

EFFECTS OF AUTONOMY-SUPPORTIVE AND CONTROLLING STYLES ON SITUATIONAL SELF-DETERMINED MOTIVATION: SOME UNEXPECTED RESULTS OF THE COMMITMENT PROCEDURE¹

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Summary.—Distinct and simultaneous effects of autonomy-supportive and controlling styles, usually considered as mutually exclusive, on situational self-determined motivation are tested. In Study 1, economics students ($N=100$; 57 men, 43 women; M age = 21.5 yr.) were randomly assigned to one of the four experimental conditions (high vs. low) of autonomy supportive and/or controlling behaviors during a task. Results supported the independence of those constructs. An unexpected effect in regards to Self-determination Theory was found in the Low autonomy – High control condition in which self-determined motivation was observed. The interpretation for this specific condition, an effect due to the attempt to reduce cognitive dissonance triggered by the commitment procedure, was tested. In Study 2, sport students ($N=80$, 44 men, 36 women; M age = 19.2 yr.) were randomly assigned to one of the three experimental conditions: No commitment, Commitment plus self-affirmation, and Commitment without self-affirmation. Results supported Study 1's interpretation: motivation was lower when participants were recruited without a commitment procedure or when they were invited to self-affirm than when participants recruited with a commitment procedure.

A large part of the literature on self-determined motivation (Deci & Ryan, 1987, 2008) has highlighted that an important social factor influencing subordinates' motivation is the interpersonal style displayed by their supervisors. This factor has been found to influence self-determined motivation in various contexts such as sport (Gillet, Vallerand, Amoura, & Baldes, 2010), education (Black & Deci, 2000), or work (Gillet, Berjot, & Paty, 2010). The more supervisors support autonomy in their relationships with their subordinates, the more they satisfy subordinates' basic psychological need for autonomy and promote their autonomous motivation (for a review, see Moreau & Mageau, 2013), i.e., *"to behave with a sense of volition,*

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willingness, and congruence; (...) to fully endorse and concur with the behavior one is engaged in" (Deci & Ryan, 2012, p. 85). An autonomy-supportive style encourages subordinates' self-regulation by allowing them to make choices, thus supporting their need for autonomy. Conversely, a controlling style promotes subordinates' controlled motivation and amotivation by thwarting subordinates' need for autonomy (Deci, Eghrari, Patrick, & Leone, 1994; Grolnick, 2003; Reeve, 2009). A controlling supervisor pressures subordinates to think, feel, or behave in specific ways. According to the Hierarchical Model of Intrinsic and Extrinsic Motivation (HMIEM; Vallerand, 1997), this social factor affects self-determined motivation at three levels of generality (global, contextual, and situational).

Researchers often consider supervisors' behavior as either autonomy-supportive (and not controlling) or as controlling (and not autonomy-supportive; Deci, Schwartz, Sheinman, & Ryan, 1981; Vansteenkiste, Sierens, Goossens, Soenens, Dochy, Mouratidis, *et al.*, 2012). They thus imply that the supervisor's behavior cannot be perceived as both autonomy-supportive and controlling (Soenens & Vansteenkiste, 2010). However, in real life, supervisors' behaviors are often far more complex and can, at times, appear to be autonomy-supportive *and* controlling because a large array of behaviors is displayed (Grolnick & Ryan, 1989; Pelletier, Fortier, Vallerand, & Brière, 2001; Tessier, Sarrazin, & Ntoumanis, 2008; Amoura, Berjot, Gillet, Caruana, & Finez, 2013). The idea that both interpersonal styles can be displayed simultaneously has been more explicitly and recently highlighted in contexts such as sport (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010), health (Ng, Ntoumanis, & Thøgersen-Ntoumani, 2014), and parenting (Silk, Morris, Kanaya, & Steinberg, 2003). However, this literature is scarcer, and has mostly used correlational designs. Moreover, most experiments were run at a contextual level (Vallerand, 1997) and often only with measures of perceptions (by the way of autonomy-support/control scales). The goal of the current study is to test more directly the hypothesis of the independence of autonomy and control by using an experimental design in which controlling and/or autonomy-supportive behaviors are directly displayed by a supervisor while students perform a task. In addition, the effects of those behaviors on the situational self-determined motivation of students will be assessed.

Interpersonal Style

When behaving in an autonomy-supportive manner, a supervisor adopts students' perspectives and feelings, gives rationales when a request is made, and supports students' choice and self-regulation (Deci, *et al.*, 1994; Reeve & Jang, 2006; Jang, Reeve, & Deci, 2010). That autonomy-supportive style has been operationalized in prior studies through

behaviors such as (a) nurturing inner motivational resources (Stefanou, Perencevich, DiCinto, & Turner, 2004), (b) providing rationales (Reeve, Jang, Hardre, & Omura, 2002), (c) relying on non-controlling and informational language (Reeve & Jang, 2006), d) displaying patience (Reeve & Jang, 2006), and (e) acknowledging and accepting expressions of negative affect (Reeve, 2009). The literature has clearly shown that those behaviors promote self-determined motivation. For instance, Moustaka, Vlachopoulos, Kabitsis, and Theodorakis (2012) have shown that participants who were involved in a fitness program in an autonomy-supportive context reported higher satisfaction of their needs for autonomy and competence, self-determined motivation, and subjective vitality, compared to a group in a non-autonomy-supportive context. Also, in an educational context, Sheldon and Filak (2008) have shown that autonomy-support, competence-support, and relatedness-support predicted students' intrinsic motivation and willingness to recommend the experience (Boggle puzzle) to another student. Finally, Reeve and Jang (2006) have shown that teachers' autonomy support, compared to controlling teachers, influenced significantly more students' perceived autonomy, interest, engagement, and performance in a puzzle task. Similar results were reported in the literature on Self Determination Theory (SDT: see also Reeve, 2009, for a review in the educational domain; Tsai, Kunter, Lüdtke, Trautwein, & Ryan, 2008).

Still, according to Reeve (2009), a controlling style consists of forcing subordinates to adopt the teacher's perspective, intruding into students' thoughts, feelings, or actions, and pressuring students to think, feel, or behave in a specific way. Controlling style is operationalized through behaviors such as relying on outer sources of motivation, neglecting rationales, relying on pressuring-inducing language, displaying impatience for students to produce the right answer, and asserting power to overcome students' complaints and expressions of negative affect. Again, the literature has shown that a controlling style promoted controlled forms of motivation (introjected and extrinsic regulations) and amotivation (Pelletier, *et al.*, 2001), because control thwarts basic psychological needs (Soenens, Vansteenkiste, Sierens, Dochy, & Goossens, 2012). The SDT literature also distinguishes externally from internally controlling techniques (Ryan, 1982; Plant & Ryan, 1985). Externally controlling techniques refer to tangible rewards (Deci, 1971), deadlines (Amabile, DeJong, & Lepper, 1976), surveillance (Lepper & Greene, 1975), controlling statements (Assor, Kaplan, Kanat-Maymon, & Roth, 2005), evaluations (Harackiewicz, Manderlink, & Sansone, 1984), or threats (Deci & Cascio, 1972), all of which have deleterious effects on self-determined motivation. Internally controlling techniques go further in thwarting people's basic psychological needs for autonomy, competence, and relatedness as they use guilt-inductions, shaming,

love withdrawal, and performance goals (Soenens & Vansteenkiste, 2010; Mageau, Ranger, Koestner, Moreau, & Forest, 2011; Moreau & Mageau, 2012). To the best of the authors' knowledge, internally controlling techniques have never been used in an experimental study, for evident ethical reasons.

If these two styles clearly refer to different behaviors, the way they are considered by researchers varies and no consensus has been reached. Indeed, supervisors' behaviors are complex.

Relations Between Autonomy-supportive and Controlling Styles

As already mentioned, autonomy support and control are the two major interactional styles and have for a long time been considered opposites and/or as mutually exclusive (Mageau & Vallerand, 2003; Silk, *et al.*, 2003; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004; Bartholomew, *et al.*, 2010; Soenens & Vansteenkiste, 2010). For instance, Mageau and Vallerand (2003) proposed a classification of autonomy-supportive behaviors in which they suggested that avoiding controlling behaviors (e.g., overt control, criticism and controlling statements, and tangible rewards) equates to autonomy support in the sense that controlling behaviors harm basic psychological needs satisfaction. Similar reasoning has been used in the context of education. Reeve, Jang, Carrell, Jeon, and Barch (2004) taught teachers to support students' autonomy and then asked independent judges to observe them during their classes. The observers had to fill a rating sheet which included bipolar items with autonomy-supportive behaviors at one end and their corresponding controlling behaviors at the other end. Their results showed that trained teachers used more autonomy-supportive behaviors while teaching compared to a control group. Then, as predicted, the more teachers displayed autonomy-supportive behaviors, the more students' engagement in class increased. This illustrates the underlying conceptualization of styles as being two ends of a single continuum.

However, this view is being challenged, as many behaviors can be displayed in real life settings by supervisors. For example, during a class teachers may at time allow choices and encourage students while at other times they may have to give specific orders, evaluate, or penalize students. So, autonomy-supportive and controlling behaviors might not be as mutually exclusive as thought if a succession of several behaviors must be considered over a period of time.

Several studies have reported low to moderate links between autonomy-supportive and controlling styles when assessed with self-reported measures. Indeed, those measures often ask participants to report on a set of behaviors displayed by a supervisor for a time period. For example, in the sport context Pelletier, *et al.* (2001) assessed the perceptions of coaches' interpersonal style as being autonomy-supportive or controlling among a

sample of swimmers. The authors observed a moderate negative link between autonomy-supportive and controlling styles ($\beta = -0.36$). Moreover, results from structural equation modeling indicated that the more the athletes perceived their coach as being autonomy-supportive, the more their motivation was self-determined and the more they persisted in the activity. The authors also found that perceptions of autonomy-supportive and controlling styles were both positively associated with introjected regulation (i.e., a form of controlled motivation), suggesting that both styles can be used simultaneously by coaches. In the parenting context, Silk, *et al.* (2003), who interviewed teenagers about their relationship with their parents, also reported a low negative correlation between autonomy-supportive and controlling style ($\beta = -0.18$) and observed that “autonomy” and “control” were two distinct behaviors with different consequences.

Another way of showing that the two styles are independent is to study the process through which they affect outcomes. For example, in a health context, Balaguer, González, Fabra, Castillo, Mercé, & Duda (2012) showed that while an autonomy-supportive style predicted athletes' subjective vitality through needs satisfaction, a controlling style predicted athletes' burnout through needs thwarting. More directly, Ng, Ntoumanis, and Thøgersen-Ntoumani (2014) showed, using structural equation modeling, that the interpersonal style of a significant other influenced autonomous and controlled motivation to exercise as well as amotivation through different cognitive mediators. Autonomy support predicted autonomous motivation through needs satisfaction, while controlling behaviors predicted controlled motivation and amotivation through needs thwarting. The authors also showed that autonomous motivation positively predicted physical activity and healthy eating, while controlled motivation negatively predicted physical activity. Finally, amotivation predicted unhealthy eating. The authors directly challenged the bipolar conceptualization and affirmed that autonomy support and control may be inversely related but not two ends of a continuum.

Finally, some studies have used a person-based approach to challenge the bipolar conceptualization. For example, using cluster analysis, Amoura, *et al.* (in press) have shown that both styles were distinctly perceived by students as the analysis yielded four distinct groups according to the level of autonomy and control students perceived in their teacher's behaviors. Moreover, self-determined motivation varied according to clusters. Students perceiving their teacher as displaying high autonomy-supportive behaviors and low control scored as more self-determined than those perceiving low autonomy-supportive behaviors and high control. The self-determination of students perceiving their teachers as displaying either high or low behavior on both measures (autonomy and control) was in-between.

In a second study, the authors further tested the independence of the two styles by studying the process through which both perceived styles affected self-determination. Results supported the hypothesis that perceived autonomy-supportive behaviors predicted positively self-determined motivation through the satisfaction of basic psychological needs; controlling behaviors predicted negatively self-determined motivation through the thwarting of basic psychological needs. Still using cluster analysis, Soenens, Vansteenkiste, and Sierens (2009) have shown in the parenting domain that the relation between autonomy support and control (as two ends of one continuum or distinct construct) depends on the way autonomy support is considered (promotion of independence or volitional functioning). Results of their study adds to the Silk, *et al.* (2003) study as far as they showed that parents may be perceived as being simultaneously autonomy-supportive (promotion of independence) and controlling. Parents with this perceived interpersonal style may encourage independence in a pressuring way.

More recent studies tend to favor the hypothesis that the two styles are independent. However, it is important to note that they mostly used correlational designs and self-report scales, i.e., perceptions of subordinates of their supervisor's behaviors, not actual behavioral measures. This distinction is important insofar as actual behaviors may be perceived and interpreted differently by individuals according to context and personal characteristics. Other researchers have studied actual behaviors more directly. For example, Tessier, *et al.* (2008) set up training for teachers in Physical Education to favor autonomy support in their vocational activity and actually filmed the teachers' behavior. Results confirmed that autonomy-supportive and controlling behaviors are distinct and not mutually exclusive and also showed that teachers' attempts to be autonomy-supportive did not necessarily diminish their controlling behaviors, which were still observed by pupils after the training.

STUDY 1

More recent studies challenge the view that autonomy and control are two ends of a single continuum. However, as already mentioned, most designs were correlational and most used global perceptions of subordinates. In the current study, the effect of actual behaviors of supervisors on students' situational self-determination will be studied by manipulating the supervisor's display of autonomy-supportive and controlling behaviors during a short period of time. Only a few experimental studies have addressed the question of the effects of autonomy-supportive and controlling styles on self-determined motivation (Koestner, Ryan, Bernieri, & Holt, 1984; Deci, *et al.*, 1994; Vansteenkiste, *et al.*, 2004). This experimental design would permit observation in a real context of effects on students' self-determined motivation. Moreover, because of the experimental de-

sign, the effects of the interpersonal style will be studied at the situational level of generality (Vallerand, 1997; Vallerand, Carbonneau, & Lafrenière, 2009). According to the Hierarchical Model of Intrinsic and Extrinsic Motivation (HMIEM; Vallerand, 1997), the effect of social factors such as interpersonal styles are the same at all levels of generality.

Based on the literature about the effect of styles on motivation (Pelletier, *et al.*, 2001; Silk, *et al.*, 2003; Soenens, *et al.*, 2009; Bartholomew, *et al.*, 2010; Ng, *et al.*, 2014) and the more rare literature on the affect of actual behaviors on motivation (Reeve, *et al.*, 2004; Tessier, *et al.*, 2008):

Hypothesis 1. Participants in the High autonomy and Low control condition will show the highest situational self-determined motivation.

Hypothesis 2. Participants in the Low autonomy and High control condition will show the lowest situational self-determined motivation.

Hypothesis 3. Participants in the High autonomy and High control condition should present moderate situational self-determined motivation because of the controlling aspects of the interpersonal style of the experimenter.

Hypothesis 4. Participants in the Low autonomy and Low control condition should also present moderate situational self-determined motivation because of the absence of autonomy support.

METHOD

Participants

The participants were 100 French third-year economy students (57 men, 43 women). The mean age was 21.5 yr. ($SD = 1.2$). Students were from four different classes (belonging to the same academic topic). Each class was assigned to a condition² ($ns = 31, 16, 30$, and 23).

Measures

Manipulation check.—Two simple and direct questions were asked to assess how students perceived the behavior of the experimenter during the study on a 7-point Likert-type scale, with anchors 1: Completely

²This way of doing permits the experimenter to display specific behaviors according to experimental conditions. As in most French universities, students are distributed in classes according to their family names. Students with a family name beginning with a A or B belong to class 1 (they fill a class up to 30 students). So, students don't have the choice of their timetable (again, this is the administration that decides which group will get the 8 o'clock class). Note that the four groups did not differ on their contextual academic motivation ($F_{3,96} = 0.62$, $p = .60$).

disagree and 7: Completely agree. One item assessed the perceived autonomy-supportive style of the experimenter ("During the experiment, I think that the experimenter gave me autonomy") and the other assessed the perceived controlling style of the experimenter ("During the experiment, I think that the experimenter exercised control over me").

Situational motivation.—Situational self-determined motivation was assessed using the French version of the Situational Intrinsic Motivation Scale (Guay, Vallerand, & Blanchard, 2000) while adapting it to the specificity of the task. This scale is composed of 16 items and measures four forms of motivation³: 4 items assessed intrinsic motivation ("Because I think that this activity is interesting"; $\alpha = .93$), 4 items assessed identified regulation ("Because I am doing it for my own good"; $\alpha = .89$), 4 items assessed external regulation ("Because I am supposed to do it"; $\alpha = .74$), and 4 items assessed amotivation ("There may be good reasons to do this activity, but personally I don't see any"; $\alpha = .77$). Items were rated on a 7-point scale with anchors 1: Corresponds not at all and 7: Corresponds exactly. A situational Relative Autonomy Index (RAI), which refers to the global self-determination level, was calculated (Grolnick & Ryan, 1987).⁴ This scale has been found reliable and valid in various contexts such as sport (Gillet, Vallerand, *et al.*, 2010), health (Labbrozzi, Robazza, Bertollo, Bucci, & Bartoli, 2013), and education (Johnson, Prusak, Pennington, & Wilkinson, 2011).

Procedure

Contextual motivation toward studies was assessed 3 mo. before, during a lecture, and no differences on the RAI and sex were observed between the four groups.⁵ Students were informed of the deontological rules underlying research in human sciences (the anonymous results, the possibility to stop the experiment at any time, and respect of the rights and welfare of participants).

All four groups were randomly assigned in one of the four experimental conditions. All students took part in the experiment the same day (a Friday). Groups followed one another, and the first three groups

³Introjected and integrated regulations, two types of extrinsic motivation, are not included in the scale. According to the authors, this is because their inclusion would result in a too long questionnaire. The SIMS is designed to be used in various life settings and needs to be a "versatile and brief measure of ongoing self-regulatory processes."

⁴The situation Relative Autonomy Index was calculated as follows: $SRAI = (\text{intrinsic motivation} \times 2) + \text{identified regulation} - \text{external regulation} - (\text{amotivation} \times 2)$. Indeed, each regulation was weighted according to its position in the self-determination continuum: +2 for intrinsic motivation, +1 for identified regulation, -1 for external regulation, and -2 for amotivation.

⁵A difference was observed on age ($F_{3,66} = 2.69, p = .05$). LSD Fisher post hoc test revealed that students of the High-autonomy - High-control condition were significantly younger than students of the High-autonomy - Low-control condition and younger than students of the Low-autonomy - Low-control condition.

were instructed not to tell other students what would happen. The experimenter (always the same) was introduced by the regular teacher at the beginning of a regular lesson in organizational psychology. To motivate students to participate and because students couldn't gain money or credits, the experimenter said to each class separately: "I need volunteers to conduct this study." Then he said, "Of course, you are free to participate or not. In this regard, if someone does not wish to participate, he/she can raise a hand now and wait outside while the experiment is conducted." All students agreed to participate in the study, which was presented as a study about how students solve logic tasks.⁶ Students were given 20 min. to solve four relatively difficult logic tasks. The first task consisted in storing tokens of different lengths on a table in which other tokens were already stored. The second task consisted in placing points on a table by avoiding having two points on the same row of the table. The third and fourth tasks consisted of completing math problems.

In this study, autonomy-supportive style was operationalized as (a) non-controlling and informational language and (b) autonomy in the organization of the experimental task (Reeve, 2009). "Controlling style" was operationalized as (a) explicitly controlling statements (Assor, *et al.*, 2005), (b) explicit surveillance behaviors (Lepper & Greene, 1975), and (c) evaluation (Harackiewicz, *et al.*, 1984). A controlling style, contrarily to an autonomy-supportive style, should produce an external locus of causality among participants (deCharms, 1968; Ryan & Connell, 1989; Vansteenkiste, Simons, Lens, Soenens, & Matos, 2005) because of the frustration of their need for autonomy. Hence, their tendency to willingly take part in the experiment should be lower.

High autonomy – Low control condition (Condition 1; $n=31$).—Participants were told: "You can get organized as you wish. There is no order in the resolution of the tasks (High autonomy-support; non-controlling language and autonomy support in the organization). Try to do the best you can, on your own, even if no control will be made during the realization; I will only be here to ensure the experiment runs smoothly but I will not be watching you" (Low control; no controlling statements, no explicit surveillance, and no evaluation).

High autonomy – High control condition (Condition 2; $n=16$).—Participants were told: "You can get organized as you wish. There is no order in the resolution of the tasks (High autonomy-support; non-controlling language and autonomy support in the organization). Note that these tasks will have to be solved under my supervision. I will come by to watch

⁶During the presentation of the social psychology class, it was announced to the students that experiments would take place in order to illustrate the course and that they were free to participate or not.

and supervise your work to see how you proceed. An observation will be made following this first series of tasks" (High control; controlling statement, explicit surveillance behavior, and evaluation).

Low autonomy – Low control condition (Condition 3; $n=30$).—Participants were told: "Solve the tasks in the order they are presented to you. Read carefully the instructions for each of them. It is better for you not to rush to solve the tasks, and instead to read the instructions several times, and to use the draft next to you. Finally, before writing down the final solution, think of the alternatives and detach yourself from your first impression. Take a break between every task (Low autonomy; use of controlling language and low autonomy in the organization). Try to do the best you can, on your own, even if no control will be made during the realization; I will only be there to ensure the good running of the experiment but I will not be watching you" (Low control; no controlling statements, no explicit surveillance, and no evaluation).⁷

Low autonomy – High control condition (Condition 4; $n=23$).—Participants were told: "Solve the tasks in the order they are presented to you. Read attentively the instructions for each of them. It is better for you not to rush to solve the tasks, but instead to read the instructions several times, and to use the draft next to you. Finally, before writing down the final solution, think of the alternatives and detach yourself from your first impression. Take a break between every task (Low autonomy; use of controlling language and low autonomy in the organization). Note that these tasks will have to be solved under my supervision. I will come to watch and supervise your work to see how you proceed. An observation will be made following this first series of tasks" (High control; controlling statement, explicit surveillance behavior, and evaluation).

While students were solving the tasks and according to the conditions they were in, the experimenter adapted his behaviors to fit the condition. In the controlling conditions, he walked down the rows of the small classroom watching over students' shoulders, took notes, and showed clearly his control over them. In the autonomy-supportive conditions, the ex-

⁷The fact is that low autonomy-support does not mean the use of controlling instructions. As Bartholomew, et al. (2010) stated, "*The absence of autonomy support might, for instance, simply be indicative of a more neutral rather than directly controlling style.*" The authors operationalized the "Low autonomy-support / Low-control" condition in order to show that coherent levels of autonomy-supportive and controlling behaviors (i.e., both scores being high or low) could lead to moderate levels of self-determined motivation. As suggested by Silk and colleagues (2003, p. 115), and as parents may do, teachers displaying little autonomy support and little control as well as those displaying high autonomy support and high control might act this way for strategic reasons. Finally, the literature (Balaguer, et al., 2012; Ng, et al., 2013) has shown that if an autonomy-supportive style, when adopted, clearly leads to self-determined motivation insofar as it satisfies basic psychological needs (autonomy, competence, and relatedness), the absence of these autonomy-supportive behaviors do not necessarily thwart psychological needs as controlling ones could do."

perimenter simply encouraged students' autonomy in their organization without any particular behavior. Participants were told that they would have 20 min. to solve the tasks.⁸ In order to have a situational measure of motivation during the task, participants were asked to stop the task after 6 min. and to fill out a questionnaire. Then students were gratefully thanked and debriefed in order to discourage them from communicating about the experiment to other students who would participate later in the day. One week after all the experiments, the experimenter fully debriefed the students about the preliminary results of the study.

RESULTS

Means, standard deviations, and correlations between all the variables are shown in Table 1. No extreme or atypical values were found. A one-way analysis of variance (ANOVA) was run to test for the effect of the experimental manipulation on the students' perceptions of autonomy-supportive and controlling behaviors of the experimenter. Results indicated that the manipulation of autonomy had a significant effect on students' perceptions of autonomy-supportive style of the experimenter ($F_{1,98} = 43.1, p < .001, \eta^2 = 0.30$); the manipulation of control had a significant effect on students' perceptions of the controlling style of the experimenter ($F_{1,98} = 21.51, p < .001, \eta^2 = 0.18$).

To assess the effect on situational motivation,⁹ a 2 (High autonomy vs Low autonomy) $\times$ 2 (High control vs Low control) ANOVA was run on the dependent variable Relative Autonomy Index. Means and standard deviations for all measures according to each of the four conditions are in Table 2. Hypothesized results showed a significant interaction between autonomy-supportive and controlling styles on the Situational Relative Autonomy Index ($F_{1,96} = 8.99, p < .004, \eta^2 = 0.09$).¹⁰ Contrarily to expectations, results showed that students' situational motivation in the Low autonomy–High control condition ($M = 3.02, SD = 1.39$) was not significantly different from students' motivation in the High autonomy–Low control condition ($M = 2.78, SD = 1.20$). However, these two experimental conditions were significantly different from the Low-autonomy–Low control condition ($M = -1.38, SD = 1.22$) and the High autonomy–High control condition ($M = -1.10, SD = 1.67$), which did not differ from each other.

⁸The time required to solve the 4 tasks was pre-tested with a population of 35 students, 3 men, 32 women ($M_{age} = 20.8 \text{ yr.}, SD = 3.0$) at 12 min.

⁹Only the significant interaction between autonomy-supportive and controlling style on the Relative Autonomy Index (RAI) are graphically presented; the RAI reflects the global level of situational self-determined motivation.

¹⁰An ANCOVA was also run with contextual motivation at time one (4 weeks before) as a covariate. The interaction was still significant ($F_{1,96} = 9.82, p < .003$).

TABLE 1
MEANS, STANDARD DEVIATIONS, AND CORRELATIONS BETWEEN THE DIFFERENT VARIABLES

Variable	M	SD	1	2	3	4	5	6
1. Perceptions of autonomy support	5.60	1.39						
2. Perceptions of psychological control	4.88	1.59	-.04					
3. Situational intrinsic motivation	4.33	1.57	.02	-.02				
4. Situational identified regulation	3.55	1.57	.07	-.09	.66†			
5. Situational external regulation	4.94	1.30	.14	-.04	-.27†	-.25†		
6. Situational amotivation	3.15	1.32	-.07	.14	-.65†	-.52†	.20*	
7. Situational Relative Autonomy Index	0.96	6.91	.03	-.08	.90†	.78†	-.45†	-.83†

* $p < .05$. † $p < .01$. ‡ $p < .001$.

DISCUSSION

The goal of Study 1 was to explore the separate and combined effects of autonomy-supportive and controlling styles on situational self-determined motivation by using an experimental design. The measures of autonomy-supportive and controlling style were negatively and non-significantly correlated ($r = -.04$, ns) suggesting that these interpersonal styles could be distinct concepts and not two ends of the same continuum. This finding is consistent with prior research reporting low negative links between autonomy-supportive and controlling styles (Pelletier, *et al.*, 2001; Silk, *et al.*, 2003; Tessier, *et al.*, 2008; Blanchard, Amiot, Perreault, Vallerand,

TABLE 2
MEANS AND STANDARD DEVIATIONS FOR ALL MEASURES BY AUTONOMY AND CONTROL

Variable	High Autonomy				Low Autonomy			
	High Control		Low Control		High Control		Low Control	
	M	SD	M	SD	M	SD	M	SD
Situational intrinsic motivation	3.73	0.39	4.68	0.28	4.57	0.32	4.10	0.28
Situational identified regulation	2.90	0.38	4.01	0.27	3.93	0.31	3.12	0.27
Situational external motivation	4.79	0.31	5.13	0.22	4.32	0.26	5.29	0.23
Situational amotivation	3.34	0.32	2.73	0.22	2.86	0.26	3.70	0.23
Situational Relative Autonomy Index	-1.10	1.67	2.78	1.20	3.02	1.39	-1.38	1.22

& Provencher, 2009; Bartholomew, *et al.*, 2010; Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011).

Consistent with the hypotheses, the results indicated that the High autonomy–Low control condition led to self-determined situational motivation (Hypothesis 1 validated). The lowest situational self-determined motivation was observed in the Low autonomy–Low control condition and in the High autonomy–High control conditions (Hypotheses 2 and 4 validated). However, surprisingly, the Low autonomy–High control condition led to the highest situational self-determined motivation (Hypothesis 3 not validated). This is all the more surprising given that this condition was not supposed to lead to self-determined motivation as much as would the High autonomy–Low control condition, the literature being quite clear and coherent about the effects of control on self-determined motivation (Deci & Ryan, 2000; Ryan & Deci, 2000, 2002). One explanation might be that participants' perceptions differed from the behaviors displayed by the experimenter. However, the manipulation check showed that participants in the Low autonomy–High control condition perceived the experimenter as more controlling than those in the High autonomy–Low control condition. The explanation based on a distortion of perceptions is then improbable. Another explanation might come from the specific situation that might have distorted participants' interpretation of the situation. As already mentioned, French participants are free to accept or not to participate in experiments, and are very rarely rewarded directly (i.e., money) or indirectly (i.e., credits). So, a strong commitment procedure requiring public acceptance and an explicit declaration of freedom was used to recruit as many participants as possible. An explanation for the still-high motivation observed in a controlling situation might be due to an attempt to reduce the dissonance between participants' declaration of freedom and the control of the situation in which they engage themselves (Festinger, 1957; Beauvois & Joule, 1999). This interpretation is challenging and innovative. No studies, to the best of the authors' knowledge, have reported such incoherent results. The implications for further experiments in this domain of interpersonal styles might be quite important. Therefore, it was decided to test this interpretation in a subsequent study.

STUDY 2

In order to test for this interpretation, Study 2 specifically focused on this condition (i.e., Low autonomy–High control). To ensure it, a replication of this condition was designed and two other conditions favoring a reduction of the dissonance were added, one without a commitment procedure and another reducing the threat implied by the dissonance by the way of a self-affirmation intervention. If participants recruited with a commitment procedure reported more self-determined motivation than

participants assigned to the same situation without a commitment procedure, the high level of self-determined motivation reported by participants in the Low autonomy–High control condition could be due to the commitment procedure.

As mentioned, another way to address this question is to keep the commitment procedure to recruit students, but to try to alleviate participants' need to diminish the cognitive dissonance that may result from the inconsistency between their choice to participate freely in the experiment and the controlling behavior of the experimenter. To do so, a self-affirmation procedure was chosen (Steele, 1988; Sherman & Cohen, 2006). Past work has demonstrated that self-affirmation interventions reduce the threat to self-integrity triggered by cognitive dissonance and thus reduce participants' need to change their behaviors or attitudes to restore their self-integrity (for a review, see Sherman & Cohen, 2006). Self-affirmation theory is an alternative explanation for cognitive dissonance phenomena (Steele & Liu, 1983; Steele, 1988). It posits that affirming valued sources of self-worth such as important personal qualities, values, or relationships can reduce threats to the self. Because cognitive dissonance may generate a threat to the self, self-affirmation can alleviate this threat and render the change of attitude unnecessary (Sherman, 2013). Consistent with this idea, Steele (1988) demonstrated that participants who were self-affirmed had fewer attitude changes in situations experimentally created to generate cognitive dissonance compared to participants of a control condition who did not have a chance to self-affirm.

To summarize, if the higher reported situational self-determined motivation found in Study 1 was due to students' attempts to restore cognitive consonance:

Hypothesis 1. Lower situational self-determined motivation should be observed in a Low autonomy–High control situation without a commitment procedure.

Hypothesis 2. Lower situational motivation should be observed in Low autonomy–High control situation in which a commitment procedure is combined with a chance to self-affirm, compared to a situation with a commitment procedure and no chance to self-affirm.

METHOD

Participants

Participants were 80 French first-year sport students (44 men, 36 women). The mean age was 19.2 yr. ($SD = 1.0$). They were not familiar with the experimenter, who was the same as in Study 1. Contextual motivation

toward studies was assessed two weeks before during a physiology lecture. No differences on the RAI, age, or sex were found between the three groups.¹¹ The experiment took place during a regular lesson of physiology and the experimenter acted exactly in the same way as he did in Study 1. The study had been announced by the regular teacher two weeks earlier. Here again, students were informed of the deontological rules underlying research in human sciences. Then three experimental conditions were assigned (No commitment, Commitment plus self-affirmation, Commitment without self-affirmation) in which students were from three different classes ($ns=27, 28$, and 25). In each of these three conditions, participants received the same Low autonomy–High control instructions than those provided to group 3 of Study 1.

Measures

Manipulation check.—The same materials as in Study 1 were used again to assess students' perceptions of the experimenters' behavior (as being autonomy-supportive or controlling; 7-point scale).

Situational motivation.—Self-determined motivation was assessed with the same scale that was used in Study 1. Internal consistency for each subscale was satisfactory: intrinsic motivation ($\alpha=.92$), identified regulation ($\alpha=.83$), external regulation ($\alpha=.76$), and amotivation ($\alpha=.77$). As in Study 1, a Situational Relative Autonomy Index (SRAI), which refers to the global self-determination level, was calculated (Grolnick & Ryan, 1987).

Procedure

In the No commitment condition, the experimenter was introduced by the regular teacher as doing an experiment on the way students solve logic tasks. The teacher specified also that, as for any other experiment, students had the choice not to participate by leaving the room.¹² After this introduction, the teacher left the classroom. The experimenter introduced himself and directly asked students to do the experimental tasks (which were the same as in Study 1), but without a declaration of freedom. Following the completion of the logical task, after 6 min., the experimenter asked participants to fill out the motivation questionnaire.

In the Commitment plus self-affirmation condition, students were recruited with a commitment procedure (the same as in Study 1) but had a chance to self-affirm before completing the experimental task. To self-affirm, participants were asked to rank a list of 11 values from the most im-

¹¹As in Study 1, in this university students were distributed in classes according to their family names.

¹²As in psychology, first year students often participate in experiments. They are made conscious of their options. Moreover, as psychology students, they were all aware of ethical and deontological issues of research.

portant to the least important in their life. Then they were invited to write during 12 min. an essay on the value they ranked in first position. In this essay, students were asked to explain to what extent this value was important to them. The self-affirmation procedure was based on the materials used in previous experiments (e.g., Cohen, Garcia, Apfel, & Master, 2006; Finez & Sherman, 2012; see Sherman & Cohen, 2006, for a methodological review). After that, the experimenter gave them the experimental task but stopped them after 6 min. to ask them to fill out the motivation questionnaire.

In the Commitment without self-affirmation condition, students were recruited with a commitment procedure (the same as used in Study 1). This time, participants were asked to rank a list of 11 values from the most important to the least important in their life. Then students were invited to write during 12 min. an essay on the value they had ranked in the eleventh position. This is a standard no-affirmation control condition that has been used in previous studies, in which participants write and reflect on a value not relevant to them. As a result, a difference observed between this control condition and a self-affirmation condition could be attributed to the self-affirmation intervention (writing about an important value or domain). In the present study, this condition served as a control condition for both the self-affirmation condition and the without-commitment condition because it amounts to doing nothing.

Again, after each experiment students were gratefully thanked and debriefed to discourage communication about the experiment with other students who would participate later. One week after all the interventions, the experimenter fully debriefed the students about the preliminary results of the study.

RESULTS

Means, standard deviations, and correlations between all the variables are displayed in Table 3. Again, no extreme or atypical values were found. Results indicated that the manipulation of the experimenter's controlling behavior was effective. The ANOVA included experimental conditions as the independent variables and autonomy-supportive vs controlling perceptions as the repeated dependent variable, and indicated a higher perception of controlling behavior ($M=5.62$, $SD=1.67$) than of autonomy-supportive behavior ($M=4.79$, $SD=1.90$) in every experimental condition ($F_{2,76}=8.86$, $p<.01$, $\eta^2=0.10$). No significant interaction was observed ($F_{2,76}=0.75$, ns), indicating equivalent deviations between autonomy-supportive and controlling scores in each of the experimental conditions. As in Study 1, perceptions of autonomy-supportive and controlling style were not significantly correlated ($r=.12$, ns).

TABLE 3
MEANS, STANDARD DEVIATIONS, AND CORRELATIONS BETWEEN THE DIFFERENT VARIABLES

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Perceptions of autonomy support	4.86	1.93						
2. Perceptions of psychological control	5.68	1.63	.13					
3. Situational intrinsic motivation	3.18	1.67	.02	-.14				
4. Situational identified regulation	2.89	1.50	.00	-.12	.78‡			
5. Situational external regulation	3.98	1.54	-.01	.16	-.04	-.06		
6. Situational amotivation	3.87	1.60	-.18	.12	-.60‡	-.50‡	.20	
7. Situational Relative Autonomy Index	-2.47	7.39	.09	-.18	.88‡	.78‡	-.33‡	-.85‡

* $p < .05$. † $p < .01$. ‡ $p < .001$.

A one-way ANOVA was run on the dependent variable, the Situational Relative Autonomy Index. The ANOVA was followed by two contrasts. The first focused on the effect of the commitment procedure (No Commitment vs Commitment without self-affirmation). The second focused on the effect of self-affirmation (Commitment plus self-affirmation vs Commitment without self-affirmation). Motivation means and standard deviations according to commitment (vs no commitment) and self-affirmation (vs no self-affirmation) are displayed in Table 4.

The one-way ANOVAs indicated significant effects of experimental conditions on the Situational Relative Autonomy Index ($F_{2,76} = 13.56$,

TABLE 4
MEANS AND STANDARD DEVIATIONS FOR ALL MEASURES ACCORDING TO EXPERIMENTAL CONDITION

Variable	No Commitment		Commitment			
			No Self-affirmation		Self-affirmation	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Situational intrinsic motivation	2.36	1.06	4.18	1.57	2.85	1.58
Situational identified regulation	1.87	0.75	3.84	1.52	2.96	1.27
Situational external motivation	4.66	1.51	3.76	0.92	3.49	1.67
Situational amotivation	4.41	1.41	3.21	1.46	4.12	1.60
Situational Relative Autonomy Index	-6.90	4.21	2.03	6.92	-3.07	6.93

$p < .001$, $\eta^2 = 0.26$).¹³ Thus, the planned comparisons were performed. Results on SRAI supported this study's hypotheses. Participants in the No commitment condition ($M = -6.90$, $SD = 4.21$) indicated less self-determined motivation than those in the Commitment-without self-affirmation condition ($M = 2.03$, $SD = 6.92$, $t = 4.65$, $p < .001$, $d = 3.78$). The second contrast indicated that participants in the Commitment plus self-affirmation condition reported marginally lower self-determined motivation scores ($M = -3.07$, $SD = 6.93$, $t = 1.66$, $p = .10$, $d = 2.63$) than those in the Commitment without self-affirmation condition ($M = 2.03$, $SD = 6.92$).

DISCUSSION

The purpose of Study 2 was to test an original explanation of Study 1's results, which showed that students' situational self-determined motivation toward a task increased when they were recruited with a commitment procedure (Joule & Beauvois, 1998), in spite of the highly controlling interpersonal style of the experimenter. This study's interpretation of this effect was that this self-determined motivation could be a reaction to the cognitive dissonance (Festinger, 1957; Beauvois & Joule, 1999) induced by the declaration of freedom followed by the realization of a task under control. When participants were presented with a situation not expected to produce a state of dissonance (Hypothesis 1), or when they were given the possibility to reduce it through a self-affirmation procedure (Hypothesis 2), self-determined motivation decreased (Hypotheses 1 and 2 validated). These findings open a potential field of study linking self-determined motivation, self-affirmation, and commitment procedures.

The findings support the general interpretative hypothesis underlying this study, which assumes that the high self-determined motivation under a controlling behavior of the experimenter observed in Study 1 may be due to the free consent procedure used to recruit participants.

GENERAL DISCUSSION

The main goal of the present research was to assess the separate and conjunct effects of autonomy-supportive and controlling behaviors on self-determined motivation at a situational level of generality. In line with previous research (Pelletier, *et al.*, 2001; Silk, *et al.*, 2003; Tessier, *et al.*, 2008; Blanchard, *et al.*, 2009; Bartholomew, *et al.*, 2010; Bartholomew, Ntoumanis, Ryan, Bosch, *et al.*, 2011), the two studies supported the idea that autonomy-supportive and controlling behaviors should be considered independently, since they have distinct effects on self-determined motivation. If the majority of previous research was based on participants' perceptions

¹³As in Study 2, an ANCOVA was run with contextual motivation assessed at time 1 (four weeks before) as a covariate. The effect of condition was still significant ($F_{2,76} = 9.78$, $p < .001$).

of the supervisors' behaviors (assessed with self-report scales), the present research was based on actual behaviors. Despite the inconsistent result observed in the highly controlling situation, which can be explained by the commitment procedure, the results replicate previous studies. So, it seems that the distinct effects of styles on self-determined motivation is the same if behaviors are considered instead of perceptions of behaviors. However, this does not rule out an eventual distortion in the interpretation made from the behaviors under specific circumstances such as a commitment procedure. This idea suggests that an interpretative process occurred anyway among participants. Externally controlling behaviors such as those used in both studies might then not be intrinsically controlling. More studies have to be run to explore the interpretative process that might happen between an actual behavior and its perception/interpretation.

Limitations

These studies add to the literature arguing the independence of autonomy and control. However, it is important to note that in both studies the post-experimental checks of the perception of interpersonal styles were based on single items. This could explain why the negative correlation between autonomy-supportive and controlling style observed in Study 1 was weak. Indeed, those single questions imply that participants form a global impression of the experimenter's behaviors, and it is not known exactly how this impression was formed and which behavior was most salient for participants. More studies with strongest measures of interpersonal styles at the situational level could be very interesting.

Also, the participants were third-year economy students in Study 1 and first-year sport students in Study 2. Although some differences exist (age and major), the effects of autonomy-supportive and/or controlling behaviors on self-determined motivation were robust, whatever the social context considered (e.g., sport, education, parenting, or health). Autonomy-support leads to self-determined motivation, as contrasted with control. Whatever the major studied (economy or sport), or the age of college students (first or third academic year), the effects of the experimenter's behaviors on students' situational self-determined motivation remained the same. The Relative Autonomy Index (RAI) was chosen to assess self-determined motivation. The RAI is a global indicator of the self-determined motivation, which is useful for reducing the numbers of dependent variables and is regularly used by researchers (Soenens, Sierens, Vansteenkiste, Dochy, & Goossens, 2012; Amoura, Berjot, & Gillet, 2013; Kusurkar, Ten Cate, Vos, Westers, & Croiset, 2013). But the RAI does not allow identification of the combination and parts of each form of motivational regulation (Ratelle, Guay, Vallerand, Larose, & Senécal, 2007).

Further Study

Behavioral indicators of situational self-determined motivation would be interesting. Future research could replicate this experimental design with a random assignment of participants, instead of a random assignment of groups, in the different experimental conditions. Study 2 still observed the conjunct effect of both interpersonal styles but focused on only one experimental condition of Study 1 (Low autonomy–High control condition). Also, the effects of the commitment procedure and self-affirmation were not investigated for the three other experimental conditions (i.e., High autonomy–Low control; Low autonomy–Low control; High autonomy–High control). However, in Study 1, these three other conditions did not create dissonance either because of the low control (Low autonomy–Low control condition) or because of the concomitant presence of high autonomy-supportive behaviors (High autonomy–High control condition).

The studies did not allow assessment of how the situational motivation observed may evolve over time and its effects on contextual motivation. This could be interesting to test for the existence of a “bottom-up effect” (Vallerand, 1997) showing that the situational self-determined motivation (in a specific situation) induced by the experimental conditions affects contextual self-determined motivation (in the studies in general). Finally, needs satisfaction and needs thwarting were not assessed, which could provide other answers. Indeed, if autonomy-support and control are conceptually distinct, then they might be expected to affect motivation via a distinct process (Balaguer, *et al.*, 2012; Ng, *et al.*, 2013). Autonomy-support has been found to affect self-determined motivation through needs satisfaction (Baard, Deci, & Ryan, 2004; Vallerand, 2007), and psychological control has been found to affect psychological adjustment variables (Bartholomew, Ntoumanis, Ryan, Bosch, *et al.*, 2011; Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011) or self-determined motivation (Amoura, *et al.*, in press; Ng, *et al.*, 2014) negatively through needs thwarting.

Implications

Beyond theoretical aspects, some practical implications can be inferred. Teachers, who often have to watch over students to evaluate their performance and to deter misconduct (Borich, 1988), prefer controlling behaviors rather than autonomy-supportive ones (Boggiano, Barrett, Weiher, McClelland, & Lusk, 1987; Barrett & Boggiano, 1988), and are often more controlling than autonomy-supportive (Newby, 1991). Previous research has shown that external pressures (high-stakes testing policies) may partially explain teachers' controlling behaviors (Deci, Spiegel, Ryan, Koestner, & Kauffman, 1982; Ryan & La Guardia, 1999; Pelletier,

Seguin-Levesque, & Legault, 2002). Teachers are regularly taught that an autonomy-supportive style is a better way to adopt to improve students' self-determined motivation. Current results suggest that explicit control, surveillance, evaluation, and injunctions to behave in a specific way, which could be considered as soft psychological control (compared to internally controlling techniques), can lead to situational self-determined motivation only under certain specific circumstances—here, when people are placed in a cognitive dissonance state induced by a commitment procedure. But the literature broadly shows that when students feel controlled, their self-determined motivation decreases. Through these results and from SDT, it is quite clear that autonomy support promotes self-regulating learning, self-determined motivation, and well-being. Rather than control, teachers may use “structure” (Connell & Wellborn, 1991; Jang, *et al.*, 2010). Structure is necessary to self-determined motivation and should not be confused with a controlling style (Vansteenkiste, *et al.*, 2012). According to Reeve (2006), structure consists in (a) presenting clear goals, rules, and expectations before engaging in an activity; (b) to offer help, guidance and supervision, which implies surveillance; and (c) giving positive feedback. Indeed, contrary to a controlling style, structure does not thwart basic psychological needs for autonomy, competence, and relatedness (Vansteenkiste, *et al.*, 2012). In fact, while structure affects students' behaviors, psychological control affects cognitions through manipulation. When structure is provided in an autonomy-supportive manner, self-determined motivation is fostered. So, if teaching implies giving rules, indications, and surveillance, this is not problematic if monitoring is explicitly clarified as being for students' progress, and not as social control (Plant & Ryan, 1985; Enzle & Anderson, 1993). Controlling behaviors such as intimidation, verbal abuse, guilt, shame, physical punishment, or pressure, really do not support self-determined motivation, even among people recruited with a commitment procedure.

From the researchers' point of view, a controlling style does not lead to self-determined motivation, but they draw attention to the fact that the conditions under which situational self-determined motivation measures are performed requires caution.

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Young Adult and Parent Perceptions of Facilitation: Associations with Overparenting, Family Functioning, and Student Adjustment

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ABSTRACT

Overparenting occurs when parents engage in developmentally inappropriate involvement in their children's lives. This topic is salient in the context of young adults attending college, as this developmental stage necessitates independent decision-making and adjustment on the part of these students. At the same time, the turbulence involved in this transition might engender parental interference and facilitation that could impact young adults' adjustment and perceived family functioning. This study used structural equation modeling to examine overparenting, perceived interference, facilitation, student adjustment, and family functioning in 302 parent–young adult dyads. Results indicated that overparenting was associated with facilitation, but not interference. Whereas this association was negative for young adults, it was positive for parents. This pattern was also reflected in the indirect effects of overparenting on student adjustment through young adults' versus parents' perceived facilitation. Young adults appear to have better outcomes when they perceive their parents to be facilitating their goals.

Overparenting, also known as helicopter parenting (LeMoyne & Buchanan, 2011), is marked by parents' developmentally inappropriate overinvolvement in their children's lives. Because overparenting exceeds children's needs, these behaviors can inhibit children's autonomy (Schiffrin et al., 2014), coping (Segrin, Woszidlo, Givertz, & Montgomery, 2013), learning (Schiffrin & Liss, 2017), competence (Schiffrin et al., 2014), and self-efficacy (Bradley-Geist & Olson-Buchanan, 2014; Givertz & Segrin, 2014; Reed, Duncan, Lucier-Greer, Fixelle, & Ferraro, 2016). Research demonstrates that individual characteristics, such as self-efficacy and depression, act as conduits through which problematic communication behaviors associated with overparenting are transmitted (Darlow, Norvilitis, & Schuetze, 2017); however, less is known about the relational process through which overparenting impacts young adults' outcomes.

By its very nature, overparenting is accompanied by parental uncertainty and concern over possible hazards the child might experience (Segrin, Givertz, Swiatkowski, & Montgomery, 2015), both of which might be invigorated during relational transitions, including the transition to college. According to the relational turbulence literature, relational transitions often coincide with perceived interference and facilitation (i.e., the disruption or promotion of one's goals by a significant other; Knobloch & Solomon, 2004). Although interference and facilitation have traditionally been examined during the shift toward greater interdependence in close relationships (Knobloch & Donovan-Kicken, 2006; Knobloch & Solomon, 2004), these constructs may also be relevant as young adults negotiate greater autonomy from their parents during the transition to college. Accordingly, in this study, we aim to understand whether overparenting is associated with

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interference and facilitation, as well as whether these variables are associated with student adjustment and family functioning, both of which are critical elements of young adults' well-being during college (Credé & Niehorster, 2012).

Overparenting

Overparenting is reflected in a variety of communication behaviors. Some of the most common features of overparenting include anticipatory problem-solving, advice and affect management, tangible assistance, and inhibition of child self-direction (Segrin, Woszidlo, Givertz, Bauer, & Murphy, 2012). Although children are the targets of overparenting, in some cases, these behaviors might not be evident to children. For instance, anticipatory problem-solving reflects parents' tendency to anticipate and solve problems before they come to fruition for their children. This practice cannot be accurately measured from the child's perspective as they are likely unaware of their parents' involvement. This may be one reason why Schiffrin and Liss (2017) found that parent and child reports of helicopter parenting were uncorrelated on approximately half of the individual items in their measure, especially those that reflected elements of overparenting about which the child may be unaware (e.g., parent calling professor, monitoring friends).

Further, the discrepancy between parents' behaviors and young adults' perceptions of these behaviors is illustrated by Segrin et al. (2013), who identified a significant association between young adults' self-reported narcissism and parent – but not young adult – reports of overparenting. In other words, it appears that the manifestation of narcissism in young adults is better predicted by parents' reports of the full range of their overparenting behaviors rather than their children's limited awareness of these behaviors. As a result, measuring parents' reports of their overparenting behaviors should provide a more comprehensive picture of overparenting within the family environment (Segrin et al., 2012).

To further understand overparenting in the family environment, it is valuable to highlight associations between overparenting and salient interpersonal and family constructs. For instance, previous research suggests that overparenting is associated with parents' and young adults' perceived quality of family communication (Segrin et al., 2012), parents' anxiety and children's distancing (Segrin et al., 2013), children's depression and anxiety (Reed et al., 2016; Rousseau & Scharf, 2015), children's life satisfaction (Schiffrin et al., 2014), and children's perceptions of anxious parenting and emotional criticism (Segrin et al., 2015). It is not surprising that young adults experience these undesirable outcomes, as overparenting is also associated with authoritarian parenting behaviors and family communication patterns reflecting conformity (Odenweller, Booth-Butterfield, & Weber, 2014), both of which inhibit coping and adjustment. Given that most young adults seek greater independence during the transition to college (Johnson, Gans, Kerr, & LaValle, 2010), they might resent parental overreach, especially if they consider their parents to be interfering with – rather than facilitating – their goals. Accordingly, this study examines parents' and young adults' perceived interference and facilitation in association with parents' reported overparenting.

Facilitation and interference

The transition to college, and out of the home in which one was raised, can be challenging (Ruberman, 2014) and demanding, as young adults must adjust to new social and academic environments and expectations. This developmental period requires increased independence and self-regulation on the part of young adults (Bryde & Milburn, 1990), as many of them are learning to manage tasks for which their parents were previously responsible (e.g., grocery shopping, laundry, finances, etc.). It is no surprise that this period involves changes in family relationships and dynamics (Arnett, 2000; Johnson et al., 2010), particularly in terms of the renegotiation that occurs in parent–child relationships (Azmitia, Syed, & Radmacher, 2013).

Whereas some young adults might invite their parents' continued participation in or management of routine aspects of their lives, others might find this involvement to be unwelcome. Similar perceptions have been described in the relational turbulence literature, which suggests that relational transitions create opportunities for significant others to impede (interference) or enable (facilitation) each other's daily goals (Knobloch & Solomon, 2004). Although much of the research on interference and facilitation in close relationships coincides with turbulence involved in relationship development, relational turbulence is evident in other family contexts, including empty nest transitions (Nagy & Theiss, 2013), infertility (Steuber & Solomon, 2008), and military families' reintegration (Theiss & Knobloch, 2013). As such, it is plausible that relational turbulence – and by extension, interference and facilitation – occurs during transitions in parent–child relationships as well.

Much of the existing research on interference and facilitation in parent–child relationships concerns parents' involvement in their children's academic experience. Healthy parental involvement is reflected by parents' participation in their children's educational experience (Jeynes, 2007) that is aimed at facilitating their children's goals. In this case, parental involvement is positively associated with children's academic achievement (Fan & Chen, 2001; Gonida & Cortina, 2014; Jeynes, 2007). On the other hand, parents' involvement is characterized as interference when their participation complicates or obstructs their children's goals (Cooper, Lindsay, & Nye, 2000). Accordingly, parents' interference with their children's homework is inversely associated with children's academic self-efficacy beliefs (Gonida & Cortina, 2014) and achievement (Cooper et al., 2000). Taken together, these studies suggest that facilitation and interference are relevant in the parent–child context. Given that the current study focuses on young adults' communication with their parents, interference and facilitation will be examined in conjunction with other salient outcomes of overparenting, including adjustment and family functioning.

Adjustment and family functioning

Student adjustment is conceptualized as managing the novel and competing demands associated with the college experience (Baker & Syrk, 2015). When parents interfere with young adults' ability to manage and cope with the transition to college, it may infringe upon their children's independence (e.g., Cooper et al., 2000; Gonida & Cortina, 2014) and impede their adjustment. Indeed, overparenting is associated with increased anxiety and stress (Segrin et al., 2013), as well as lower school engagement (Padilla-Walker & Nelson, 2012), academic performance (Schiffrin & Liss, 2017), academic self-efficacy (Gonida & Cortina, 2014), and academic and social adjustment (Darlow et al., 2017) among college students.

Beyond the effects upon academic adjustment, if young adults feel resentful toward their parents' overinvolvement, overparenting may influence “the overall health/pathology of the family” (Epstein, Baldwin, & Bishop, 1983, p. 173). For instance, overparenting is positively associated with a critical family environment (Segrin et al., 2015), the child's greater financial dependence on the family (Lindell, Campione-Barr, & Killoren, 2017), lower levels of parental autonomy granting (Padilla-Walker & Nelson, 2012), and less functional family communication and lower family satisfaction (Givertz & Segrin, 2014). Findings such as these suggest that overparenting may often be enacted in family contexts that are otherwise less than optimal. Therefore, we examine the association between overparenting and more general family functioning, in addition to more specific student adjustment outcomes, to potentially illuminate problems in the family system that may covary with overparenting.

The current study

In order to better understand the relational processes associated with the transition to college, the current study aims to extend the literature by examining the relationships between overparenting and perceptions of parents' facilitation and interference of their young adult children's goals. It is

valuable to examine facilitation and interference from the parents' and young adults' perspectives because what might seem like parental interference from the children's perspective might not seem like interference from the parents' perspective. Based on the literature, we expect that overparenting will be significantly related to interference (H1a) and facilitation (H1b).

In addition, given that overparenting is consistently and negatively associated with young adults' academic outcomes (Gonida & Cortina, 2014; Padilla-Walker & Nelson, 2012; Schiffrin & Liss, 2017), and parental interference is negatively associated with young adults' academic achievement (Cooper et al., 2000), we expect that there will be an indirect effect of overparenting on student adjustment to college through interference and facilitation (H2).

Although less is known about the relationship between parental facilitation and interference and family functioning, findings from the relational turbulence literature provide some foundation for this association. For instance, previous research suggests a positive association between interference and turmoil (Knobloch, 2007) and negative emotion (Knobloch, 2008) in romantic relationships. As such, it is plausible to assume that acts of interference should be deleterious to family functioning, whereas acts of facilitation should be generally beneficial to harmonious family functioning. Given the associations between overparenting and adverse outcomes in parent–young adult relationships (e.g., Kouros, Pruitt, Ekas, Kiriaki, & Sunderland, 2017; Segrin et al., 2013), as well as the aforementioned association between interference and relationship turmoil (Knobloch, 2007), we expect that there will be an indirect effect of overparenting on family functioning through interference and facilitation (H3).

Method

Participants

Participants in this investigation were 302 parent–adult child dyads. The parent sample was 82% female, and 76.2% White (3.6% were African American, 1.7% were American Indian, 3.3% were Asian/Pacific Islander, 10.6% were Hispanic, 4% were other, and 0.7% had missing data). Most parents reported being married previously or currently (96.4%), 31.5% of which reported ever being divorced. The majority of parents reported earning a bachelor's degree (37.7%), and 20.9% earned a GED/high school degree, 11.9% earned an associate's degree, 23.2% earned a graduate/professional degree, 5% had no degree, and 1.3% had missing data. 45 % of parents reported that this was the first of their children to attend college.

The young adult sample was 75% female and 72.5% White (4% were African American, 1.7% were American Indian, 5% were Asian/Pacific Islander, 13.6% were Hispanic, and 3.3% were other). Most young adult children reported that their parents were previously or currently married (93%), and 26.2% reported that their parents had ever been divorced. The young adults primarily reported living in an apartment or house (67.5%), and 15.2% reported living in a dorm, 8.6% reported living with a parent, 6% reported living in a Greek house, and 2.6% reported having an alternate living arrangement. In terms of frequency of communication with parents or stepparents, 27.8% of young adults reported communicating with them several times per day, 21.9% reported communicating with them once per day, 27.5% reported communicating with them several times per week, 15.2% reported communicating with them about once per week, 5% reported communicating with them several times per month, 2.3% reported communicating with them about once per month, and 0.3% reported communicating with them less than once per month.

Measures

Overparenting

Parents' overparenting behaviors were measured with four subscales from the overparenting scale (Segrin et al., 2015, 2012). Parents completed the 12-item anticipatory problem solving subscale (e.g., "I try to anticipate things that will prevent my child from reaching his/her goals and act to eliminate

them before they become a problem”), the 8-item advice and affect management subscale (e.g., “If I see that my child is feeling badly I try to cheer him/her up”), the 7-item tangible assistance subscale (e.g., “I see to it that my child’s financial needs are taken care of”), and the 6-item risk aversion subscale (e.g., “I do what I can to protect my child from risky situations”). Response options for all items ranged from 1 = *strongly disagree* to 5 = *strongly agree*. See Table 1 for means, standard deviations, and Cronbach’s alpha reliabilities.

Interference and facilitation

Interference and facilitation were measured using Knobloch and Solomon’s (2003) seven-item interference and 5-item facilitation measures, both of which were adapted from the original measure to reflect parent–child interactions rather than interactions with romantic partners. Young adults considered the interactions they had with their parent since coming to college, and responded to items including, “my parent interferes with the plans I make,” (interference) and “my parent supports my daily motion” (facilitation). In evaluating their child’s perceived parental interference and facilitation, parents considered the interactions they had with their child since s/he came to college, and responded to items including, “my child thinks that I interfere with the plans he/she makes,” (interference) and “my child thinks I support his/her daily motion” (facilitation). Young adults and parents responded to the 7 interference items and 5 facilitation items on a scale where 1 = *strongly disagree* and 5 = *strongly agree*.

Student adjustment

Young adults’ adjustment was measured with the Student Adaptation to College Questionnaire (Baker & Syrk, 1999). Items from three dimensions (academic adjustment, social adjustment, and attachment) were included in the current study. This scale was selected for inclusion in the current study because it assesses students’ adjustment to college in a variety of domains rather than focusing solely on their academic performance as an indicator of their adjustment. Academic adjustment includes items related to students’ motivation to learn, reports of their academic performance, and perceptions of their learning environment. This subscale was measured with 13 items such as “I am attending classes regularly” and “I really haven’t had much motivation for studying lately.” The social adjustment subscale includes items related to students’ relationships with peers, teachers, and mentors on campus as well as relationships with students’ social networks back home. The social adjustment subscale was measured with 14 items including “I have been feeling lonely at college a lot lately” and “I am quite satisfied with my social life at college.” Finally, attachment is conceptualized as the students’ “commitment to educational-institutional goals and degree of attachment to the particular institution the student is attending” (Baker & Syrk, 2015, p. 15). The attachment subscale was measured with 4 items including “I am pleased now about my decision to go to college” and “On

Table 1. Means, standard deviations, and Cronbach’s alpha reliabilities among major study variables.

	Mean (SD)	Cronbach’s alpha reliability
Anticipated Problem Solving (p)	3.16 (.81)	.90
Advice and Affect Management (p)	4.24 (.60)	.88
Tangible Assistance (p)	3.62 (.75)	.79
Risk Aversion (p)	3.65 (.70)	.77
Interference (s)	1.57 (.80)	.93
Facilitation (s)	3.61 (1.05)	.90
Interference (p)	1.72 (.80)	.92
Facilitation (p)	3.16 (.81)	.85
Family Functioning (s)	4.00 (.74)	.89
Academic Adjustment (s)	3.44 (.65)	.83
Social Adjustment (s)	3.82 (.76)	.90
Attachment (s)	4.52 (.72)	.73

Note: The response options for all variables ranged from 1 to 5.

p = parent report, s = student report.

balance, I would rather be home than here.” Negatively worded items were reverse scored. Young adults responded on a scale from 1 = *doesn't apply to me at all* to 5 = *applies very closely to me*. Higher scores on the student adjustment measures signify better adjustment.

Family functioning

Young adults' perceived family functioning was measured with the general functioning scale of the Family Assessment Device (FAD; Miller, Epstein, Bishop, & Keitner, 1985). In this subscale of the FAD, participants reported on their perceptions of their family's climate in relation to how open they are in expressing their feelings, how easy or difficult decision-making interactions are, and how cohesive and accepting they are as a family. This scale was selected for inclusion in the current study as it provides a holistic assessment of young adults' perceptions of the family climate. Young adults responded to this 12-item measure regarding the functioning of their family of origin on a scale where 1 = *strongly disagree* to 5 = *strongly agree*. Sample items included, “we can express feelings to each other,” and “we don't get along well together.” Negatively worded items were reverse scored; thus, higher scores represented better family functioning.

Procedure

Following Institutional Review Board (IRB) approval, young adult–parent dyads were recruited through announcements made in communication courses at two large southwestern universities. Interested participants were instructed to send an email to a research address expressing their interest in the study. The third author responded with an email containing a link to an online questionnaire and an assigned code number. At the end of the online questionnaire, young adults were instructed to enter their code number and an email address for the parent with whom they had the closest relationship. The young adults were instructed to get permission from their parent before providing their contact information. Some young adults indicated that their parents were not willing to participate (see discussion below), but most secured permission, and provided the parent contact information. The third author recorded parent email addresses, assigned them code numbers matching their children, and emailed these parent participants a link to an online questionnaire and their unique code number.

To further validate these matches, both young adults and parents were asked to complete an item on their respective questionnaires asking for the first three letters of the child's last name and the first three letters of the parent's last name. Initial responses were provided by 306 parents and 375 young adults. However, four parent participants were deleted because their information could not be matched to a young adult participant, and 73 young adult participants were deleted because of incomplete or missing parent questionnaires, resulting in a final sample of 302 young adult–parent dyads. This represents 81% of the initial responses.

Results

Preliminary analyses

Prior to testing the research questions and hypotheses, a series of preliminary analyses were conducted to test for differences in main study variables as a function of demographic variables. First, the young adult variables (i.e., facilitation, interference, academic adjustment, social adjustment, attachment, and family functioning) and parent variables (i.e., anticipatory problem solving, advice and affect management, tangible assistance, risk aversion, facilitation, and interference) were tested for sex differences. Among the young adults, men scored significantly higher than women on interference, $t(297) = 2.16, p < .05, \eta^2 = .015$ and lower than women on attachment, $t(297) = 2.97, p < .01, \eta^2 = .029$. All other comparisons were nonsignificant. Among parents, women scored higher

than men on advice and affect management, t (297) 2.28, $p < .05$, $\eta^2 = .017$. All other comparisons were nonsignificant.

Tests of ethnic group differences on the young adult variables revealed a significant effect only for social adjustment, F (5,298) = 2.52, $p < .05$, $\eta^2 = .041$. There were five ethnic groups with more than one degree of freedom and post-hoc pairwise differences among these five groups were tested with the Tukey HSD test. White young adults reported higher social adjustment than Hispanic young adults. The remaining nine post-hoc comparisons were not statistically significant. Tests of ethnic group differences on the remaining five young adult variables were not significant. For parents, tests of ethnic group differences revealed a statistically significant effect for interference, F (5,298) = 4.18, $p < .05$, $\eta^2 = .067$. Asian parents ($N = 9$) scored significantly higher than White, Black, or Hispanic parents. The remaining seven post-hoc comparisons were nonsignificant. There were also significant ethnic group differences for anticipatory problem solving, F (5,298) = 5.35, $p < .01$, $\eta^2 = .084$. Tukey post-hoc comparisons showed that Hispanic parents ($N = 32$) scored significantly higher than White parents. The remaining nine post-hoc comparisons were nonsignificant. Tests for ethnic group differences on the remaining four parent variables were nonsignificant.

Finally, young adults were asked if their parents had divorced and 28% responded affirmatively. Young adults whose parents had divorced were compared to those whose parents had never divorced on the six major study variables for young adults. There were no significant differences between the two groups on any of these variables (all t values < 1.44 , ns). Also, young adult respondents were asked if their parents had ever been married and 7% responded negatively. The same type of comparison over the six major study variables revealed no significant differences aside from family functioning, where those young adults whose parents had married reported higher family functioning ($M = 4.03$) compared to those whose parents had not married ($M = 3.67$), t (297) = 2.12, $p < .05$. A similar set of tests on all of the parent-reported variables revealed no significant differences as a function of parental divorce (all t values < 0.98 , ns) or parental marriage (all t values < 1.33 , ns).

Collectively, the vast majority of tests for differences as a function of sex, ethnic group, parental divorce, or parental marriage yielded nonsignificant effects. The few significant differences in young adult or parent variables as a function of these demographic variables were weak in magnitude. Therefore, these variables were not considered for further analysis.

Measurement analyses

A correlation matrix including all major study variables appears in Table 2. The research questions and hypotheses were tested with structural equation modeling in AMOS 20.0 using maximum likelihood estimation. As a prelude to testing the structural models, two measurement models were assessed for their fit to the sample data. The first included the four indicators of parent-reported overparenting (risk aversion, tangible assistance, advice and affect management, and

Table 2. Correlations among major study variables.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Antic. Prob. Solve (p)	–											
2. Advice Aff. Mgmt. (p)	.49*	–										
3. Tang. Assist. (p)	.47*	.44*	–									
4. Risk Aversion (p)	.58*	.54*	.49*	–								
5. Interference (s)	.05	.05	.04	.11	–							
6. Facilitation (s)	–.07	–.11	–.09	–.10	–.23*	–						
7. Interference (p)	.19*	–.18*	–.09	.00	–.03	.06	–					
8. Facilitation (p)	.30*	.24*	.17	.21*	.01	.04	.07	–				
9. Family function (s)	–.01	.04	–.06	–.03	–.42*	.44*	.00	.05	–			
10. Academic Adjust. (s)	–.09	–.01	–.07	–.03	–.21*	.19*	.01	.07	.34*	–		
11. Social Adjust. (s)	–.03	.02	–.01	.00	–.30*	.22*	–.06	.13*	.34*	.34*	–	
12. Attachment (s)	.01	–.01	–.02	–.06	–.31*	.29*	.03	.05	.40*	.35*	.39*	–

Note. (s) = student report, (p) = parent report. * $p < .05$.

anticipatory problem-solving), young adult- and parent-reported interference observed variables, and young adult- and parent-reported facilitation observed variables. In addition, three indicators of student adjustment were included: academic adjustment, social adjustment, and personal-emotional adjustment, to make up a latent variable. All possible pairwise correlations between the latent overparenting variable, the latent student adjustment variable, and the four remaining interference and facilitation variables were specified. This model was used to test H1a, H1b, and H2, and is associated with the structural model that appears in Figure 1. Results indicated this measurement model provided a good fit to the sample data, $\chi^2 = 87.18$, $df = 39$, $p < .001$, $\chi^2/df = 2.34$, CFI = .92, RMSEA = .06 (90% CI = .05–.08).

The second measurement model was comparable to the first. It included the four indicators of overparenting, the two observed interference variables, the two observed facilitation variables, and the young adult-reported family functioning variable. Again, all possible pairwise correlations between the latent overparenting variables and all remaining observed variables were specified. Although the initial model had a reasonable fit, modification indices suggested that it could be improved substantially by specifying a correlation between the error term for the anticipatory problem solving variable and the parent-reported interference variables. Because both of these variables were generated by parent reports and share a strong conceptual association, this specification was deemed

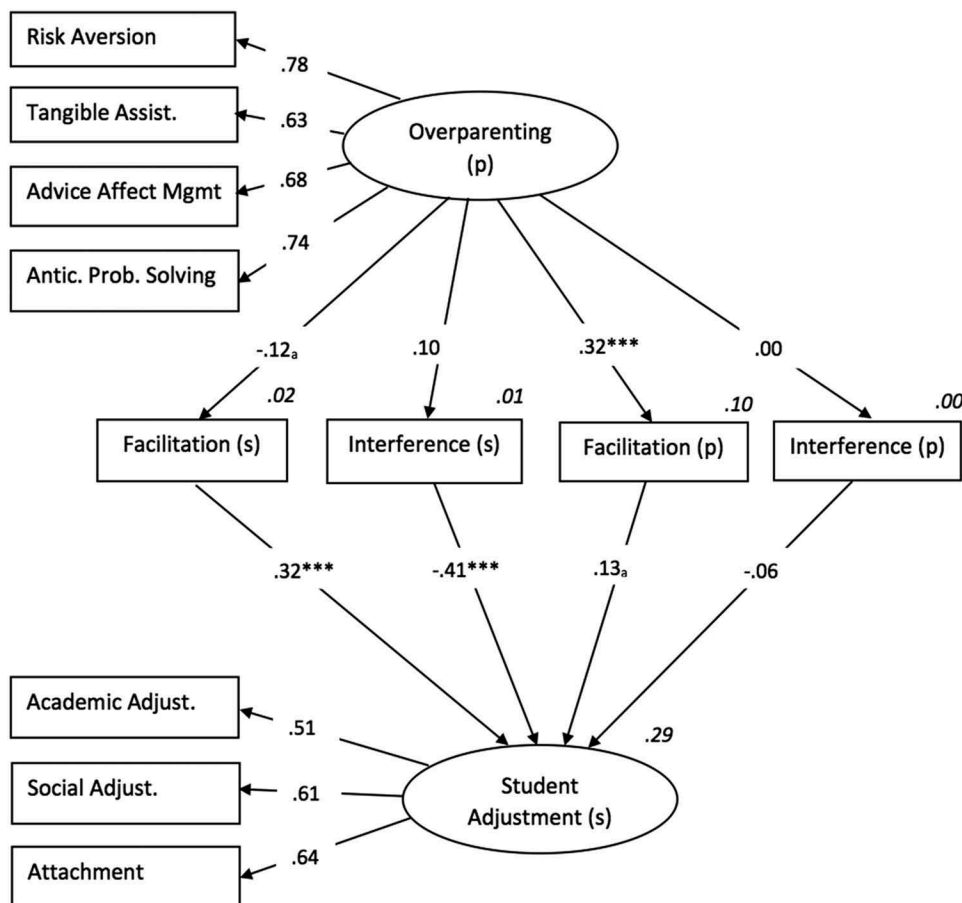


Figure 1. Overparenting, parental facilitation and interference, and student adjustment structural model. Figure values in normal font are standardized regression coefficients. Values in italics are squared multiple correlations. Error terms have been omitted for ease of presentation. (p) = parent report. (s) = student report. * $p < .05$, *** $p < .001$. ^a $p = .05$.

appropriate. With that specification added, the resultant model provided an excellent fit to the sample data, $\chi^2 = 41.74$, $df = 22$, $p < .01$, $\chi^2/df = 1.90$, CFI = .96, RMSEA = .06 (90% CI = .03–.08). This model was used to test H1a, H1b, and H3, and is associated with the structural model that appears in Figure 2.

The test of H1a, H1b, and H2 was conducted with the structural model that appears in Figure 1. A bias-corrected bootstrapping procedure based on 2000 bootstrap samples was used to estimate 95% confidence intervals around the indirect effects using AMOS 20. Estimands were used to specify each of the four unique indirect effects that appear in the model. The results indicated that this model provided a good fit to the sample data, $\chi^2 = 87.74$, $df = 40$, $p < .001$, $\chi^2/df = 2.19$, CFI = .92, RMSEA = .06 (90% CI = .05–.08).

Overparenting was not significantly associated with interference, as reported by young adults or parents (H1a). However, overparenting was marginally associated with young adult ($\beta = -.12$, $p = .05$) and significantly associated with parent-reported ($\beta = .32$, $p < .001$) facilitation (H1b). It should be noted that the direction of the association between overparenting (as reported by parents) and facilitation differed as a function of who was reporting on the facilitation. Moreover, significant associations emerged between student adjustment and young adult-reported facilitation ($\beta = .32$, $p < .001$) and interference ($\beta = -.41$, $p < .001$). Although, parent-reported facilitation and student adjustment were marginally related ($\beta = .13$, $p = .05$), parent-reported interference and student adjustment were not significantly related. Hypotheses 1a and 1b asked whether overparenting was associated with interference and facilitation. These results indicated that there is no association between overparenting and interference. However,

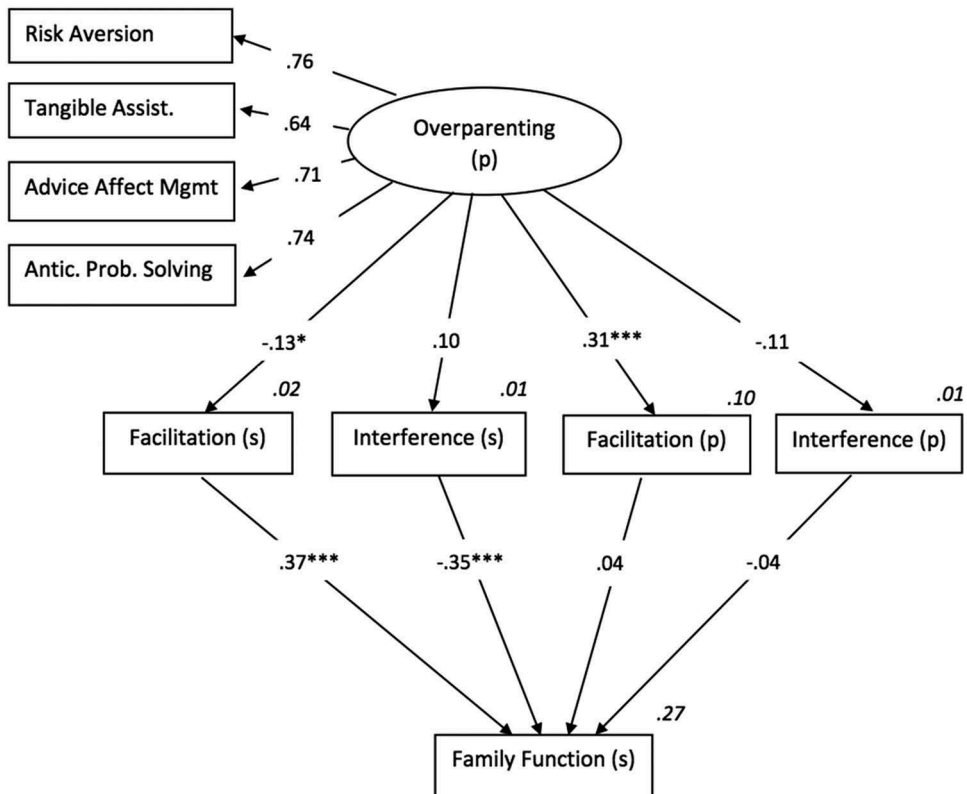


Figure 2. Overparenting, parental facilitation and interference, and family functioning structural model. Figure values in normal font are standardized regression coefficients. Values in italics are squared multiple correlations. Error terms have been omitted for ease of presentation. (p) = parent report. (s) = student report. $*p < .05$, $***p < .001$.

overparenting appears to be associated with facilitation, albeit in different directions as a function of whether young adult or parent reports of facilitation are considered. Although there was a marginal relationship between parent-reported facilitation and student adjustment, a parallel relationship did not emerge for parent-reported interference.

Pursuant to evaluating H2, the four indirect effects in [Figure 1](#) were tested for statistical significance. There was a significant indirect effect of overparenting on student adjustment through young adult-reported ($B = -.02$, 95% CI = $-.06$ to $-.00$) and parent-reported ($B = .02$, 95% CI = $.00$ – $.05$) facilitation. This partially confirms H2, but again, the direction of the indirect effects was different for young adult- versus parent-reported facilitation. The results indicated that lower levels of overparenting are associated with higher young adult reports of parental facilitation, which are in turn positively associated with student adjustment. It is also the case that higher levels of overparenting are associated with higher parental reports of facilitation, which are in turn positively associated with student adjustment. The indirect effects through young adult-reported ($B = -.02$) and parent-reported ($B = .00$) interference were both statistically nonsignificant. These results therefore provide partial support for H2 in that there were significant indirect effects on student adjustment through facilitation, but not through interference.

The test of H1a, H1b, and H3 was conducted with the structural model that appears in [Figure 2](#). This model was tested with the exact same procedures as the structural model for student adjustment, except in this case, the dependent variable was family functioning. The results indicated that this model provided an excellent fit to the sample data, $\chi^2 = 43.82$, $df = 23$, $p < .01$, $\chi^2/df = 1.91$, CFI = .96, RMSEA = .06 (90% CI = $.03$ – $.08$).

Again, overparenting was not significantly associated with interference, as reported by young adults or parents (H1a), but it was significantly associated with both young adult-reported ($\beta = -.13$, $p < .05$) and parent-reported ($\beta = .31$, $p < .001$) facilitation (H1b). There were also significant associations between young adult-reported parental facilitation ($\beta = .37$, $p < .001$) and interference ($\beta = -.35$, $p < .001$) and young adult-reported family functioning. However, the corresponding associations between parents' reports of interference and facilitation and their child's report of family functioning were both nonsignificant. Again, the association between facilitation and interference and family functioning were evident when young adult, but not parent, reports of facilitation and interference were considered.

There are four indirect effects in [Figure 2](#). The indirect effects from overparenting to family functioning, through young adult-reported interference ($B = -.04$), parent-reported interference ($B = .01$), and parent-reported facilitation ($B = .02$) were all nonsignificant. However, there was a statistically significant indirect effect of overparenting on young adult-reported family functioning through young adult-reported facilitation ($B = -.06$, 95% CI = $-.12$ to $-.00$). The effect can be best understood as follows: lower levels of overparenting are associated with higher young adult-reported facilitation from parents, which in turn is associated with higher young adult reports of family functioning. This indirect effect thus provides partial support for H3, which predicted an indirect effect of overparenting on family functioning through interference and facilitation. Specifically, this indirect effect is only evident through young adult-reported facilitation, but not parent-reported facilitation, or interference from either parents or young adults.

Discussion

This study was designed to test concurrent associations between overparenting and young adult college students' adjustment and appraisal of their family's functioning. These associations were predicted to occur through parental facilitation and interference. The results indicated that overparenting was associated with parental facilitation, but not with parental interference. This relationship differed between young adult- and parent-reported facilitation. Whereas overparenting was negatively associated with facilitation according to young adults, it was positively associated with facilitation according to parents. Overparenting had similarly contradictory indirect effects on young

adults' appraisals of their adjustment. The indirect effect was negative when considering young adults' reports of facilitation but positive when considering parents' reports of facilitation. Overparenting also had an indirect effect on young adults' family functioning through their perceived parental facilitation.

Attending college necessitates adjustment on the part of the student; however, it is often the case that parents experience change during this developmental shift as well (Aquilino, 2006). In line with relational turbulence theory, which suggests that facilitation and interference coincide with shifts toward interdependence in close relationships (Knobloch & Solomon, 2004), the results from this study indicate that these relational processes may also occur alongside shifts toward greater independence, such as during the transition to college. Specifically, our results revealed inverse relationships between overparenting and facilitation for young adults and parents. In other words, as parents reported engaging in greater overparenting behaviors, they perceived themselves to be more helpful in terms of facilitating their children's daily goals, but their children perceived their parents to be less helpful in terms of facilitating their daily goals.

These relationships are further clarified in Table 2, which reveals that there is essentially no correlation between young adult and parent reports of parental facilitation ($r = -.03$, *ns*) and interference ($r = .04$, *ns*). Indeed, it appears that young adults and parents differ in their evaluations of these concepts, as young adults' reports of parental interference and facilitation are negatively correlated ($r = -.23$, $p < .05$), but parents' reports of parental interference and facilitation are not correlated ($r = .07$, *ns*). In other words, young adults perceive lower interference with greater facilitation, but the relationship between these variables appears to be mixed for parents. These results illustrate the importance of multiple informant designs when studying family communication processes and are consistent with others in the literature showing low parent-child interrater agreement in perceptions of family processes (Pelegrina, García-Linares, & Casanova, 2003).

Where we had common assessments from both young adults and parents (e.g., facilitation and interference), it was generally the young adult-reported, but not the parent-reported, independent variables that predicted the young adults' outcomes. Differential associations as a function of different informants paint a more complete picture of what may, or may not, be happening in families. If young adult and parent reports of young adult outcomes were equally predictive, that would reduce the value added by a second family informant. Notwithstanding some of the aforementioned limitations associated with assessing parenting practices from the perspective of children, the results from assessments of facilitation and interference suggest that there may also be value inherent in assessing young adults' perceptions of their parents' parenting practices.

Although overparenting was related to young adult and parent reports of parental facilitation, it was not related to young adult or parent reports of interference. Again, the nonsignificant correlation between facilitation and interference for parents suggests that parents are mixed with regard to their evaluation of their overparenting behaviors. Some parents might believe it is their duty to be highly involved in their children's lives while other parents might recognize the problematic nature of this behavior. Young adults might also have ambivalent feelings regarding their parents' overparenting and interference. Alternatively, given that overparenting was examined from the parents' perspective, and that interference was examined from the young adults' perspective, it is also likely that their inconsistent perspectives (e.g., Segrin et al., 2015) contributed to the nonsignificant results.

Despite the limited association between interference and overparenting, young adult-reported parental interference was negatively related to their appraisal of family functioning and student adjustment. In contrast, young adult-reported parental facilitation was positively related to their reports of family functioning and adjustment. In line with the existing research on relational turbulence (Knobloch, 2007, 2008) and facilitation and interference in families, it seems that interference is associated with adverse outcomes (Gonida & Cortina, 2014), but that parental facilitation is associated with positive outcomes for young adults (Norvilitis & MacLean, 2010). Together, these results extend the overparenting and relational turbulence literature by demonstrating that facilitation and interference are salient relational processes when it comes to transitions in

parent–child relationships. Still, it is important to note that these relationships primarily emerged for young adult reports of interference and facilitation, again demonstrating that family members differ with regard to their perspective on these variables.

Whereas parents' reports of interference and facilitation were not directly associated with young adults' outcomes, a significant indirect effect of parent-reported overparenting on student adjustment through parent-reported facilitation emerged. This indirect effect illustrates a pattern wherein overparenting was associated with higher parent-reported facilitation, which was then associated with higher student adjustment. This finding likely highlights some of the positive elements of overparenting that translate to facilitation, such as guidance, emotional support (Padilla-Walker & Nelson, 2012), and involvement (Fan & Chen, 2001). In other words, despite their engagement in overparenting behaviors, these parents might also realize the value of helping their children develop self-management skills, which then aids in their adjustment.

Overparenting was also indirectly associated with family functioning and student adjustment through young adult-reported parental facilitation. These indirect effects demonstrated that higher overparenting was associated with lower young adult-reported facilitation, which was then associated with lower student adjustment and family functioning. These results are consistent with previous research indicating that overparenting is associated with adverse outcomes for children. Although overparenting might be well-intentioned, these behaviors involve overreaching rather than teaching, reflected by enmeshment (Segrin et al., 2013) or a critical family environment (Segrin et al., 2015), which can result in adverse psychosocial, relational, and academic outcomes for children (Schiffrin & Liss, 2017; Segrin et al., 2015, 2013). In this study, students report better adjustment and family functioning to the extent that they perceive their parents to be more helpful when it comes to facilitating their goals. In line with relationship turbulence research, this finding illustrates the important role that facilitation plays when it comes to relationship transitions.

By highlighting parental facilitation and interference as potential mechanisms through which overparenting is expressed, this study both expands upon the previous overparenting research and highlights consequential variables in the development of theories of overparenting. Parents inclined toward overparenting generally believe that they are facilitating the achievement of their children's goals. At the same time, they do not recognize that these behaviors could potentially be antagonistic to their children's goals. This contradiction highlights what may be a family-system level problem in which parents could be pushing their children toward achievements in which the children are not interested. Consequently, such parental efforts are more likely to be seen by the child as non-facilitative, reflecting a misalignment of the child's goals and the parent's goals for the child. As such, it is no surprise that interference, and lacking facilitation, may be detrimental to relationship quality (Knobloch, 2007, 2008), or in the case of this study, family functioning and adjustment. The mixed findings for the overparenting indirect effects in this study might also explain some of the inconsistent findings in the overparenting literature (e.g., Padilla-Walker & Nelson, 2012; Schiffrin & Liss, 2017). In general, parents see this type of parent–child communication as helpful, but children do not always see things the same way.

One of the more obvious practical implications to emerge from these findings is that parents and their emerging adult children may benefit from discussing their different perceptions of parents' enactment of overparenting and facilitation. These conversations may help in minimizing the perceptual discrepancy between parents and their young adult children. A best practice might involve parents explicitly articulating to the young adult child why they are enacting various parenting practices and perhaps explicitly verifying with the child that this is indeed what s/he prefers or desires.

Limitations and future directions

This study contributes to the literature on overparenting, but with some limitations that should be addressed. First, this study was cross-sectional; therefore, it is not possible to determine the causal direction of the associations examined. It would also be valuable to understand overparenting, as well as

outcomes like family functioning and student adjustment from both young adults' and parents' perspectives in order to gain a more complete understanding of how these variables are associated within the family system. Similarly, parents are not the only family members involved in this developmental transition; elucidating the role of other family members (e.g., siblings) in this process would also be instructive. For example, if parents are focused on a child who still lives at home, they might be less concerned about their child in college. In contrast, if this is the first of their children to attend college, parents might be exceedingly worried about their child's adjustment or struggling to negotiate changes in control and accessibility. Inaccurate self-reflection and social desirability could also limit the accuracy with which family members reported overparenting, facilitation, or interference as well.

Although many samples fall short of being fully representative of a larger population, this sample was particularly homogeneous. Most of the participants were female (82% of parents and 75% of young adults) and white (75% of parents and 72% of young adults), and 23% of the parents held a graduate/professional degree, which exceeds the national average. It is possible that the results from this study do not translate to families with different cultural and educational backgrounds; therefore, future research should consider whether these patterns occur in more diverse populations (see, for example, Kwon, Yoo, & De, 2017; Scharf, Rousseau, & Bsoul, 2017). At the same time, because overparenting is most prevalent in white middle-upper class households (Nelson, 2010), this sample may still be appropriate for testing the predicted processes associated with overparenting. Finally, nearly 50% of the young adults reported communicating with their parents at least once per day. This intensive level of parent-child communication is also characteristic of the family communication in which overparenting is most prevalent (Kelly, Duran, & Miller-Ott, 2017), but it would be valuable to examine these variables in a sample of parents and young adults who are more varied in their backgrounds and level of communication.

Conclusion

This study examined overparenting in the context of the developmental transition involving a child attending college. Two relational transition processes, interference and facilitation, were examined in conjunction with overparenting, students' adjustment and family functioning. Overparenting was associated with facilitation, but not interference. However, while young adults reported lower facilitation with greater overparenting, parents reported greater facilitation with greater overparenting, illustrating that when examining overparenting, incorporating different perspectives is an essential part of understanding family communication. Facilitation also appeared to function as a mechanism through which overparenting is expressed, as overparenting was indirectly related to student adjustment through parental facilitation. Taken together, it appears that young adults' adjustment and perceptions of family functioning are better to the extent that they perceive their parents to be engaging in helpful communication behaviors, at least some of which may be animated or foiled by the tendency to engage in overparenting.

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Research article

Effect of Autonomy Support on Self-Determined Motivation in Elementary Physical Education

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Abstract

Using the quasi-experimental design, this study examined the effect of autonomy support on self-determined motivation in elementary school physical education (PE) students. One hundred and twenty six participants were assigned to either the autonomy support group (n = 61) or the control group (n = 65) for a six-week intervention period. Perceived teacher autonomy, perceived autonomy in PE, and self-determined motivation in PE were pre- and post-tested using validated questionnaires. Significant increases in perceived teacher autonomy and perceived autonomy in PE were observed in the autonomy support group, but not in the control group. Intrinsic motivation was higher in the autonomy support group than that in the control group. From an experimental perspective, these findings suggest that the autonomy support was successfully manipulated in the PE classes, which in turn increased the students' perceived autonomy and intrinsic motivation.

Key words: Intrinsic motivation, perceived autonomy, self-determination theory.

Introduction

Physical activity (PA) shows a decline trend in youth as they grow older (Nader et al., 2008; Troiano et al., 2008). School physical education (PE) functions as a viable channel to promote youth PA either directly (Bassett et al., 2013; Pate et al., 2011) or indirectly (e.g., by fostering students competence and motivation; Chen and Ennis, 2009). Psychological research has shown that students that are motivated often display stronger effort, intention, and persistence in behavior than students who are less motivated or unmotivated (Bryan and Solmon, 2007; Pintrich, 2003). In PE, creating a motivational learning environment is important to facilitate engagement and learning (Braithwaite et al., 2011; Todorovich and Curtner-Smith, 2002; 2003). PE teachers play a vital role in creating educational environments that support students' needs and enhance their motivation (Ntoumanis, 2005; Shen et al., 2009).

The self-determined theory (SDT) is one of the mature motivation theories applied in exercise and sport sciences, including PE pedagogy. According to the SDT, in an educational setting in particular, a learner's level of motivation is positioned on the continuum polarized by intrinsic motivation (i.e., undertaking an activity for its own sake) and amotivation (i.e., lack of any motivation) (Deci and Ryan, 1985; Ntoumanis, 2001). Along the con-

tinuum, from the more self-determined to the less self-determined, are four levels of extrinsic motivation: integrated regulation, identified regulation, introjected regulation, and external regulation (Deci and Ryan, 1985). With integrated regulation, a learner is motivated by reckoning the significance of a behavior. For example, a student recognizing the health benefits of PA believes regular exercising is a part of daily life and then take actions in behavior. For identified regulation, a learner's motivation is often derived from the sense of identity in engaging in the behavior. For example, when PA is viewed as a behavior that defines the self as a person, the student's exercise intention, effort, and persistence become proactive. For introjected regulation, motivation tends to be characterized by a sense of guilt or jeopardy (e.g., feeling guilty for not committing time to exercise as planned). Using the same example as above, a learner with introjected regulation may feel the urge not to disappoint people (including themselves) and then discipline to participate in PAs. For external regulation, a learner's motivation relies on the extent to which he/she may obtain a reward or avoid a punishment as consequence of the behavior. Examples of external regulation in PE include receiving praise/criticism from the teacher for displaying active participation in PA both in and outside of PE classes.

A person is believed to have three innate psychological needs, namely, the needs to perceive competence (feeling competent and capable), autonomy (having choice and control), and relatedness (feeling affiliated with others in the context) (Deci and Ryan, 1985). The extent to which these three needs are supported and satisfied largely dictates the level of self-determined motivation, with greater needs satisfaction being associated with higher level of motivation; vice versa (Deci and Ryan, 1985). In the context of PE pedagogy, researchers have explored the relationships between providing needs support to students and how that impacts self-determined motivation as well as subsequent motivation outcomes (i.e., need support → need → satisfaction → motivation → motivation outcomes; Deci and Ryan, 1985; Ntoumanis, 2001; Sun and Chen, 2010). Cross-sectional evidence indicates that supporting learners' needs for perceiving competence, autonomy, and relatedness in PE classes predicts autonomous motivation, which in turn predicts participation in leisure-time PA (Hagger et al., 2005; Ntoumanis, 2005; Shen et al., 2009). More self-determined students with higher levels of motivation tend to exert higher effort (Cox et al., 2011; Taylor et al.,

2010) and experience greater intention (Lim and Wang, 2009; Taylor et al., 2010), enjoyment (Cox et al., 2013; McDavid et al., 2014), PA levels (Cox et al., 2013; Taylor et al., 2010), active game participation (Wallhead et al., 2013), and enhanced cardiorespiratory fitness (Shen et al., 2009). Despite the importance to satisfy all three innate psychological needs (Shen et al., 2009; 2012), the extant literature shows that providing strong support for autonomy stands out as the most salient factor for eliciting self-determined motivation and motivational responses (Hagger et al., 2005; Lonsdale et al., 2013; Shen et al., 2009).

The most relevant application of the SDT in PE pedagogy probably lies in the fact that the teacher can motivate students to engage and learn during class by providing needs support. Intervention studies aimed at increasing students' self-determined motivation in PE are well-documented in the research literature. Of the three needs support, it is obvious that most studies have attempted to provide autonomy support in PE classes in the attempt to stimulate students' motivation. For example, Prusak et al. (2004) examined the effects of choices in PE on the motivation of seventh- and eighth-grade female students. The choices studied included allowing students to choose learning activities and partner(s) during a ten-day intervention. Forty-two intact classes were assigned to the choice group or the no-choice group. The study found that the choice group reported higher intrinsic motivation and identified regulation but lower external regulation and amotivation than the control group (Prusak et al., 2004). Similarly, Tessier et al. (2010) instructed teachers to change their teaching styles to facilitate 9th - 11th grade students' (mean age = 16.56 years old) motivation in sport-based PE classes, which led to increased need satisfaction, self-determined motivation, and in-class engagement. To further examine the effect of needs support on behavioral outcomes, Lonsdale et al. (2013) intentionally manipulated PE classes by assigning classes into one of the four conditions: (a) explaining relevance, (b) providing choice, (c) providing a completely free choice, or (d) control. The interventions significantly enhanced eighth grade students' perceived autonomy in both of the choice-based groups; the "free choice" intervention increased PA, and the choice-based interventions decreased sedentary behavior (Lonsdale et al., 2013). Likewise, Chatzisarantis and Hagger (2009) successfully trained teachers to adopt and implement the autonomy supportive instruction during PE classes. This intervention led to stronger intentions to exercise and higher leisure-time PA levels among high school students (mean age = 14.84) compared to the control group.

As shown above, most of the research studies that have adopted the SDT as theoretical lens have employed the cross-sectional, observational research design; while more intervention studies using experimental designs are few and needed. Furthermore, successful SDT-guided interventions in PE were mostly conducted by making instructional changes such as providing autonomy support to students during class. Nevertheless, these interventions focused on older adolescents enrolled in secondary school PE as the research population, and these studies were

exclusively conducted in the western societies (e.g., Australia, the Europe, U.S.A., etc.). It remains unclear whether SDT-guided interventions featuring autonomy support manipulation in younger students from non-western societies will lead to a motivational learning context that enhances students' motivation. Thus, the purpose of this study was to evaluate the effect of a carefully manipulated PE course on elementary-school students' motivation. It was hypothesized that students enrolled in SDT-guided PE classes (i.e., the autonomy support group) would perceive higher autonomy support and display higher self-determined motivation than students in the control group.

Methods

Participants

The sample consisted of 126 students (Male, $n = 65$; Female, $n = 61$) in a district of New Taipei City, Taiwan. These participants originated from four classes that were randomly selected from 12 classes (6th grade level) offered at a local elementary school. Prior to data collection, we obtained permission from the principal and head teachers of the school to conduct the study. In addition, all of the participants' parents or guardian provided consent forms approved by the Institutional Review Board of National Taiwan Sport University before participating in the study. The participants were assigned to the autonomy support group (two classes, $n = 61$) or the control group (two classes, $n = 65$). Table 1 presents the summary of the demographic data of the two groups.

Table 1. Participant demographic data between control and autonomy physical education groups. Data are means ($\pm$ SD).

Variables	Control Group	Autonomy support Group
N	65	61
Female	30	31
Age (yr)	13.7 (.5)	13.7 (.5)
Body mass index ($\text{kg}\cdot\text{m}^{-2}$)	20.6 (4.1)	20.6 (4.4)
PA experiences		
Sport team (yes %)	10.8%	4.9%
Sport club (yes %)	10.8%	8.2%
PA status (yes %)	47.7%	54.1%
Partners (%)		
along	10.8%	9.8%
family member	21.5%	31.1%
classmate/friend	41.5%	26.2%
no specific	26.2%	32.8%
Parent's PA status (yes %)	30.8%	34.4%

PA experiences = physical activity experiences; Sport team = whether participating sport team; Sport club = whether participating sport club; PA status = whether participating in PA regularly through moderate-intensity exercise, three times per week, for 20 minutes each time; Partners = partners for PA. Parent's PA status = parent's PA status.

Experimental Procedures

The experimental procedures of the present study included pre-test, intervention, and post-test stages. During the first stages, the participants were asked to complete the demographic information and PA history questionnaires a week before the intervention. The questionnaires involved questions associated with PA experiences based upon students' involvement during the previous month, includ-

ing: a) whether they have participated in a sports team (Y/N); b) whether they have participated in a sports club (Y/N); c) whether they have participated in regular PA by exercising with moderate intensity, three times a week, for 20 minutes each time (Y/N); d) whether they have partners during their PA participation (e.g., alone, family, classmate); and e) whether their parents are physically active (Y/N). These questions were used to examine and control for potential confounders for motivation in PE lessons. Participants were then instructed to complete three additional main questionnaires that assessed perceived teacher autonomy, perceived autonomy in PE, and self-determined motivation in PE. These questionnaires were read to the participants and questions were answered in a timely manner.

In the intervention stage, participants were assigned to the autonomy support group or the control group. The PE classes at the participating school were offered 40-minute long classes twice per week for six weeks. It included six activities as the primary instructional content (i.e., running, jumping, Chinese yo-yo, vaulting boxes, badminton, and basketball). Each activity was taught twice per week.

Perceived autonomy was manipulated at two levels: a) sequence of the PE content, and b) selection of the sub-content. In the autonomy supportive groups, participants were permitted to discuss the sequence of the PE content for the next six weeks, and decisions were made by consensus. In addition, each lesson was segmented into four sections, in which at least two sections were designed for sub-group practices. For example, the running lesson includes an introduction to running, straight running, curve running, and relay practice; whereas the other three sections engage in group-based practice/training with groups of four to six students. Participants in the autonomy supportive group could choose their partners. The participants in the control group received identical overall PE content and skill instructions; however, the sequence of content for the six weeks of the study was teacher-determined. In addition, students' group partners were arbitrarily assigned by the PE teacher for each lesson. The teacher did not allow requests from the participants to change partners. All four PE classes were taught by a certified PE teacher who had more than 12 years of teaching experiences.

The third stage was similar to the first stage for post-experiment assessment. Participants completed the same questionnaires as baseline in the final week of the PE classes. The same researcher administered the post-experiment data collection.

Instrumentation

Perceived teacher autonomy: Students' perceived autonomy offered by their PE teacher was measured by a short questionnaire with six questions. These questions were designed using a seven-point Likert scale with choices ranging from 1 = strongly disagree to 7 = strongly agree. For example, one question is phrased as I think my PE teacher listens to our opinions in class. The short questionnaire was adapted from Standage et al. (Standage et al. 2006). The construct's Cronbach's alpha was 0.76.

Perceived autonomy in PE: Students' perceived autonomy in PE was measured by a short questionnaire with five questions. These questions also used a seven-point Likert scale with choices ranging from 1 = strongly disagree to 7 = strongly agree. For example, one question is phrased as I could choose what content to learn in PE. The short questionnaire was adapted from Standage et al. (Standage et al., 2006). The construct's alpha was 0.72.

Self-determined motivation in PE: Students' self-determined motivation in PE was measured by a questionnaire with 30 questions. Five factors are captured by these questions: intrinsic motivation, identified regulation, introjected regulation, external regulation, and amotivation. These questions also used a seven-point Likert scale with choices ranging from 1 = strongly disagree to 7 = strongly agree. For example, one question for intrinsic motivation is phrased as I partake in PA in PE class is because PA is fun. Exemplified questions for identified regulation, introjected regulation, external regulation, and amotivation are "I feel strange if I don't do PA in PE class", "I feel guilty if I have no PA in PE class", "I do PA in PE class in order to have good score", and "I have no idea why do PA in PE class". The Taiwanese version of short questionnaire was adapted from Ntoumanis (2001). Cronbach's alpha for the five factors ranged from 0.77 to 0.91.

Statistical analysis

Descriptive data are shown as mean and standard deviations (SD) in text and standard error (SE) in figures. Where appropriate, a t-test or chi-square was applied to test the demographic differences between autonomy support and control groups. A two-way repeated-measures analysis of variance (ANOVA) within a group's between-subject factor (i.e., two group) and time-point (i.e., pre- and post-test), along with its within-subject factor, was employed separately to test autonomy-related alterations as a function of group and time-point (i.e., perceived teacher autonomy and perceived autonomy in PE). The ANOVA also served as a manipulation check for autonomy support.

A similar two-way ANOVA was employed to test the alterations of five types of motivation (i.e., amotivation, external motivation, introjected regulation, identified regulation, and intrinsic motivation). Results were presented using the Greenhouse-Geisser statistics. Significant main and interaction effects were further analyzed by multiple t-test comparisons using the Bonferroni correction ($\alpha=0.05$). Partial eta-square was presented as effect size.

Results

Participant Demographic Data

The t-test revealed no difference regarding age and body mass index between autonomy support and control groups ($t_s = -0.81$ to 0.03 , $p_s > 0.05$). Similarly, chi-square tests showed no difference among demographic variables related to each PA variable (i.e., sport team, sport club, PA status, partner, and parents' PA status) between the two groups (chi-square = 0.24 to 3.77 , $p_s > 0.05$).

Perceived autonomy

Perceived Teaching Autonomy: There was a significant main group effect, $F(1,124) = 6.91$, $p = 0.01$, partial $\eta^2 = 0.53$, along with a main time effect, $F(1,124) = 15.63$, $p = 0.001$, partial $\eta^2 = 0.11$. Significant group by time interaction was also revealed, $F(1,124) = 21.50$, $p = 0.00$, partial $\eta^2 = 0.15$. Follow-up multiple comparisons revealed that the autonomy support group demonstrated higher post-test than pre-test scores ($p = 0.001$). Additionally, the autonomy support showed higher post-test scores relative to the control group ($p = 0.001$). No difference was observed during pre-test conditions (Figure 1a).

Perceived Autonomy in PE: There was a significant main group effect, $F(1,124) = 10.38$, $p = 0.002$, partial $\eta^2 = 0.08$, and a main time effect, $F(1,124) = 26.66$, $p = 0.001$, partial $\eta^2 = 0.18$. Significant interaction of group and time was also revealed, $F(1,124) = 30.62$, $p = 0.001$, partial $\eta^2 = 0.20$. Multiple comparisons found that the autonomy support group, not the control group, demonstrated higher scores in post-test than in pre-test ($p = 0.001$). Additionally, they also showed higher scores in in post-test compared to the control group ($p = 0.001$). No difference was observed in the pre-test condition (Figure 1b).

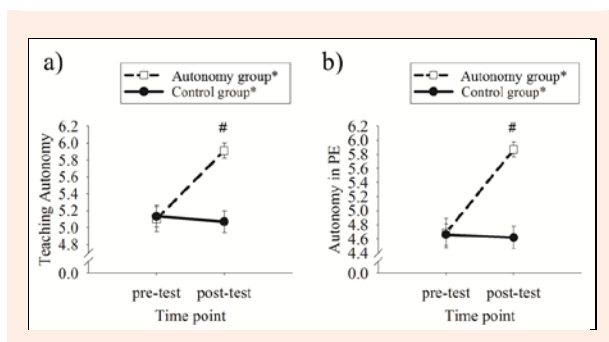


Figure 1. Illustration of perceived autonomy data as function of group and time point. **a)** perceived teaching autonomy and **b)** perceived autonomy in physical education. * significant difference within time points, $p < 0.05$. # significant difference between the two groups, $p < 0.05$.

Self-determined motivation in PE

Statistical values for self-determined motivation in PE by group the time points are presented in Table 2.

Amotivation: There was no significant group effect, $F(1,124) = 2.64$, $p = 0.11$; time effect, $F(1,124) = 3.65$, $p = 0.06$; or interaction effect, $F(1,124) = 2.15$, $p = 0.15$ (Figure 2a).

External motivation: There was no significant group effect, $F(1,124) = 0.005$, $p = 0.94$; time effect, $F(1,124) = 0.01$, $p = 0.91$; or interaction effect, $F(1,124) =$

0.01 , $p = 0.92$.

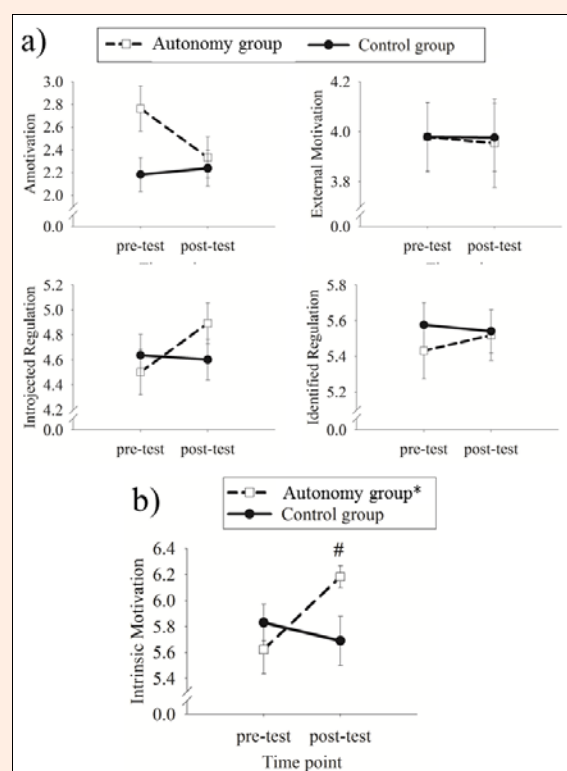


Figure 2. Illustration of self-determined motivation in physical education as function of group and time point: **a)** amotivation, external motivation, introjected regulation, and identified regulation; and **b)** intrinsic motivation. *significant difference within time points, $p < 0.05$. #significant difference between the two groups, $p < 0.05$.

Introjected regulation: There was no significant group effect, $F(1,124) = 0.14$, $p = 0.71$; time effect, $F(1,124) = 0.14$, $p = 0.08$; or interaction effect, $F(1,124) = 3.21$, $p = 0.08$.

Identified regulation: There was no significant group effect, $F(1,124) = 0.27$, $p = 0.61$; time effect, $F(1,124) = 0.06$, $p = 0.81$; or interaction effect, $F(1,124) = 0.35$, $p = 0.56$.

Intrinsic motivation: There was no significant group effect, $F(1,124) = 0.60$, $p = 0.44$ or time effect, $F(1,124) = 2.92$, $p = 0.09$. However, a significant interaction of group and time was revealed, $F(1,124) = 8.18$, $p = 0.005$, partial $\eta^2 = 0.06$. Follow-up multiple comparisons found that the autonomy support group, not the control group, demonstrated higher scores in the post-test than in the pre-test ($p = 0.002$). They also showed higher scores in post-test compared to the control group ($p = 0.02$), whereas no difference was observed during pre-test (Figure 2b).

Table 2. Self-determined motivation in physical education by group the time points. Data are means ($\pm$ SD).

Variables	Control Group		Autonomy support Group	
	Pre-test	Post-test	Pre-test	Post-test
Amotivation	2.18 (1.20)	2.24 (1.28)	2.76 (1.56)	2.33 (1.42)
External Motivation	3.98 (1.09)	3.98 (1.09)	3.98 (1.09)	3.95 (1.38)
Introjected Regulation	4.64 (1.33)	4.60 (1.30)	4.50 (1.42)	4.89 (1.28)
Identified Regulation	5.58 (1.00)	5.54 (.97)	5.43 (1.22)	5.52 (1.11)
Intrinsic Motivation	5.83 (1.14)	5.69 (1.52)	5.62 (1.44)	6.18 (.66)

Discussion

This study evaluated the effect of autonomy support on students' perceived autonomy and self-determined motivation in elementary-school PE classes in Taiwan. The quasi-experimental design enabled the researchers to compare the outcomes between the experimental and control groups. Although mature motivation theories (e.g., achievement goal theory and the SDT) have been applied in PE to study students' motivation (Braithwaite et al., 2011; Shen et al., 2009; Todorovich and Curtner-Smith, 2002; 2003), most of these studies were cross-sectional or observational in nature. Few SDT-based intervention studies in PE pedagogy that are based on experimental designs have been conducted, and these studies mainly focused on older adolescents in upper middle school or high schools in non-western societies. This present study was one of the earliest studies that attempted to create motivational PE environments from the SDT perspective in elementary schools in Taiwan. The intervention demonstrated favorable findings in the experimental group compared to the control group. These findings are discussed below.

The evaluation of this intervention shows that manipulation of the PE environment was successful. The methods we used to manipulate the PE classes involved utilizing strategies such as giving students more choices in selecting partners and learning content instead of the teacher completely controlling everything in the class. Such manipulations of choice have been used in other research studies as documented in the research literature (e.g., Chatzisarantis and Hagger, 2009; Lonsdale et al., 2013; Tessier et al., 2010). As in other intervention studies, the changes made to the instructional conditions in this study were recognized and appreciated by the Taiwanese students. Compared to those in the control group, the students who received a choice-based intervention (with autonomy support) experienced significantly higher levels of perceived autonomy from the teacher's instructional behaviors as well as from the PE lessons overall. This set of findings suggests that like PE classes in the western societies, the SDT is also indeed a powerful theoretical framework that can guide and enhance instructional practices in Taiwanese PE classrooms.

The other major finding of the study is that compared to traditional PE, the SDT-guided PE instruction created more favorable motivational responses among students over six weeks of intervention. Specifically, the students in the experimental group significantly increased their intrinsic motivation, whereas those in the control group did not. This finding is consistent with other intervention studies conducted at the secondary school level (Chatzisarantis and Hagger, 2009; Prusak et al., 2004; Tessier et al., 2010). However, unlike previous research (e.g., Prusak et al., 2004), no significant increases in motivation variables such as identified motivation, external regulation, and amotivation were observed in this study. This finding is informative and encouraging for future research. Specifically, it confirmed the tenability and efficacy of the SDT in that providing students with support for their innate needs (such as perceived autonomy)

can significantly impact students' motivational responses (Bryan and Solmon, 2007; Deci and Ryan, 1985; Ntoumanis, 2001; Sun and Chen, 2010). In line with previous research (Chatzisarantis and Hagger, 2009; Lonsdale et al., 2013; Prusak et al., 2004; Tessier et al., 2010), this finding reinforces the importance of affording students choices and autonomy in PE lessons in both western and Taiwanese societies. The positive outcome of this study also shows how easy it is for teachers to make instructional changes to their lessons that can result in positive meaningful student responses. Most importantly, the significant change observed in motivational responses in this project was that of intrinsic motivation: the highest level of motivation. This means that as result of increased autonomy support, the Taiwanese students increased their intrinsic motivation (i.e., enjoying the PE lessons for their sake). Given the importance of fostering self-determined motivation (intrinsic motivation in particular) in PE (Chen and Ennis, 2009; Cox et al., 2008), the finding from the present study bears important theoretical and practical implications to curriculum and instruction in PE. Future research and practice are encouraged to utilize the SDT as the theoretical framework to create and tailor PE lessons to stimulate and foster intrinsic motivation in students. Teachers are strongly encouraged to be supportive so students could have positive and high quality learning experiences in each PE lesson.

This study's strength lies in its research design. At baseline, the experimental group and control group demonstrated similar characteristics. Potentially confounding variables were controlled for before the start of the experiment. In addition, instruments with sound validity and reliability were utilized in the study to collect data. For these reasons, changes by group can be attributed to manipulations of the PE classes. The study also acknowledges that it is limited because it was conducted in a single elementary school. The results would be stronger if data were collected from more classes in a variety of schools (e.g., urban versus suburban). Thus, the findings may not be generalizable to school settings with various characteristics. We also acknowledge that autonomy support could be manipulated in ways beyond providing students choices for selections of content and learning tasks. Autonomy support could be reflected in all aspects of the teaching (e.g., task structure, task presentation, class management, evaluation, etc.) at various stages (i.e., planning, teaching, post-teaching stages). For example, allowing students to formulate a group for team-based learning, or incorporating peer evaluation could be perceived as autonomy supportive in PE classes. Furthermore, this study only examined the effect of autonomy support on students' self-determined motivation. We would like to acknowledge that self-determined motivation is impacted by the level of satisfaction for all three innate psychological needs (i.e., competence, autonomy, and relatedness). Future intervention studies should examine ways to provide support to satisfy these needs so that students could be situated in learning situations where they have optimal opportunities to enjoy the learning experiences and make good progress towards instructional objectives and goals. Last but not the least, the present

study used questionnaires for measurement. Issues with using self-report instruments have been widely recognized by social science researchers; and alternative measures such as observation and behavioral protocols have been used in motivation research. However, as mentioned above, the questionnaires used in this study are validated and have shown sound psychometric qualifications.

Conclusion

Guided by the framework of the SDT, this study successfully manipulated the PE lessons by supporting students with more autonomy. The changes made by the PE teachers were recognized by students, who perceived and experienced increased levels of autonomy originated from both the teacher's teaching behaviors as well as from the PE classroom overall. The intervention significantly enhanced students' intrinsic motivation, which is viewed as the highest level of motivation in all situations. Future research is encouraged to design and evaluate SDT-guided interventions in elementary schools of various characteristics in Taiwan and other societies. Future research in elementary school PE settings should also examine learning- or behavior-related outcomes (e.g., PA, knowledge and skill acquisition), in addition to motivational responses (e.g., intrinsic motivation), attributable to SDT-guided interventions.

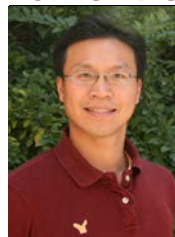
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Key points

- The SDT is a relevant theoretical framework for elementary school physical education.
- Using the quasi-experimental research design, this study is one of the earliest studies supporting that elementary school PE teachers can manipulate the instructional context using the SDT to increase students' perceived autonomy and intrinsic motivation.
- Increasing students' perceived autonomy may not lead to significant changes in other SDT constructs (i.e., amotivation, external regulation, introjected regulation, and identified regulation).

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Why autonomy-supportive interventions work: Explaining the professional development of teachers' motivating style



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HIGHLIGHTS

- Post-intervention, teachers' motivating style became more autonomy supportive.
- During the intervention, teachers developed three personal-professional resources.
- Intervention-enabled gains in teaching efficacy explained greater autonomy support.
- Intervention-enabled gains in intrinsic goals explained greater autonomy support.

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ABSTRACT

Carefully designed interventions consistently help K-12 teachers learn how to implement a more autonomy-supportive classroom motivating style. In the present study, we investigated what resources teachers acquired during these interventions that explained why they are so able to successfully upgrade the quality of their motivating style. We randomly assigned 91 full-time teachers to participate or not in a year-long autonomy-supportive intervention program (ASIP), and we longitudinally assessed autonomy support and three hypothesized mediating resources—gains in need satisfaction during teaching, gains in teaching efficacy, and a greater adoption of intrinsic instructional goals. The ASIP did increase teachers' autonomy support, as expected, and the two resources that explained this professional developmental achievement were intervention-enabled gains in teaching efficacy and intrinsic instructional goals.

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In every class, teachers ask their students to engage in various learning activities. While doing so, teachers inevitably rely on a particular motivating style, the most widely studied of which is autonomy support (Assor, Kaplan, & Roth, 2002; Cheon, Reeve, Yu, & Jang, 2014; Deci, Schwartz, Sheinman, & Ryan, 1981). Autonomy support is an interpersonal tone of support and understanding in which the teacher appreciates, vitalizes, and actively supports students' inner motivational resources (e.g., intrinsic motivation, psychological needs) by utilizing teaching practices such as taking the students' perspective, creating opportunities for students' input and initiative, offering learning activities in need-satisfying ways,

providing explanatory rationales for teacher requests, and acknowledging and accepting students' expressions of negative affect as both understandable and okay. A teacher's classroom autonomy-supportive motivating style is important because its presence catalyzes high-quality and engagement-fostering motivations (need satisfaction, autonomous motivation, intrinsic goals) and hence students' adaptive classroom functioning and outcomes (Assor et al., 2002; Cheon, Reeve, & Moon, 2012; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004; Vansteenkiste, Simons, Lens, Soenens, & Matos, 2005).

When K-12 teachers participate in carefully-designed, theory-

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based, and workshop-oriented training programs to learn how to become more autonomy supportive toward their students during instruction, two reliable effects occur. First, most teachers capitalize on this professional developmental opportunity and successfully upgrade the quality of their classroom motivating style (more autonomy supportive), as documented both by students' post-intervention perceptions of their teacher's motivating style (Cheon et al., 2012; Cheon, Reeve, & Song, 2016) and by observers' objective ratings of teachers' post-intervention teaching behavior (Cheon et al., 2014; Cheon & Reeve, 2015). Second, after teachers become more autonomy supportive, their students show large, educationally-important, and wide-ranging gains in autonomous motivation, classroom engagement, conceptual learning, academic achievement, and well-being (Cheon et al., 2012, 2016; Chatzisarantis & Hagger, 2009; Tessier, Sarrazin, & Ntoumanis, 2010; Vansteenkiste, Matos, Lens, & Soenens, 2007).

What this research literature has not yet been able to do is to explain precisely what personal resources teachers acquire during these interventions that allow them to upgrade the quality of their motivating style so successfully and so reliably. That is, these interventions work, but it is still an open question as to precisely why they work as well as they do.

1. Explaining why autonomy-supportive intervention programs work

We propose that teacher participation in an ASIP allows teachers to develop three empowering personal-professional resources—namely, greater psychological need satisfaction during teaching, greater teaching efficacy, and the adoption of relatively more intrinsic (and less extrinsic) instructional goals.

Greater need satisfaction. The reason why students of autonomy-supportive teachers show a wide range of important positive educational outcomes (e.g., greater engagement) is clear—it is because they first experience greater psychological need satisfaction during classroom instruction (i.e., greater autonomy, competence, and relatedness satisfaction; Cheon et al., 2012). That is, gains in need satisfaction produce a wide range of positive outcomes (Ryan & Deci, 2017). That is, students show more interest during instruction, become more engaged, and learn more conceptually after they first experience greater autonomy, competence, and relatedness need satisfaction. Interestingly, teachers too experience this same boost in their own need satisfaction after they learn how to teach in more autonomy-supportive ways (Cheon et al., 2014). That is, just as their students show greater need satisfaction from receiving autonomy support, teachers show greater need satisfaction from giving autonomy support. Other research shows that a teacher's autonomy-supportive motivating style and his or her need satisfaction during teaching tend to positively covary (Quiles, Moreno-Murcia, & Lacarcel, 2015). Given this evidence, we propose that teacher participation in an ASIP will enhance teachers' need satisfaction during teaching and this intervention-enabled boost in need satisfaction will, in turn, explain why teachers are able to use the ASIP to learn how to become more autonomy supportive.

Greater teaching efficacy. Teaching efficacy is a teacher's judgment of his or her capacity to cope with the teaching situation in ways that bring about desired outcomes, and it revolves principally around teachers' confidence in being able to implement instructional strategies that reliably boost students' learning, engagement, and desired behavior (Tschannen-Moran & Woolfolk Hoy, 2001). Like other teacher training programs to increase teaching efficacy (e.g., Liaw, 2017), teachers who participate in autonomy-supportive interventions also show a rather pronounced

increase in their teaching efficacy (Cheon et al., 2014), and this increase occurs because, during an ASIP, teachers (1) expand their existing repertoire of instructional behaviors to incorporate new-and-improved and evidence-based ways to enhance their students' conceptual learning, engagement, and behavior and (2) come to believe that these newly-learned autonomy-supportive instructional behaviors (e.g., “take the students' perspective”, “provide explanatory rationale for requests”) are both highly effective and easy-to-do (Reeve & Cheon, 2016). Given that participation in an ASIP has been shown to increase teaching efficacy and given that ASIP participation helps teachers see autonomy-supportive instructional behaviors as both effective and easy-to-implement, we propose that a second reason why teachers learn to be more autonomy supportive is because the intervention enhances their sense of teaching efficacy.

Teaching efficacy and competence need satisfaction are similar, but not interchangeable, motivational constructs (Rodgers, Markland, Selzler, Murray, & Wilson, 2014). Both constructs can be experienced and measured in somewhat similar ways (e.g., as perceived competence), but they are also different in important ways. Teaching efficacy is a key concept in social-cognitive theory (Bandura, 1986), and it represents a teacher's situation-specific self-confidence. Teaching efficacy develops as teachers reflect on whether they can execute specific teaching behaviors under specific circumstances. Once formulated, teaching efficacy predicts behavioral initiation, effort, and persistence, but it does not concern the outcomes of such teaching (e.g., need satisfaction, well-being). The need for competence is a key concept in self-determination theory (Ryan & Deci, 2017), and it represents a teacher's sense of effective functioning during teaching. Competence need satisfaction during teaching predicts the proactive desire (intrinsic motivation) to exercise and grow one's capacities and teaching skill, and it generates a willingness (even an eagerness) to seek out new challenges and to want to make progress and to learn something new. When teachers add new instructional skills to their repertoire, they do not so much formulate a judgment of efficacy but, instead, experience a deep sense of satisfaction and well-being from a job well done. In terms of measurement, self-efficacy and competence need satisfaction have been shown to be two distinct constructs—conceptually and statistically (as per confirmatory factor analysis; Rodgers et al., 2014).

Adoption of intrinsic instructional goals. Instructional goals represent the priorities or desired outcomes that teachers bring with them into the classroom. According to a self-determination theory framework (Kasser & Ryan, 1996, 2001; Sheldon, Ryan, Deci, & Kasser, 2004), these priorities can be divided into two categories of intrinsic and extrinsic instructional goals. Extrinsic instructional goals are those classroom priorities and teacher strivings to promote their students' socially-valued indicators of worth, such as high test scores, while intrinsic instructional goals are those classroom priorities and teacher strivings to promote their students' personal and relationship growth (Jang, 2017). Adopting intrinsic goals can be expected to increase teachers' use of autonomy-supportive instructional behaviors because autonomy support is literally the means by which teachers pursue their intrinsic instructional goals [i.e., “To accomplish my intrinsic instructional goal (e.g., to promote my students' personal growth), I will need to teach in an autonomy-supportive way.”], just as adopting extrinsic goals can be expected to take teachers away from autonomy-supportive instructional behaviors [i.e., “To accomplish my extrinsic instructional goal (e.g., to promote my students' high test scores), I will need to forego teaching in an autonomy-supportive way.”]. Given the close relation between intrinsic goals and autonomy-supportive teaching practices (Jang, 2017), we

propose that a third reason why teachers learn to be more autonomy supportive is because they adopt a greater usage of intrinsic instructional goals.

2. Research questions and hypotheses

The starting point of the present study was the observation that K-12 teachers learn how to become more autonomy supportive toward their students when they participate in carefully-designed and theory-based interventions (i.e., an ASIP). Given this starting point, our research question was to ask why teachers are able to use these interventions as professional developmental opportunities to upgrade the quality of their motivating style. Stated a bit differently, our research question was this: What personal-professional resources do teachers acquire during these interventions that might explain why they are able to upgrade the quality of their classroom motivating style?

Hypothesis 1 was that the intervention would produce its intended effect—that is, the teachers who were randomly assigned to participate in the intervention would report a more autonomy-supportive motivating style at year end than would the teachers who were randomly assigned into the control group. *Hypothesis 2* was that all three possible paths to becoming more autonomy supportive—greater need satisfaction, greater teaching efficacy, and adopting more intrinsic goals—would each individually explain why the intervention worked. *Hypothesis 2* was therefore a mediation hypothesis—namely, that participation in the ASIP would allow teachers to develop these three personal-professional resources, and that each of these resources in turn would explain why teachers who participated in the ASIP showed a more autonomy-supportive motivating style at year end.

3. Method

3.1. Participants

Every summer, the Korean Ministry of Education requires all certified teachers throughout the nation to complete an official teacher training (or teacher education) program, the purpose of which is to further teachers' professional and career growth and development. During this two-day session, we were allowed to approach all physical education (PE) teachers in attendance to invite them to participate in our study. One hundred and two teachers agree to participate in the study. All 102 teachers were full-time, certified, and experienced PE teachers who taught in one of 102 different schools dispersed across 12 different school districts throughout the nation of South Korea. Over the course of the academic year (two semesters—Fall and Spring), 11 of these teachers were unable to complete all parts of the study, so the final analyzed sample included 91 PE teachers (57 males, 34 females; 20 elementary, 44 middle, and 27 high schools), all of whom were ethnic Korean. The teacher retention rate throughout the year-long intervention was therefore 89.2% (91/102). The 11 teachers who did not complete the study did not differ from the 91 teachers who did complete all aspects of the study on any T1 dependent measure or on any teacher demographic characteristic, all t 's(100) < 1.50, ns . The teacher-participants in the analyzed sample had, on average, 10.4 years of teaching experience ($SD = 8.2$; $range = 1–33$) and were, on average, 35.9 years old ($SD = 8.9$; $range = 23–57$). In addition, 11 of the 91 teachers taught students with special needs in their classes. In appreciation of their participation, each teacher-participant received the equivalent of \$50. This monetary compensation was given at the end of the academic year (i.e., it was offered as an “unexpected reward”), and it was framed as a statement of appreciation for the extra time teachers gave to complete

all aspects of the study.

3.2. Procedure and implementation of the ASIP intervention

Teacher-participants were randomly assigned into either the experimental ($n = 48$) or control ($n = 43$) condition. Participation (or not) in the intervention was the study's independent variable. The procedural timeline for the year-long intervention and the three waves of data collection appear in Fig. 1.

For the data collection, teacher-participants completed the 4-page questionnaire for the first time before they participated in Part 1 of the intervention (T1, in August during the summer break—2 weeks prior to the beginning of the Fall semester), for a second time after the Fall semester's final examination (T2, late December), and for a third time after the Spring semester's final examination (T3, early July). For teachers in the control condition, they taught their classes using their pre-existing motivating styles (i.e., “practice as usual”). For teachers in the experimental condition, we delivered the ASIP in three parts.

Part 1 was a 3-hour workshop delivered by the author team that took place in the early afternoon two weeks prior to the beginning of the Fall semester (during the August summer break). It introduced autonomy-supportive teaching, contrasted autonomy support against teacher control, provided empirical evidence on the benefits of autonomy support and the cost of control, and introduced teachers to the following six recommended autonomy-supportive instructional practices: Take the students' perspective; vitalize students' psychological needs during learning activities; rely on invitational language; provide explanatory rationales for teacher requests; display patience; and acknowledge and accept expressions of negative affect.

Part 2 was a second 3-hour workshop that took place in the late afternoon (on the same day) following the completion of Part 1 and a lunch break. It provided live and videotaped examples of the six autonomy-supportive instructional behaviors and revolved mostly around describing, modeling, explaining, coaching, and scaffolding the “how to” of each recommended instructional behavior. It also provided examples and tips in how to transform controlling instructional behaviors into more autonomy-supportive ones. While Part 1 was mostly an informational presentation, Part 2 was mostly a practical and skill-based “how to” workshop that featured practice and group discussion. Many questions in the group discussion were “how to” based, but other questions revolved around how realistic, how effective, and how easy to implement the recommended autonomy-supportive instructional behaviors were, especially in the context of a pressure-inducing school system. After Part 2, the research team kept in contact with all teacher-participants (via email, text messages, and telephone calls). About half of the teachers in the experimental group initiated contact with the research team, and most of these questions asked about how to cope with particular obstacles (e.g., lack of time) or difficulties (e.g., large class size) while trying to implement autonomy-supportive instruction.

Part 3 was a 3-hour session in which the first hour reviewed the materials from Parts 1 and 2, while the last two hours featured a teacher-to-teacher (peer-based) group discussion. Because teachers were geographically diverse, Part 3 took place during the between-semester winter break when teachers' schedules were flexible enough to accommodate such a meeting (see Fig. 1). During the group discussion, teachers shared their classroom experiences and exchanged tips and suggestions in how to become more autonomy supportive and less controlling toward their students during instruction. After these group discussions, about one-third of teacher-participants in the experimental condition again kept in contact with members of research team by calling, texting, or e-mailing

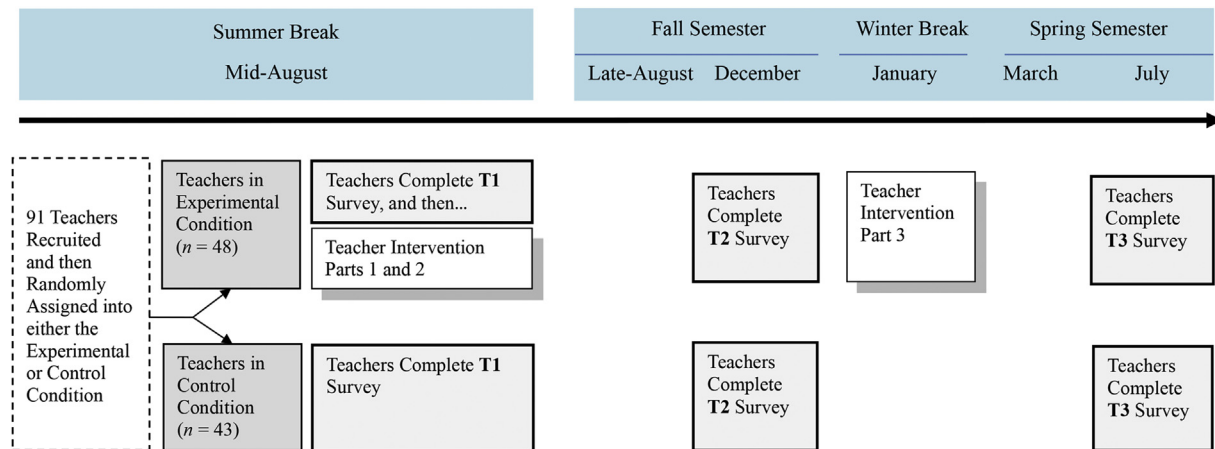


Fig. 1. Procedural timeline for the events included in the delivery of the year-long intervention and in the data collection.

with most questions asking for scaffolding in the specific autonomy-supportive instructional behaviors they were trying to implement.

3.3. Measures

Each measure used the same 7-point scale that ranged from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*), except for the teaching efficacy measure because its authors recommend the use of a 9-point scale (Tschannen-Moran & Woolfolk Hoy, 2001). While each measure was originally written in English, we used a previously translated and back-translated Korean-language version of each measure, which we had available to us through our access to previously published research (Cheon et al., 2014, 2016; Klassen et al., 2009).

Autonomy-Supportive Motivating Style. We assessed two indicators of teachers' autonomy-supportive motivating style. For self-rated autonomy support, teachers completed the 6-item teacher-version of the Learning Climate Questionnaire (LCQ; Cheon et al., 2016). Sample items include "I provide my students with choices and options" and "I try to understand how my students see things before I suggest a new way they might do things". This measure was internally consistent in the present study ($\alpha = 0.79$ at T1; $\alpha = 0.82$ at T3). For personal endorsement of autonomy-supportive teaching, teachers completed the Teaching Scenarios measure (Cheon et al., 2014). This measure presents a 263-word description of prototypical autonomy-supportive teaching that is then followed by 4 questions that referenced that teaching scenario, including "This approach to teaching describes how I teach my students on a daily basis" and "This is an accurate and true description of what I do during my teaching". This measure was also assessed in an internally consistent way ($\alpha = 0.78$ at T1; $\alpha = 0.89$ at T3). These two indicators of autonomy support were moderately correlated with each other ($r = 0.42$ at T1, $r = 0.65$ at T2).

Need Satisfaction. We assessed autonomy, competence, and relatedness need satisfaction with three separate scales. For autonomy satisfaction, we used a teacher-version of the 5-item Perceived Autonomy scale (Standage, Duda, & Ntoumanis, 2006). A sample item is, "I feel that I teach because I want to" (α at T1 = 0.83; α at T2 = 0.86). For competence satisfaction, we used a teacher-version of the 4-item Perceived Competence scale from the Intrinsic Motivation Inventory (McAuley, Duncan, & Tammen, 1989). A sample item is, "I think I am pretty good at teaching" (α at T1 = 0.88; α at T2 = 0.91). For relatedness satisfaction, we used a

teacher version of the 5-item Perceived Relatedness scale from the Basic Needs Satisfaction in Sport Scale (Ng, Lonsdale, & Hodge, 2011). A sample item is, "I have close relationships with people in my class" (α at T1 = 0.79; α at T2 = 0.76). Because scores on the three measures were adequately intercorrelated [r 's among the autonomy, competence, and relatedness measures were 0.71, 0.32, and 0.34 at T1 (3-scale $\alpha = 0.71$) and were 0.74, 0.39, and 0.41 at T2 (3-scale $\alpha = 0.76$)], we equally-weighted and averaged the three scores into a single overall score for need satisfaction.

Teaching Efficacy. To assess teaching efficacy, teachers completed the widely-used short form of the Teachers' Sense of Efficacy Scale (TSES; Tschannen-Moran & Woolfolk Hoy, 2001). The 12-item TSES assesses three aspects of teaching efficacy (for instructional strategies, student engagement, and classroom management). Scores on the 4-item teaching efficacy for instructional strategies scale (e.g., "How much can you do to provide an alternative explanation when students are confused?") showed acceptable internal consistency ($\alpha = 0.84$ at T1; $\alpha = 0.90$ at T2), as did the scores on the 4-item teaching efficacy for student engagement scale (e.g., "How much can you do to motivate students who show low interest in school work?") ($\alpha = 0.81$ at T1; $\alpha = 0.89$ at T2), as did the scores on the 4-item teaching efficacy for classroom management scale (e.g., "How much can you do to calm a student who is disruptive or noisy?") ($\alpha = 0.82$ at T1; $\alpha = 0.87$ at T2). Because scores on the three measures were adequately intercorrelated [r 's among the instructional strategies, student engagement, and classroom management measures were 0.63, 0.81, and 0.73 at T1 (3-scale $\alpha = 0.88$) and 0.80, 0.91, and 0.77 at T2 (3-scale $\alpha = 0.94$)], we equally-weighted and averaged the three scores into a single overall score for teaching efficacy.

Relative Intrinsic Instructional Goals. To assess intrinsic and extrinsic instructional goals, teachers completed the 20-item Goal Content Questionnaire (GCQ; Sebire, Standage, & Vansteenkiste, 2008). The GCQ assesses five aspirations or goals (skill development, social affiliation, health management, image, and social recognition), the first three of which are scored as intrinsic goals and the last two of which are scored as extrinsic goals. Teachers rated each item responding to the stem, "Please indicate to what extent these goals are important for you while teaching." Scores on the 4-item intrinsic skill development goal scale (e.g., "To acquire new teaching skills.") showed acceptable internal consistency ($\alpha = 0.87$ at T1; $\alpha = 0.92$ at T2), as did scores on the 4-item social affiliation goal scale (e.g., "To form close bonds with my students"; α s at T1 and T2 = 0.81 and 0.91), as did scores on the 4-item health management goal scale (e.g., "To improve my students overall

health”; α s = 0.93 and 0.95). Similarly, scores on the 4-item extrinsic image goal scale (e.g., “To be professional so to look expert to others.”) showed acceptable internal consistency (α s = 0.89 and 0.90), as did scores on the 4-item social recognition goal scale (e.g., “To be socially respected by others”; α s = 0.91 and 0.95). At T1, teachers’ intrinsic goals ($M = 5.55$, $SD = 0.64$, $\alpha = 0.84$) correlated positively ($r = 0.48$, $p < 0.01$) with their extrinsic goals ($M = 3.33$, $SD = 1.12$, $\alpha = 0.92$), but at T2 teachers’ intrinsic goals ($M = 5.63$, $SD = 0.73$, $\alpha = 0.91$) were largely independent ($r = -0.15$, $p = 0.163$) of their extrinsic goals ($M = 3.72$, $SD = 1.14$, $\alpha = 0.93$). Following the tradition established in this research (Sheldon & Kasser, 1995, 1998, 2008), we computed one overall “relative intrinsic instructional goals” score by subtracting the mean score on the 8 extrinsic items from the mean score on the 12 intrinsic items. In the interpretation of this score, it is not so much that teachers adopt intrinsic or extrinsic instructional goals as it is that they adopt intrinsic goals to a greater degree than they adopt extrinsic goals.

3.4. Data analyses

The unit of analysis was the teacher, and the research design was longitudinal. To analyze both hypotheses, we used structural equation modeling (SEM; LISREL 8.80, Jöreskog & Sörbom, 2006). To evaluate model fit, we relied on the chi-square test statistic and multiple indices of fit (as recommended by Kline, 2011), including the root-mean-square error of approximation (RMSEA), the standardized root-mean-square residual (SRMR), and the comparative fit index (CFI). For RMSEA and SRMR, values less than 0.08 indicate good fit; for CFI, values greater than 0.95 indicate good fit (Hu & Bentler, 1999; Kline, 2011).

We assessed the study’s outcome measure—autonomy-supportive motivating style—as a latent variable created from the two indicators of self-rated autonomy support (LCQ score) and personal endorsement of autonomy-supportive teaching (Teaching Scenarios score). We assessed the study’s three hypothesized mediators as observed variables. Specifically, for psychological need satisfaction, we equally-weighted and averaged teachers’ score on the autonomy, competence, and relatedness satisfaction scales; for teaching efficacy, we equally-weighted and averaged teachers’ score on the instructional strategies, student engagement, and classroom management scales; and for relative intrinsic goals, we equally-weighted and averaged teachers’ scores on the intrinsic goals and extrinsic goals scales (after reverse scoring the extrinsic goal score). In each case, we used an equally-weighted score because we had no a priori reason to overweight or underweight any one aspect of teachers’ need satisfaction, teaching efficacy, or instructional goals. The analytic decision to use only observed scores to represent the three hypothesized mediators was necessitated by the statistical need to keep the ratio of participants (91) to measured variables (8) in line with the recommended minimally acceptable 10.0 participants/measured variables ratio (Maxwell, 2000). Had we assessed the three hypothesized mediators as latent variables, the participants:measured variables ratio would have dropped from an acceptable 11.4 down to an unreliable ratio of only 4.6 (91:20).

We also considered whether or not our statistical tests were adequately powered. To estimate the sample size needed to reach generalizable conclusions, we calculated what the minimal sample size would be for a F-test-based multiple regression that used conventional statistics ($\alpha = 0.05$, $\text{power} = 0.95$) to detect the capacity of seven moderately potent antecedents ($d = 0.30$) among a set of 11 total predictors (7 antecedents in Fig. 1 plus the 4 statistical controls) to predict the outcome measure. That minimal sample size would be 81, based on Faul, Erdfelder, Lang, and

Buchner’s (2007) G*Power 3 software program. Because our analyzed sample size was $N = 91$, we determined that our hypothesis tests were adequately powered, though just barely so.

In the test of hypothesis 1, autonomy support was the repeated measures within-subjects outcome variable, experimental condition was the between-subjects independent variable, and gender, grade level taught, special education class, and years of teaching experience served as T1 covariates. We included these teachers’ demographic characteristics because they are frequently correlated with teachers’ motivating style (Cheon et al., 2016) and because, in the present data, teacher gender and special education classes were associated with 1 of the 8 assessed dependent measures, grade level taught was associated with 2 dependent measures, and years of teaching experience was associated with 4 dependent measures (see these statistics in Table 1). Given these associations, we included gender (females = 0, males = 1), grade level taught (elementary = 0, middle = 1, high school = 2), special education classes (no = 0, yes = 1) and years of teaching experience as a set of four covariates (i.e., a statistical controls) in all subsequent analyses.

In the test of hypothesis 2, autonomy support was the repeated measures within-subjects dependent variable, experimental condition was the between-subjects independent variable, need satisfaction, teaching efficacy, and relative intrinsic instructional goals were three repeated measures within-subjects independent variables, and gender, grade level, special education class, and teaching experience served as covariates. The five T1 predictor variables (experimental condition, autonomy-supportive motivating style, need satisfaction, teaching efficacy, and intrinsic goals) and the four statistical controls (gender, grade level, special education class, and years of teaching experience) were allowed to correlate freely. The three T2 within-wave mediators (need satisfaction, teaching efficacy, and intrinsic instructional goals) were allowed to correlate. To represent the longitudinal character of the data set, we allowed the between-wave error terms of each observed variable to correlate with itself from T1 to T2 (for the four mediators) and from T1 to T3 (for the two indicators of autonomy-supportive motivating style). Finally, to test for mediation, we used the INDIRECT macro in SPSS to conduct bootstrapping analyses based on 1000 bootstrapping resamples (Preacher & Hayes, 2008).

4. Results

4.1. Preliminary analyses

Missing data were rare (<0.1%), so we used the expectation-maximization (EM) algorithm to produce a multiple imputed data set (generating 200 iterations). We also explored whether the distribution of scores for each measured indicator deviated from normality and found that all values for skewness and kurtosis were less than |1.0|, indicating little deviation from normality. Finally, we tested for the equivalence of our two groups at T1. Teachers randomly assigned into the experimental group did not differ from teachers assigned into the control group on any of the eight T1 measures/indicators (autonomy support, 3 hypothesized predictors, 4 statistical controls).

4.2. Did the ASIP work? (Hypothesis 1)

The structural model to test Hypothesis 1 (i.e., experimental condition would predict increased T3 autonomy support, controlling to T1 autonomy support) fit the data well, $\chi^2(9) = 10.80$, $p = 0.289$, $RMSEA = 0.041$, $SRMR = 0.045$, $CFI = 0.99$. As expected, experimental condition (ASIP participation) predicted increased T3 autonomy support ($B = 0.39$, $SE B = 0.12$, $\beta = 0.39$, $t = 3.23$, $p = 0.002$), even after controlling for T1 autonomy support

Table 1
Descriptive statistics and correlation matrix for experimental condition, the latent variables for T1 and T3 autonomy support, the observed variables for the three T1 and T2 hypothesized predictors, and the four T1 statistical controls.

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. ASIP Experimental Condition	–												
2. T1 Autonomy Support	–0.03	–											
3. T3 Autonomy Support	0.41	0.55	–										
4. T1 Need Satisfaction	0.20	0.42	0.44	–									
5. T1 Teaching Efficacy	0.15	0.28	0.30	0.58	–								
6. T1 Relative Intrinsic Goals	0.01	0.22	0.08	0.02	–0.01	–							
7. T2 Need Satisfaction	0.36	0.28	0.43	0.73	0.42	0.02	–						
8. T2 Teaching Efficacy	0.49	0.22	0.57	0.43	0.60	0.03	0.56	–					
9. T2 Relative Intrinsic Goals	0.35	0.10	0.37	0.10	0.02	0.48	0.26	0.42	–				
10. Teacher Gender	0.31	0.15	0.18	0.01	0.23	0.06	0.09	0.20	–0.03	–			
11. Grade Level Taught	0.08	–0.05	0.13	0.05	0.22	–0.21	–0.02	–0.04	–0.09	0.16	–		
12. Special Education Classes	–0.15	0.04	0.00	–0.14	–0.25	0.10	–0.07	–0.06	–0.01	–0.10	–0.49	–	
13. Years of Teaching Experience	0.35	0.10	0.31	0.24	0.10	–0.14	0.31	0.24	0.09	0.06	0.01	–0.13	–
Mean	0.53	5.26	5.53	4.01	5.96	0.76	5.52	6.27	1.17	0.63	0.95	0.13	10.4
Standard Deviation	0.50	0.65	0.73	0.52	0.90	0.91	0.71	1.07	1.21	0.49	0.75	0.34	8.23
Possible Range	0–1	1–7	1–7	1–7	1–9	–6 to +6	1–7	1–9	–6 to +6	0–1	0–2	0–1	1–33

Note. $r's(91) \geq 0.21, p < 0.05$; $r's(91) \geq 0.26, p < 0.01$; and $r's(91) \geq 0.33, p < 0.001$. $N = 91$. T1 = Time or Wave 1; T2 = Time 2; T3 = Time 3.

Experimental condition: control condition = 0, ASIP experimental = 1. Gender: women = 0, men = 1.

Grade Level Taught: elementary = 0, middle school = 1; high school = 2. Special Education Classes: no = 0, yes = 1.

($\beta = 0.69, p < 0.001$), gender ($\beta = -0.09, p = 0.323$), grade level ($\beta = -0.15, p = 0.105$), special education class ($\beta = -0.09, p = 0.280$), and teaching experience ($\beta = 0.11, p = 0.199$). This result—the statistically significant effect of experimental condition on a change in teachers' T3 autonomy-supportive motivating style—shows that the ASIP worked (i.e., produced the hypothesized direct effect).

4.3. Why did the ASIP work? (Hypothesis 2)

The descriptive statistics and intercorrelations among experimental condition, T1 and T3 autonomy support, T1 and T2 need satisfaction, teaching efficacy, and relative intrinsic instructional goals, and the four T1 covariates appear in Table 1. The structural model to test Hypothesis 2 fit the data reasonably well, $\chi^2(30) = 45.55, p = 0.034, RMSEA = 0.064, SRMR = 0.046, CFI = 0.98$. The path diagram showing the standardized estimates for each hypothesized path appears in Fig. 2. For clarity, we do not show the four T1 statistical controls in the figure, but we do report their results in the full statistical findings below.

In the prediction of each of the three hypothesized T2 mediators (see the downwardly-sloped lines on the upper-left side of Fig. 2), ASIP participation (1) *increased T2 need satisfaction* ($B = 0.19, SE B = 0.08, \beta = 0.19, t = 2.47, p = 0.015$), even after controlling for T1 need satisfaction ($\beta = 0.69, p < 0.001$), gender ($\beta = 0.03, p = 0.633$), grade level ($\beta = -0.05, p = 0.510$), special education class ($\beta = 0.04, p = 0.582$), and teaching experience ($\beta = 0.08, p = 0.272$); (2) *increased T2 teaching efficacy* ($B = 0.42, SE B = 0.08, \beta = 0.42, t = 5.34, p < 0.001$), even after controlling for T1 teaching efficacy ($\beta = 0.59, p < 0.001$), gender ($\beta = -0.04, p = 0.563$), grade level ($\beta = -0.15, p = 0.058$), special education class ($\beta = 0.08, p = 0.351$), and teaching experience ($\beta = 0.05, p = 0.486$); and (3) *increased T2 relative intrinsic instructional goals* ($B = 0.39, SE B = 0.09, \beta = 0.39, t = 4.14, p < 0.001$), even after controlling for T1 relative intrinsic goals ($\beta = 0.49, p < 0.001$), gender ($\beta = -0.18, p = 0.045$), grade level ($\beta = 0.00, p = 0.971$), special education class ($\beta = -0.02, p = 0.871$), and teaching experience ($\beta = 0.03, p = 0.706$).

In the prediction of T3 autonomy-supportive motivating style (see the downwardly-sloped lines on the lower-right side of Fig. 2), T2 teaching efficacy ($B = 0.33, SE B = 0.12, \beta = 0.33, t = 2.45, p = 0.016$) and T2 relative intrinsic instructional goals ($B = 0.22, SE B = 0.10, \beta = 0.22, t = 2.09, p = 0.039$) were both individually

statistically significant predictors, while T2 need satisfaction was not an individually statistically significant predictor ($B = -0.18, SE B = 0.12, \beta = -0.18, t = 1.48, p = 0.142$), at least after controlling for experimental condition ($\beta = 0.28, p = 0.011$), T1 autonomy support ($\beta = 0.57, p = 0.003$), T1 need satisfaction ($\beta = 0.09, p = 0.562$), T1 teaching efficacy ($\beta = -0.09, p = 0.500$), T1 intrinsic instructional goals ($\beta = -0.23, p = 0.037$), gender ($\beta = 0.03, p = 0.727$), grade level ($\beta = -0.21, p = 0.027$), special education class ($\beta = -0.09, p = 0.324$), and teaching experience ($\beta = 0.08, p = 0.372$).

In the test for mediation, the indirect effect of experimental condition on T3 autonomy-supportive motivating style through all three hypothesized T2 mediators, including all three T1 teacher resources and all four T1 covariates as a set of seven statistical controls, were as follows. T2 teaching efficacy predicted T3 autonomy support, and its bias-corrected 95% confidence interval did not include zero, $\beta = 0.21, [0.03, 0.41]$, confirming mediation. T2 relative intrinsic instructional goals also predicted T3 autonomy support, and its bias-corrected 95% confidence interval did not include zero, $\beta = 0.12 [0.01, 0.28]$, confirming mediation. Finally, T2 need satisfaction did not predict T3 autonomy support, and its bias-corrected 95% confidence interval did include zero, $\beta = -0.14 [-0.20, 0.02]$, confirming the lack of mediation.

5. Discussion

The present study asked this question: Why do teachers who participate in carefully-designed, theory-based, and workshop-oriented intervention programs learn a more autonomy-supportive motivating style as well as and as reliably as they do? Accordingly, we sought to discover what personal-professional resources these teachers acquired during the intervention that allowed them to so successfully upgrade the quality of their classroom motivating style. While we tested the validity of three possible explanatory mediating processes, only two emerged as individually statistically significant mediators—namely, greater teaching efficacy and a greater tendency to adopt intrinsic (relative to extrinsic) instructional goals.

Teaching efficacy emerged as the first autonomy-supportive-enabling resource teachers acquired during the ASIP. Much of what teachers learned during the ASIP was the “how to” of six recommended instructional behaviors that previous research had documented to be reliable and potent catalysts to enhancing

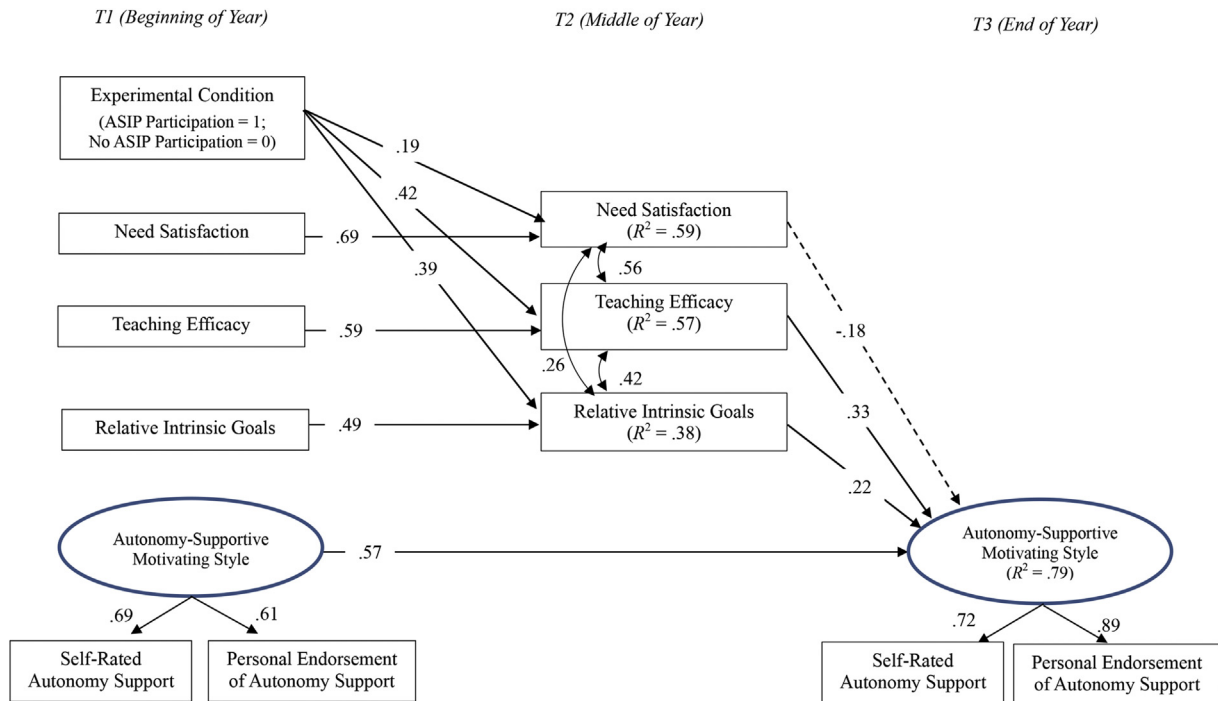


Fig. 2. Hypothesized mediation model to test which of teachers' three personal resources explain why the intervention (experimental condition) worked to increase end-of-year autonomy-supportive motivating style. Solid lines represent statistically significant paths ($p < 0.05$); dashed lines represent statistically non-significant paths. Numbers are standardized beta weights.

ASIP = Autonomy-supportive intervention program.

students' autonomous motivation, classroom engagement, and conceptual learning (Cheon et al., 2012). During the ASIP, teachers learned both the "how to" of each of the following instructional practices and also how to substitute these autonomy-supportive instructional behaviors for common but motivationally-suppressive controlling instructional behaviors: take the students' perspective (to replace take only the teacher's perspective); vitalize inner motivational resources during learning activities (to replace introduce extrinsic motivators); provide explanatory rationales (to replace directives without explanations); use invitational language (to replace use pressuring language); acknowledge and accept negative affect (to replace counter and try to change negative affect); and display patience (to replace pushing for an immediate desired behavior or right answer). Teachers also observed modeling and received encouragement and support for these new autonomy-supportive instructional behaviors as well as hands-on practice, coaching, and scaffolding, which are well-known antecedent conditions to building strong and resilient teaching efficacy beliefs (Tschannen-Moran & Woolfolk Hoy, 2007). Because autonomy-supportive instructional behaviors are highly effective in promoting students' autonomous motivation, classroom engagement, conceptual learning, and desired behavior, teachers' efficacy increased as they observed first-hand these benefits occur in their own classrooms and as a function of their own instructional behavior. Thus, learning the new autonomy-supportive instructional behaviors gave teachers the "skill" they needed to become more autonomy supportive, while acquiring a greater sense of teaching efficacy gave teachers the confidence and "will" they needed to become more autonomy supportive.

Intrinsic instructional goals emerged as the second autonomy-supportive-enabling resource teachers developed during the ASIP. Just as teachers who participated in the ASIP learned to use autonomy-supportive instructional behaviors more, teachers who

participated in the ASIP further learned to pursue intrinsic, relative to extrinsic, instructional goals. The more participating teachers adopted intrinsic instructional goals, the more sense it made for them to move toward a greater reliance on autonomy-supportive instructional behaviors because such acts of instruction (e.g., taking the students' perspective, making the learning activity more interesting and self-relevant) are a natural extension of the pursuit of an intrinsic instructional goal. That is, autonomy-supportive instructional behaviors are the means through which teachers pursue their intrinsic instructional goals. For a teacher who is committed to more extrinsic instructional goals (e.g., promote high test scores), these same autonomy-supportive behaviors make less sense, as more authoritarian (i.e., controlling) ways of teaching may make more sense as a logical means to that end.

The findings from the present study did not support greater need satisfaction as a mediating process. Teachers who participated in the intervention did report a significant increase in T2 need satisfaction during teaching (see the statistically significant path from experimental condition to need satisfaction in Fig. 2). So, these teachers did gain the personal-professional resource. And, autonomy-supportive teaching and need satisfaction during teaching were highly positively correlated both at T1 ($r = 0.59$) and at T2 ($r = 0.55$). Nevertheless, we did not find that these T2 gains in need satisfaction could explain unique variance in teachers' increased T3 autonomy-supportive motivating style.

It is always difficult to interpret a null effect, but it may be a fruitful undertaking to help guide future investigations so we introduce three considerations. First, teachers' need satisfaction was more stable over the semester than were either teaching efficacy or relative intrinsic instructional goals ($\beta_s = 0.69$ vs. 0.59 and 0.49). The intervention may have focused more on how teachers relate to students (the skills and goals they utilize) and less on elevating the teachers' own personal experience during teaching.

We suggest this possibility because the intervention produced a more substantial change in T2 teaching efficacy and intrinsic instructional goals ($\beta_s = 0.42$ and 0.39) than it did on a change in T2 need satisfaction ($\beta_s = 0.19$). Second, all three hypothesized mediators were positively intercorrelated, such that each predictor competed against the other two for explanatory variance (instead of functioning as independent predictors). Had teaching efficacy and relative intrinsic instructional goals not been included in the hypothesized model, it is likely that need satisfaction would have emerged as statistically significant predictor, given its relatively large correlations with T3 autonomy support ($r_s = 0.55$; see Table 1). Third, it could be that the relation between autonomy support and need satisfaction is that greater autonomy support and the constructive classroom changes it brings (e.g., greater student engagement) may lead to gains in teachers' need satisfaction—and not the other way around.

These findings have theoretical and practical importance for improved teaching. Theoretically, the present findings help us understand how these processes (autonomy supportive teaching and its antecedents) complement and support each other. That is, just as ASIP participation boosts teachers' sense of teaching efficacy and adoption of intrinsic instructional goals (i.e., the upper-left side of Fig. 2), boosts in teaching efficacy and instructional goals in turn explain (and even accelerate) subsequent gains in teachers' autonomy-supportive teaching (i.e., the lower-right side of Fig. 2). That is, teaching efficacy and intrinsic instructional goals function as both antecedents to and consequences of greater autonomy-supportive teaching.

Practically, the findings are important because they explain what personal-professional resources teachers are developing week-by-week during their ASIP experience. Consequently, during future ASIPs or similar teacher-focused interventions, we suggest that educators monitor and support not only developing changes in teachers' motivating style and classroom instructional behaviors but also developing changes in these two key professional developmental catalysts to a more autonomy-supportive motivating style.

6. Conclusion

Experienced teachers routinely benefit by participating in a carefully designed ASIP. Knowing this, we investigated what resources teachers acquired during these interventions that might explain why they are able to upgrade the quality of their motivating style. We found that teachers were able to use the intervention experience to become more autonomy supportive to the extent that they were able to build in themselves a greater sense of teaching efficacy and a greater reliance on intrinsic instructional goals.

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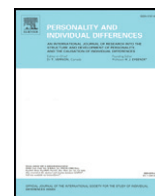
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Autonomy supportive fathers beget system-supporting children: The role of autonomy support on protesting behavior

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ABSTRACT

In this paper we examined the influence of father autonomy support on protesting behavior. Drawing from Relational Model Theory and Self-determination Theory, we hypothesized that individuals' perception and interactions with authority figures are shaped by their experiences with their fathers. When people experience their fathers as empathetic and caring, they are more likely to view other authority figures positively and make benevolent interpretations of their actions. We found support for our hypothesis in two studies conducted in Malaysia and Canada with self-reported engagement in political causes. As expected, perceived father autonomy support was related to positive perception of the government and less protesting against the government. Overall, the present paper provides evidence that children's internalized representations of their fathers are related to intentions and behaviors to change the social systems.

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1. Introduction

As long as governments have existed, it seems that people have found reasons to protest against the organized system. For instance, an artifact from the Antiquity (dated around 2350 BC) recorded a large-scale protest against the ruling government in Babylonia/Sumar for their heavy tax laws (Burg, 2004). More recently, there have been a series of well-publicized revolutions and demonstrations against governments such as the Arab Spring, which took place from 2010 to 2012 in various Arab nations as a result of dissatisfaction against the government. Whether the cause of dissatisfaction was due to corruption in the government or the government's failure to uphold human rights, ultimately the government lost the goodwill of the citizens because the citizens viewed the government as untrustworthy and therefore illegitimate. Yet, research has consistently shown that people are motivated to maintain the system (be it political, social or religious) by perceiving the system to be just and fair (Kay & Jost, 2014). This motive to justify the system fulfills both epistemic and existential motives and is associated with decreased willingness to protest against the system (Jost et al., 2012). Little research, however, has investigated the dispositional and developmental factors that lead people to justify systems. A recent study has shed light on one of such factor, showing that the more people perceived their fathers to be autonomy supportive, the more likely they were to justify the system (Chua & Philippe, 2015). The present paper further investigates parental influence on system

justification by examining the relationship between perceived father autonomy support, and support for the government and people's willingness to protest.

Relational Model Theory (RMT) posits that there are four fundamental relational models: communal sharing (CS), authority ranking (AR), equity matching (EM) and market pricing (MP) (Fiske, 2004). CS relationships are based on what people have in common, AR relationships are based on the hierarchy and ranking between individuals, EM relationships are based on additive differences and maintaining an equal balance, and MP relationships are based on proportionality and cost-benefit analysis. These models are schemas used to organize and structure the social world and they drive an individual's interpretation and responses to social interactions. These models are also used to make moral judgments and to determine what is right or wrong such that an action is perceived as immoral when it violates one of the models (Rai & Fiske, 2011). Of interest to this paper are the AR model and the associated moral action to respect and obedience to a superior. In these asymmetrical linear relationships, the subordinate has to depend and trust on the superior to care and protect him. His fate is, in many ways, determined by the good will (intentions, desires, and actions) of the superior (Houde, Sherman, White, & Sheppard, 2004). Just as it is a moral act to obey his superior, it is a moral act for the superior to protect him. As long as the superior maintains the appropriate role, people will view authority figures as legitimate and just, and will work to maintain and support the system (van der Toorn, Tyler, & Jost, 2011).

To date, few studies have examined how childhood experiences influence one's motivation to legitimize authority and the government. Drawing on both RMT and Self-determination Theory (SDT), we suggest

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that people's schema of authority is shaped by how their parents treated them. The optimal type of support is one that fulfills an individual's fundamental psychological needs of autonomy, competence and relatedness (Deci & Ryan, 2000). SDT termed this type of support as autonomy support and it is characterized by empathy and support of the recipient's authentic being. There is a large body of evidence confirming that autonomy supportive parenting is associated with greater autonomous motivation (e.g. Chirkov & Ryan, 2001; Grolnick & Ryan, 1989), autonomous internalization of values (Chirkov, Ryan, Kim, & Kaplan, 2003) and well-being (Ryan & Deci, 2001). There is much less research on how parental autonomy support shapes people's broader views of society.

Some of the core aspects of relational models are innate and unlearned, and people automatically encode and retrieve social information based on these categories (Fiske, 1995). Despite cultural variations in the prevalence and content of these categories, all humans have the same relational models to organize sociality (Fiske, 2004). Nonetheless, children need to learn how to implement these models in culturally appropriate ways (Fiske, 1991) and the implementation is heavily influenced by their first relationships (Fiske, 1993). Early experiences with one's primary caregivers impact the way a person views, understands and interacts with the social world (e.g. Hart, 2014; Levy, Blatt, & Shaver, 1998). Thus even though all persons will naturally form some relationships in terms of hierarchy—distinguishing between superiors and inferiors—there are individual differences in the representations of authority figures. Some people may be more likely to perceive authority figures as controlling and interpret their actions as malevolent and ill-intentioned while others may perceive the same authority figures as supportive and their actions as well-intentioned and good. The individual's AR model guides the perception and interpretation of the superior's motives and behavior and subsequent responses to the respective authority figure. Therefore, one will view the system as stable and trustworthy just as one's parents were stable and trustworthy, or conversely one will view the system as untrustworthy if one's parents were untrustworthy.

There is initial evidence that fathers play a particularly influential role in shaping the child's view of authority. The more people perceived their fathers to be autonomy supportive, the more they saw the government as just and fair and the less willing they were to change the political system (Chua & Philippe, 2015). Mother autonomy support was not associated with system justification. This might be due to the role of fathers in the family, as fathers tend to play the role of the authority figure in the home and are the symbolic representation of authority in society. Even within the egalitarian 21st century family unit, fathers continue to be perceived as the authority figure in the household (Paquette, 2004) and hold the role of reinforcing the rules of the household and implementing the consequences of rule breaking (Lamb, 2000). The development of the "egalitarian but traditional" framework in the 90s has maintained this role differentiation and fathers continue to have greater power and prestige in the family unit than do mothers (Carrasco & Rohner, 2013; Cotter, Joan, & Reeve, 2011). Within the larger societal context, men continue to dominate high-level positions in organizations and government and women are systematically assigned to positions of lower authority (Alkadry & Tower, 2011). Therefore, we expected that the relational schema of fathers would be strongly associated to other authority figures in society, such that experiences with one's father will influence the development of AR models and the individual's view of the government.

We posit that children who experience their fathers (as compared with mothers) as understanding, empathetic, and supportive will develop a positive schema of authority figures and hold a positive attitude towards authority. Specifically, we expected that father autonomy support would be positively associated with positive perceptions of the government and with attitudes towards maintaining the system. We tested our hypothesis in Malaysia concerning protests for clean elections and in Quebec, Canada concerning protests for accessible education following a planned raise in tuition fees.

2. Study 1

Several unprecedented mass rallies were recently held in Malaysia for free and clean elections. All rallies were regarded as illegal by the government and the government responded by arresting individuals who were involved and by using tear gas and chemical-laced water canons on the protestors.

2.1. Method

2.1.1. Participants, measures and procedure

Advertisements were posted on various online forums and on university campuses to participate on a study on participation in the rally. One hundred and sixty-three people participated in the online survey (102 females, 61 males; $M(\text{age}) = 23.68$ years, $SD(\text{age}) = 7.89$, five missing values). In all analyses, we controlled for the Big Five personality traits (Ten Item Personality Inventory; Gosling, Rentfrow, & Swann, 2003), Satisfaction with Life Scale specific to life in the country (e.g. "The conditions of my life in this country are excellent."; Diener, Emmons, Larsen, & Griffin, 1985), intentions to settle down in the country ("I intend to settle down in this country"), religiosity, and the extent to which participants identified with the country and their ethnic group, gender, and age. We wanted to investigate if father autonomy support influenced willingness to change the system above and beyond these covariates (personality traits and ideological beliefs) which have been shown to contribute to system justification beliefs (Jost, Glaser, Kruglanski, & Sulloway, 2003).

Participants were asked to complete measures of parental support and attitude towards the government and towards the movement. The 9-item autonomy support measure was taken from the 21-item Perception of Parents College Student Scale (Robbins, 1994) and corresponded to the autonomy support subscale of that measure. Participants rated the extent to which they perceived their parents to be autonomy supportive on a 1 (strongly disagree) to 7 (strongly agree) Likert scale. Father and mother autonomy supports were rated separately. Sample items included "My mother seems to know how I feel about things" and "My mother spends a lot of time with me". The Cronbach alphas for perceived mother autonomy support were .86 and for perceived father autonomy support .88.

In addition, participants completed a 3-item measure of their view of the government's response to the movement ("The government really tries to help the people.", "The government presented an acceptable offer to the people." and "The government listened to the people and was open to them."). The Cronbach alpha was .89. They also completed a 5-item measure looking at whether people should be allowed to protest for free elections (e.g. "I believe that the people have a right to express their views", "I believe that the people should stop demanding for free elections (R)"). The Cronbach alpha was .83. Finally, participants rated the extent to which they intended to attend the next rally.

2.1.2. Results and discussion

Means, standard deviations and zero-order correlations are presented in Table 1. Perceived parent autonomy support was highly correlated and surprisingly unrelated to the outcome measures. However, the

Table 1
Means, standard deviations and correlations for Study 1.

	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Mother autonomy support	4.76	1.18	–				
2. Father autonomy support	4.23	1.29	.41**	–			
3. Perceptions of government	2.48	1.21	–.10	.08	–		
4. Agreement with rally	6.14	.91	.01	–.07	–.66**	–	
5. Intention to rally	4.45	2.21	.03	.01	–.39*	.52**	–

Note.

* $p < .05$.

** $p < .01$.

results from the hierarchical linear regressions suggest a likely suppression effect between autonomy support and the outcome measures.

We conducted hierarchical linear regression on perception of government, support for the protests, and intentions to attend the rally (see Table 2). Interestingly, perceived mother autonomy support was negatively related to perception of government. In contrast perceived father autonomy support was positively related to perception of government. Such that, the more participants experienced their mother as autonomy supportive, the more they viewed the government as responding negatively to the protestors. However, the more participants experienced their fathers as autonomy supportive, the more they viewed the government as responding positively to the protestors. The high correlation between perceived mother and father autonomy supports as well as the significant association between perceived parent autonomy support and the outcome measure when both independent variables are included in the same equation suggest that the null zero-order correlations are due to a suppression effect (Mackinnon, Krull, & Lockwood, 2000).

With regard to support for protesting for clean elections, perceived father autonomy support, but not perceived mother autonomy support, was negatively related to support for the protests. Likewise, perceived father autonomy support and not perceived mother autonomy support were negatively related to intentions. We conducted exploratory analyses examining if gender of the child moderated the relationship between autonomy support and the dependent variables. The interaction terms were not significant for any of the dependent variables.

The results from Study 1 revealed that perceived father autonomy support is positively related to perceiving the government, and negatively related to protesting for clean elections, and intentions to participate in the next rally. Perceived mother autonomy support was related to a more negative perception of the government but it was unrelated to support for the movement and intentions to participate in the next rally.

3. Study 2

In the next study, we sought to replicate this finding in Quebec, Canada and to look at actual behaviors against the status quo. It is possible that in a relatively hierarchical low-freedom country such as Malaysia, people are more willing to support the government and to justify the system in order to avoid harsh consequences such as fines or imprisonment (Cichocka & Jost, 2014). We expected that regardless of structure of society, receiving father autonomy support should facilitate the acceptance of the system, even when the system allows for

opposition and that opposition to the system is commonplace. Given the findings of Study 1, we expected that fathers would have a greater influence relative to mothers on children's attitude towards the government.

From February to September 2012, there were a series of student demonstrations against a governmental proposal to increase tuition fees. At its peak, 185 000 Quebec students went on strike, blocking college and university entrances every day and engaging in various other acts of protests, ranging from large-scale petitions, street demonstrations, and sabotage. In response to the protests, the National Assembly of Quebec passed Bill 78 to ensure that no student is denied the right to receive education and restrictions were also imposed on protests near university grounds and protests involving 50 or more people.

3.1. Method

3.1.1. Participants, measures and procedure

Students from two large universities in Montreal, Quebec were contacted to participate in a study on the current student strike. An email invitation was sent to a random number of full time students from the two universities. Participants completed an online survey and were given an opportunity to enter into a draw to win one of three prizes worth \$125. A total of 529 students who were enrolled in an undergraduate or graduate level program responded to the survey. There were 408 females and 121 males, $M(\text{age}) = 25.32$, $SD(\text{age}) = 6.33$.

In this study, our covariates were basic demographic data (age, gender, income, and GPA), the Big Five personality traits (Ten Item Personality Inventory; Gosling et al., 2003), academic satisfaction scale and intentions to complete their studies. The academic satisfaction scale (e.g. "The conditions of my life at school are excellent.") was adapted from the Satisfaction with Life Scale (Diener et al., 1985). The Cronbach alpha was .88. The intentions to complete the program (e.g. "I am determined to complete my program of studies that I am enrolled in.") was measured with a 7-item Likert scale (1 = strongly disagree to 7 = strongly agree). The Cronbach alpha was .76.

As in Study 1, participants completed measures of perceived maternal and father autonomy supports, and perception of the government's response to the strike (e.g., "The government presented an acceptable offer to students"). The reliabilities of these scales were .89 .90 and .93 respectively. To measure their attitude towards the strike, participants rated the extent to which they agreed on 7-item Likert scale (1 = strongly disagree to 7 = strongly agree) with the following three items: "With regard to the current student strike, I...", "With regard to the increase in tuition

Table 2
Hierarchical regression analyses of perception of government, agreement with rally, intention to rally in Study 1.

Step	Variables	Perception of government			Agreement with rally			Intention to rally		
		β	Block F	ΔR^2	β	Block F	ΔR^2	β	Block F	ΔR^2
1	Age	-.26*	1.85	.17	.25**	2.27**	.20	.19	2.46*	.21*
	Gender	.18			.10			.06		
	Religiosity	.06			-.06			.02		
	National identity	-.20			.21†			.12		
	Ethnic identity	-.10			-.04			-.06		
	Neuroticism	-.10			-.06			-.21*		
	Extraversion	-.04			.04			.01		
	Conscientiousness	.05			.04			.06		
	Agreeableness	.13			-.02			-.20*		
	Openness	-.15			.21†			.17		
	Future intentions	.07			-.05			-.03		
2	Country satisfaction	.11	1.58	.01	-.18	2.26*	.04	-.09	2.12*	.01
3	Mother autonomy support	-.31**	2.31**	.10	.12	2.58**	.06	.08	2.23*	.04
	Father autonomy support	.30**			-.29**			-.24*		

Note.

* $p < .05$.

** $p < .01$.

fees, I..." (reverse-scored), and "With regard to the freeze in tuition fees, I...". The Cronbach alpha was .88. Finally, participants rated the frequency (1 = *Never*, 2 = *Once*, 3 = *Sometimes*, 4 = *At several occasions*, 5 = *Regularly*, 6 = *Very regularly*) in which they engaged in activities related to the strike: Wearing a red square as a symbol of protest, marching, signing petitions, protesting Bill 78, and disobeying the police to stop marching. Overall, 68% of the participants reported engaging in at least one of these behaviors at least once. More than half of the participants reported wearing a symbolic red square, signing a petition, and marching at least once (a score of 2 and above) and about 25% reported having disobeyed the police at least once. An index was created by averaging the scores on all of these behaviors. Cronbach alpha was .88. This index was log-transformed as the scores were positively skewed.

3.2. Results and discussion

Means, standard deviations and correlations are reported in Table 3. The correlations revealed that perceived mother autonomy support was unrelated to the dependent variables, but perceived father autonomy support was related to a more positive view of the government's response, greater disagreement with the strike, and less behavioral engagement in the strike.

Next, we conducted hierarchical linear regressions on perceptions of the government, agreement with the strike and behavioral engagement in the strike with father and mother autonomy supports and all our control measures. The results are reported in Table 4. As hypothesized, perceived father autonomy support was significantly related to a positive view of the government's response, and negatively related to agreement with the strike and to participation in the strike. Perceived mother autonomy support was unrelated to the dependent variables.

We conducted exploratory analyses to investigate if gender moderated the relationship between perceived father autonomy support and the dependent variables. As in Study 1, gender did not moderate the results, indicating that both males and females responded in a similar fashion to perceived father autonomy support. Thus, perceived father autonomy support was associated with a more positive view of the government and a lower likelihood of participation in the student strike.

4. General discussion

People naturally gravitate towards organizing some relationships in terms of rank and hierarchy (Fiske, 1993). People also tend to see obedience and deference to superiors as moral and good (Rai & Fiske, 2012). In the current paper, we tested our hypothesis in two very different cultures with different real-life causes. In both studies, we found that perceived father autonomy support was associated with a positive view of the government's response, a negative view of the cause and a decreased willingness to participate in movements intended to change the status quo.

One of the strengths of this paper is that the hypothesis was tested in two different cultures, which revealed unexpected but interesting differences. First, perceived mother autonomy support was associated with a negative view of the government's response in the Asian sample

but not in the Western sample. This may be due to Malaysia being a more conservative culture where husband–wife relationships are usually hierarchical and roles are clearly distinguished and enforced. Thus when a child experiences the lower powered spouse as autonomy supportive, the child might be more sympathetic towards other low powered individuals and more likely to side with the underdog. Second, even though we found support for our hypothesis in both cultures, the effect sizes were larger in Malaysia than in Canada. This might reflect the close family structure in a collectivistic culture such as Malaysia, whereby the child is more influenced by significant others. This might also be due to Canada having greater political freedom as compared with Malaysia, such that attitudes and actions towards the government are less influenced by significant others and more influenced by personal choices.¹

This paper also contributes to the current understanding of people's need to maintain a sense of psychological security (Hart, 2014). To this end, humans have evolved a security system that increases felt security and decreases anxiety. The three components of this system are attachment, self-esteem, and cultural worldviews, and all three components are interrelated. For instance, threats to personal relationships can activate an individual's worldview defenses (e.g. system justification, just world beliefs) and conversely threats to the system lead to individuals' drawing closer to their loved ones (Hart, Shaver, & Goldenberg, 2005). Our results provide further nuance to the theory by suggesting that individuals who are securely attached to autonomy supportive fathers may also be more likely to defend the system because they genuinely believe the system to be good, as their fathers were good. These individuals may not be reacting against threats due to insecurity, but rather because they are securely attached and maintain their benevolent interpretations of the actions of authority figures. As in romantic relationships (Murray, Holmes, & Griffin, 1996), these individuals view the system through rose-colored lenses and interpret the actions of the authority figure more positively, enabling them to maintain a secure attachment to the father figure and by extension to the system. There is indirect support for our hypothesis in the attachment and system justification literature such that individuals who have a sense of secure base are also more likely to view God, the ultimate authority figure, as loving and caring, as opposed to distant (Kirkpatrick, 1998). Secure attachment is also related to increased religiosity (Kirkpatrick, 1998), which is in turn associated with greater system justification (Jost et al., 2014).

Some limitations need to be underscored regarding the present research. First, the samples consisted of mainly students and may not be representative of the general population. However, as the second study directly examined an issue that was pertinent to students, it is reasonable to use a student sample. In addition, other studies using community samples have found that father autonomy support is related to higher levels of system justification (Chua & Philippe, 2015). Second, the two studies had cross-sectional designs. Therefore, the relationship between father autonomy support and willingness to protest remains unclear. While the alternative explanation (willingness to protest leading to lower perceptions of father autonomy support) seems theoretically unlikely and not the most parsimonious explanation, there may be a third unmeasured variable accounting for this relationship. Experimental studies that prime autonomy vs. controlling father support and examine its relationship on willingness to protest and perceptions of social inequality are required to confirm the actual role of perceptions of father autonomy support as dispositional developmental factors influencing system justification and willingness to protest. Third, it is still unknown whether actual father autonomy support or just perceptions from the child drive the effect. Some studies found that objective environmental autonomy-supporting aspects do correlate with people's perceptions of autonomy support (e.g. Philippe & Vallerand, 2008). Obtaining fathers' reports as well as children's perceptions of parental

Table 3
Means, standard deviations and correlations in Study 2.

	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Mother autonomy support	5.12	1.24	–				
2. Father autonomy support	4.42	1.43	.31*	–			
3. Perception of government	2.24	1.49	.08	.13**	–		
4. Agreement of strike	5.03	1.72	–.05	–.15**	–.72**	–	
5. Strike behaviors ^a	1.80	0.90	–.02	–.11*	–.54*	.69**	–

Note.

^a Untransformed means are reported.

* $p < .05$.

** $p < .01$.

¹ We would like to thank an anonymous reviewer for pointing out this effect.

Table 4

Hierarchical regression analyses of perception of government, agreement with strike and strike behaviors in Study 2.

Step	Variables	Perception of government			Agreement with strike			Strike behaviors		
		β	Block F	ΔR^2	β	Block F	ΔR^2	β	Block F	ΔR^2
1	Age	.04	3.76**	.065	.02	5.00**	.084	.01	8.70**	.139
	Gender	.06			-.08			.02		
	Income	.11*			-.16**			-.16**		
	GPA	-.03			.05			.11*		
	Neuroticism	-.06			-.02			-.08		
	Extraversion	-.03			.00			.08		
	Conscientiousness	.08			-.17**			-.22**		
	Agreeableness	.04			-.02			-.16**		
	Openness	-.14**			.12*			.17**		
2	Future intentions	.07	3.43**	.007	-.09	4.56**	.009	-.09*	7.75**	.011
	Academic satisfaction	-.08			.08			.10		
3	Mother autonomy support	.04	3.51**	.014	.02	4.85**	.022	.02	7.28**	.014
	Father autonomy support	.11*			-.16**			-.13**		

Note.

* $p < .05$.** $p < .01$.

autonomy support could be a way to shed more light on this issue. It is also possible that individuals who have positive attitudes towards the government just have unrealistically positive views about their fathers. Collecting fathers' reports of their parenting styles will allow us to tease apart perception from reality. Regardless of whether individuals have overly positive or overly negative views of their fathers, we believe that it is precisely this perception of the father figure that colors one's experiences with other authority figures. Indeed past studies have found that a person's perceptions of autonomy are a better predictor of psychological adjustment than the actual reality (O'Connor & Vallerand, 1994).

Our findings also suggests that there might be a silver lining to receiving paternal controlling support, which is usually associated with ill-being (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011). Yet, in light of the fact that system change occurs when the system is viewed as unjust and unfair (Martorana, Galinsky, & Rao, 2005), it is possible that individuals who have received controlling support are quicker to perceive the system as unjust and thus act to change the system. Future research could measure both controlling and autonomy support separately and examine the differential effects of the two types of support from a just or an unjust authority figure.² Another interesting avenue for future research is the investigation of the role of emotions in this relationship. For instance, past research has shown that controlling support leads to greater anger (Assor, Kaplan, Kanat-Maymon, & Roth, 2005) and that anger mediates the relationship between system justification and willingness to change the system (Jost et al., 2012). Receiving controlling support may be a double edged sword such that the recipient may be the rebel without a cause, but also the provocateur of important system change.

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Declaration of conflict of interest

The author(s) declared no potential conflicts of interests with respect to the authorship and/or publication of this article.

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Fathers' Autonomy Support and Social Competence of Sons and Daughters

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Relations between paternal autonomy support and four aspects of adolescent social competence and responsibility at age 16 were examined using data from the NICHD Study of Early Child Care and Youth Development. With controls on maternal autonomy support, significant relations were observed between paternal autonomy support and three of the four aspects of social behavior examined for daughters (but not sons). For daughters, the influence of paternal autonomy support was moderated by family conflict for both resistance to peer pressure and responsible behavior. The temperament of daughters moderated the relation between paternal autonomy support and resistance to peer pressure, as well. Findings were interpreted with respect to the dynamics of parent-child relationships and increasing individuation during adolescence.

Prior to 1980, most research on fathers focused on their roles as disciplinarian, breadwinner, and gender-role model (primarily with sons). Recent conceptualizations of fathering have broadened to consider a multiplicity of functions performed by fathers within the family system (Cabrera, Fitzgerald, Bradley, & Roggman, 2014; Grossmann, Grossmann, Kindler, & Zimmermann, 2008; Lamb & Lewis, 2010; Lamb & Tamis-LeMonda, 2004). To a substantial degree, research on fathering has developed somewhat independently of research on mothering because many scholars believe that fathering is fundamentally different from mothering.

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They argue that the effects of fathering cannot be explained by the traditional parenting models used to guide research on mothers (Day & Mackey, 1989; Popenoe, 1996). More recent conceptualizations of fathering have highlighted indirect effects on offspring (e.g., via marital support) and paternal behaviors that were once considered the primary domain of mothering (e.g., nurturance; Lamb, 2000; Paquette, 2004). Theories have evolved to highlight positive forms of father involvement and their influence on positive child outcomes (Cabrera, Tamis-LeMonda, Bradley, Hofferth & Lamb, 2000; Paquette, 2004; Pleck, 2007). Of particular interest to the current study is a growing consensus that the link between parental sensitive support for autonomy and adolescent social competence may be stronger for fathers than for mothers (Grossman et al., 2002; Marsiglio, Amato, Day & Lamb, 2000; NICHD Early Child Care Research Network [ECCRN], 2004; Paquette, 2004). As yet, however, few studies have focused on positive paternal behaviors and their influence on adolescent social competence and responsibility.

The focus of this study is on fathers' sensitive support for autonomy, partly because autonomy support from parents (and others) is believed to promote self-regulatory behavior and the individuation process during early adolescence, with implications for long-term social competence and social relationships (Oudekerk, Allen, Hessel, & Molloy, 2015). There is considerable evidence that parents' sensitive autonomy support helps foster children's self-regulatory competencies that lead to adaptive behavior and achievement (Allen, Chango, Szwed, Schach, & Marston, 2012; Bradley & Corwyn, 2007, 2013; Dishion & Patterson, 2006; Eamon, 2001; Eisenberg et al., 2005; Guay, Ratelle, & Chantal, 2008). Research suggests that the link between self-regulatory competencies and adaptive functioning is particularly strong during adolescence (Gestsdottir & Lerner, 2008). Behavior that supports autonomy stands in contrast to psychologically controlling behavior, which can lead adolescents to discount their own judgment and be more susceptible to external influences (Grolnick, 2003; Joussemet, Landry & Koestner, 2008; Oudekerk et al., 2015). Theoretically, actions that support autonomy include encouragement to express oneself and encouragement to make one's own decisions. These stand in contrast to behavior that is coercive, intrusive, or otherwise psychologically controlling (Barber, Bean & Erickson, 2001; Silk, Morris, Kanaya, & Steinberg, 2003).

According to *self-determination theory* (SDT), humans are intrinsically motivated to engage in interesting activities and to adopt the values and behaviors observed in their social environments (Ryan, Deci, Grolnick, & La Guardia, 2006). These motivational tendencies serve to promote the

universal human needs to feel related, competent, and autonomous. As applied to parenting, SDT posits that parental autonomy support helps children learn autonomously to self-regulate their behavior, values, and attitudes that promote successful development (Joussemet et al., 2008). However, Paquette (2004) borrowed tenants from *attachment theory* to argue that fathers must be sensitive to the child and build an emotional bond before autonomy support will have the desired effect on children. Indeed, research has found that paternal sensitivity and synchrony in exploratory play help children form a secure attachment to fathers, a base from which children develop capacities and proclivities to function as socially competent agents later in life (Bretherton, 2011; Palm, 2014).

Although research on the father–adolescent relationship is limited, there is suggestive evidence that the link between parental sensitive support for autonomy and adolescent social competence may be stronger for fathers than for mothers (Leidy, Schofield, & Parke 2013). According to arguments made by Paquette (2004; see also Grossman et al., 2002; Marsiglio et al., NICHD ECCRN, 2004), paternal sensitive support for autonomy may play a bigger role than maternal sensitive support for autonomy in facilitating the processes by which children become more agentic and learn to adjust to the demands of the world outside the immediate family, especially as regards social competence (Flanders, Leo, Paquette, Pihl, & Séguin, 2009; Paquette 2004) and peer relations (Parke et al., 2004). The NICHD Early Child Care Research Network (2004) found that, while controlling for mothers' behavior, fathers' sensitive autonomy support predicted teacher-reported social skills (e.g., cooperation, assertion, and self-control in the school environment) during the early school years. However, determining the precise impact of parental behavior on child outcomes is complicated because both theory and evidence support interconnectedness between family relationships and how the behavior of each parent functions in relation to children's behavioral development (Erel & Burman, 1995; O'Brien, 2004). Thus, any effort to identify how paternal behavior is implicated in offspring development must include a consideration of the broader network of family relationships within which it occurs.

Methodological Challenges

Evidence has begun to accumulate that a father's nurturance of his child, as well as the quality of the marital relationship, has an influence on a child's well-being (Cummings, Goeke-Morey, & Raymond, 2004; Dette-Hagenmeyer, Erzinger, & Reichle, 2014; Lamb, 2000; Paquette, Coyle-Shepherd, & Newland, 2013). However, the relatively new co-parenting

father paradigm has presented a number of challenges to researchers interested in delineating the effects of fathers on child development. With both fathers and mothers nurturing children, there is the need to differentiate *paternal effects* from *maternal effects* (Amato & Rivera, 1999; Davidov & Grusec, 2006; Marsiglio et al., 2000; Paquette, 2004; Pleck, 2010). Thus, in order to assess the unique influences of fathers on social competence, mothers' sensitive support for autonomy was statistically controlled in this study. A second complication in interpreting results on fathering is single-informant bias (Pleck, 2007). If the same informant provides data on both the independent and the dependent variables, the observed effect will likely be inflated due to shared method variance. The critical importance of these issues is highlighted in four separate reviews of research on fathering (Amato & Rivera, 1999; Leidy et al., 2013; Marsiglio et al., 2000; Pleck, 2010). All four reviews found that very few fathering studies addressed these issues, but those that did tended to find that fathers have influences on children's development distinguishable from mothers' influences.

Moderators of the Effects of Parenting on Child Outcomes

A third methodological challenge to research on parenting is that observed parental effects vary, depending on child characteristics such as gender and temperament, and family contextual factors such as marital conflict (Aldous & Mulligan, 2002; Gallagher, 2002; Newland, Coyl-Shepherd, & Paquette, 2013). There is a long history of belief that mother–daughter, father–daughter, mother–son, and father–son relationships are each distinct from one another (Russell & Saebel, 1997; Snyder, 1989). Some evidence and some theory (e.g., gender schema theory; Bem, 1985) suggest that fathers and mothers may have different influences on sons and daughters. However, evidence is mixed in this regard. Some studies show fathers have a greater influence on daughters than sons (Kosterman, Haggerty, Spoth, & Redmond, 2004; Werner & Silbereisen, 2003), whereas other studies show fathers' autonomy support has a greater influence on sons (Crockenberg, Jackson, & Langrock, 1996; Dodge, Bates, & Pettit, 1990; NICHD Early Child Care Research Network, 2008). In a study of 6- to 8-year-old children, Davidov and Grusec (2006) found that both maternal responsiveness and paternal responsiveness were predictive of children's regulation of negative affect, but only maternal responsiveness was predictive of prosocial behavior (paternal responsiveness was almost significant) and results varied somewhat by child gender. In contrast, Leidy et al. (2011) found that father acceptance was associated with outcomes among adolescent

daughters only (including positive behavior and peer acceptance), whereas father involvement benefited sons more than daughters. As already implied, part of the challenge in trying to resolve inconsistencies about father effects is that too few studies have adequately controlled for maternal parenting and other critical features of family life.

The differential susceptibility hypothesis (Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2007; Belsky & Pluess, 2009) and notions pertaining to vantage sensitivity (Pluess & Belsky, 2013) suggest that relations between parenting and child outcomes are often moderated by child temperament. The *differential susceptibility hypothesis* predicts that children with difficult or reactive temperaments will be more susceptible to positive as well as negative environmental influences. By contrast, the *vantage sensitivity hypothesis* predicts that some personality attributes increase the likelihood of benefit from supportive parenting but the same attributes may not increase susceptibility to the negative consequences of adverse environments. Because autonomy support is presumably a positive experience, both hypotheses predict that children with difficult temperaments will benefit more from autonomy support than will children with easy temperaments. One study separated the effects of fathers and mothers on sons and daughters (Ramanchandi, van IJzendoorn, & Bakermans-Kranenburg, 2010). Results showed that more highly reactive girls exhibited fewer problem behaviors and more prosocial behavior at age 6 when fathers were more involved. Similar findings did not emerge for boys, however. A few studies have utilized data from the NICHD Study of Early Child Care and Youth Development (SECCYD) to test the differential susceptibility hypothesis, but those studies didn't single out parenting by fathers. Although the studies investigated a variety of parenting practices and child outcomes during different developmental periods, each study found that child temperament moderated the relations between parenting (including autonomy support) and child outcomes (Bradley & Corwyn, 2008; Pluess & Belsky, 2010; Stright, Gallagher, & Kelley, 2008). Stright and colleagues (2008) reported that temperament in infancy moderated the relation between sensitive, autonomy-supportive parenting and four different child outcomes in the first grade (i.e., academic performance, social skills, relationship with teacher, and relationships with peers). Children with difficult temperaments benefited more from sensitive, autonomy-supportive parenting than did children with less difficult temperaments.

According to Davies and Cummings (1994), exposure to interparental conflict can be highly disturbing to children, leading to heightened emotional arousal and adjustment problems. In their meta-analysis, Erel and Burman (1995) found a link between the quality of the marital relationship

and the quality of the parent–child relationship. There was both the possibility of spillover from marital conflict into the parent–child relationship (with its potential for undermining the influence of positive parenting practices) and from modeling of productive social interactions. As regards the former, Vairami and Vorria (2007) found that, when parents fought, adolescents had more difficulty in peer relationships. There is theory (the *fathering vulnerability hypothesis*), with some supporting evidence, that paternal behavior may be more affected by marital discord than maternal behavior (Cummings, Merrilees, & George, 2010; Krishnakumar & Buehler, 2000). Buehler and Gerard (2002) found that paternal involvement with adolescents was less in the context of marital conflict but that marital conflict did not have the same impact on maternal involvement with adolescents. In the same study, marital conflict had greater consequences for daughters' adjustment than for sons' adjustment. Moreover, two studies found that marital conflict had a stronger influence on fathers' parenting than mothers' parenting, especially as regards the parenting of daughters (Kerig, Cowan, & Cowan, 1993; Stoneman, Brody, & Burke, 1989). In the Kerig et al. study, fathers were more authoritarian toward daughters than sons, and there was a larger difference when marital conflict was high. Stoneman et al. concluded that the relations between marital conflict and inconsistent parenting was stronger between fathers and daughters than any other parent gender by child gender combination. An interesting corollary of the fathering vulnerability hypothesis is that marital conflict has differential effects on fathers' relations with sons and daughters, depending on the parenting behavior and child outcome under study (Cummings et al., 2010; Katz & Gottman, 1993; Snyder, 1989). Russell and Saebel (1997) argued that future research aimed at determining unique effects of mother–daughter, father–daughter, mother–son, and father–son relationships needed to recognize and control for the quality of the marital relationship.

Research and theory suggest that supportive, autonomy-promoting behavior on the part of both parents should facilitate social competence and promote responsible behavior in children (Denham et al., 2000; Flouri, 2008). To explicate more fully how paternal autonomy support is implicated in adolescent social development, we selected two measures (self-control and social responsibility) that capture relatively broad aspects of social development and two measures (resistance to peer pressure and affiliation with positive peers) that capture peer relationships. The latter seemed particularly relevant given the importance of peer relationships during midadolescence (Steinberg & Monahan, 2007). We investigated these relations with paternal autonomy support, while

controlling for maternal autonomy support, marital conflict, and family income-to-needs ratio. Based on evidence that fathers may have different influences on sons and daughters, separate models were tested for sons and daughters. In addition, based on research on the differential susceptibility hypothesis and fathering vulnerability hypothesis, we tested whether child temperament and marital conflict moderate the paternal autonomy support–socially responsible behavior relationship. Despite limitations in extant research pertaining to the influence of fathers' autonomy support on social competence during adolescence, our review of the extant literature suggests that fathers' autonomy support has an independent influence on the social development of children that may differ for boys and girls and may be conditioned by child temperament and marital conflict.

Method

Participants

The data for this study were taken from the NICHD SECCYD. Families were recruited through hospital visits shortly after a child birth during calendar year 1991. Families lived within 1 hr of one of 10 research sites: Little Rock, AR; Irvine, CA; Lawrence, KS; Boston, MA; Philadelphia, PA; Pittsburgh, PA; Charlottesville, VA; Morganton, NC; Seattle, WA; and Madison, WI. Mothers were required to be healthy, older than 18 years, and conversant in English, whose singleton birth was normal, and families had to be living in a reasonably safe neighborhood. Of 1,364 families that completed initial data collections at 1 month, 618 had valid scores on all study variables when the dependent variable was adolescent reported self-control. The primary reason for the reduced sample size is because many fathers did not participate (e.g., only 741 completed the marital conflict scale at the fifth grade). Those 618 participants with complete data constitute the primary analytic sample for this report. Comparisons between these 618 participants and the 746 on whom complete data were unavailable showed that participant mothers were older (29.89 years at 1-month interview vs. 26.63 years), better educated (14.98 vs. 13.62 years), less likely to be of minority status (10.4% vs. 23.2%), and better off financially (mean income-to-needs ratio = 4.81 vs. 3.13). Most of the sample described themselves as White (89.6%), followed by Black (6.1%), Asian (2.6%), and other (1.7%). More details on the study design are available at <http://www.nichd.nih.gov/research/supported/seccyd/overview.cfm/>.

Materials and Procedures

Face-to-face interviews and direct observations were conducted when children were 1 and 6 months and 1¼, 2, 3, and 4½ years old and during first, third, fifth, and sixth grades. Information about family context was obtained from telephone interviews every 3–6 months from birth to school entry and during the fall and spring of each academic year through sixth grade. The entire data-collection protocol was reviewed by a steering committee supervised by the NICHD and by institutional review boards of the 10 participating institutions responsible for data collection.

Family demographics. *Family income-to-needs ratio (ITN)* was calculated from maternal reports of all sources of income, including public assistance at 1 and 6 months and 1¼, 2, 3, and 4½ years, plus kindergarten, first, third, fourth, and fifth grades. Family ITN at each point was calculated by dividing total household income by the poverty threshold established for households of a given family size. A mean ITN was calculated based on data from 1 month through fifth grade, consistent with previous reports from the NICHD Early Child Care Research Network (2001). *Gender of child* was coded 0 = *male* and 1 = *female*.

Maternal and paternal autonomy support. Videotapes of structured interactions between the parent and the target child were used to construct ratings of parental behaviors by using a 7-point rating scale (1 = *very low* to 7 = *very high*). Data were collected by research assistants who completed centralized training sessions and passed certification tests. Videotapes of the parent–child interactions were coded at a single location by raters who were blind to specifics of the study. Inter coder reliability was established by assigning coders to random sample of approximately 20% of the tapes. The intraclass correlation coefficient exceeded .83 for each assessment period. The observation task at 6 months had two components. In the first 7 minutes, parents were asked to play using any toy or object available in the home or none at all; for the remaining 8 minutes, parents were given a standard set of toys to use in play with their infants. At 1¼, 2, 3, and 4½ years and first grade, the observation procedures followed a 3-boxes task in which parents were asked to show their children age-appropriate toys from three containers and to do so in a specified order (for more detailed descriptions, see NICHD ECCRN, 2001, 2008). During the third-grade and fifth-grade structured interactions, the parent and adolescent discussed one or more topics of disagreement for 8 minutes.

At all assessment points, we derived an overall composite score for support for autonomy based on summing scores from three key aspects of autonomy support. Scores on each component could range from 1 to 7; thus, scores on the overall composite could range from 3 to 21. The maternal

autonomy support measure included all assessments, but the paternal autonomy support measure was composed of measures at 4½ years and third and fifth grades. The composites at 6 months and 1¼ and 2 years represented maternal sensitivity, positive regard to the child, and intrusiveness (reverse coded). Autonomy support at 3 and 4½ years represents supportive presence, respect for autonomy, and hostility (reverse coded). At first grade, rating scales for supportive presence, respect for autonomy, and quality of assistance were combined to create a composite. For the third-grade and fifth-grade composites, parents were rated on sensitivity, respect for adolescent's autonomy, and hostility (reverse coded). Following procedures used by the NICHD Study of Early Child Care (NICHD ECCRN, 2001) and many other studies (e.g., Bradley & Corwyn, 2007; Brooks-Gunn, Han, & Waldfogel, 2002), a cross-age composite was computed by standardizing the scores at each age and then averaging all eight scores for mothers and all three scores for fathers.

Temperament. At 1 and 6 months, *temperament* of the child was assessed with questionnaires adapted from the Infant Temperament Questionnaire (Carey & McDevitt, 1978). The 1-month temperament measure consisted of 14 questions ($\alpha = .67$), and the 6-month temperament measure consisted of 28 questions ($\alpha = .81$). Responses ranged from 1 = *almost never* to 6 = *almost always*. Mothers responded to statements like "My baby is fussy," "My baby appears bothered," "My baby is calm," "My baby moves a lot," "My baby is pleasant when first arriving in unfamiliar places," "My baby cries when left to play alone," and "My baby's hunger cry is a scream rather than a whimper." The questionnaire items were intended to assess the baby's approach, activity, intensity, mood, and adaptability. The 1-month and 6-month temperament scores were standardized and summed to form the temperament measure used in this study.

Marital conflict. When study children were in the fifth grade, fathers that lived in a long-term relationship with a partner completed a standardized relationship questionnaire (Braiker & Kelley, 1979). The parental conflict subscale consisted of five items ($\alpha = .63$), each rated on a 9-point scale (1 = *not at all* to 9 = *very much*). Questions addressed overt marital conflict such as arguing, feeling angry, trying to change your partner, and communicating negative feelings.

Self-control. Mothers and teachers completed the Social Skills Rating System (SSRS; Gresham & Elliot, 1990) when children were in sixth grade. The self-control scale from the SSRS taps socially acceptable responses in challenging social situations as perceived by mothers ($\alpha = .83$) and teachers ($\alpha = .88$). The scale consists of 10 questions asking the perceived frequency (0 = *never*, 1 = *sometimes*, and 2 = *very often*) of behaviors such as

“responds appropriately when hit or pushed by other children,” “controls temper when arguing with other children,” “receives criticism well,” and “politely refuses unreasonable requests.” The self-control measure was the mean of mother and teacher standardized scores.

Resistance to peer influence. Adolescents completed a modified version of Steinberg’s Resistance to Peer Influence questionnaire in the sixth grade. The questionnaire contains nine items. Five questions were reverse coded (e.g., “I go along with my friends just to keep them happy”) so that higher scores represented resistance to peer pressure. Four items were worded in the “resists peer pressure” direction (e.g., “It’s pretty hard for my friends to get me to change my mind”). Questions were on a 4-point scale, with response values of 1 = *not at all true*, 2 = *not very true*, 3 = *sort of true*, and 4 = *very true* ($\alpha = .63$).

Personal responsibility. As part of the SSRS (Gresham & Elliot, 1990), mothers responded to 10 “How often?” questions pertaining to their perception that the adolescent demonstrates responsible behavior. Responses ranged from 0 = *never* to 2 = *very often* and had modest internal consistency ($\alpha = .69$). Sample items included “Appropriately questions unfair household rules,” “Asks permission before using others’ property,” “Requests permission before leaving the house,” and “Reports accidents to the appropriate person.”

Involvement with positive peers. At sixth grade, mothers answered a nine-item questionnaire designed to describe the group of children that the study child “hangs out with,” with a focus on the level of maturity and responsible behavior. Responses were from 1 = *definitely no* to 5 = *definitely yes* ($\alpha = .80$). Sample items were these: “Some of these kids are bad influences on my child, these kids are often in trouble,” “I worry when my child is with these kids,” and “These kids are hard workers.” Teachers responded to a 10-item positive-peer-group questionnaire with ratings ranging from 1 = *strongly disagree* to 5 = *strongly agree* ($\alpha = .91$). Sample items include these: “Take turns effectively,” “Work well together,” “Negotiate peacefully to settle issues,” and “Get mad at each other a lot.” A positive-peers score was the mean of standardized mother and teacher scores.

Procedure

In order to reduce possible problems associated with collinearity, all independent variables that were involved in interactions were centered before interaction terms were created (Aiken & West, 1991), and interactions were included, one at a time, in the second step of a hierarchical regression procedure. A bivariate correlation between an independent variable and dependent variable (see Table 1) is the same as including the independent

Table 1. Correlations of study variables by child gender

	1	2	3	4	5	6	7	8	9
1. Self-control	1.00	.27**	.47**	.40**	.22**	-.17**	.26**	-.06	.28**
2. Resist peer pressure	.20**	1.00	.15**	.17**	.17**	.00	.18**	-.03	.14**
3. Responsible behavior	.44**	.13*	1.00	.20**	.18**	-.18**	.23**	-.01	.23**
4. Positive peers	.37**	.07	.22**	1.00	.14*	-.08	.12*	-.12*	.15**
5. Income-to-needs ratio	.20**	-.04	.14*	.14*	1.00	.01	.16**	.02	.30**
6. Child temperament	-.06	.00	-.03	-.09	-.00	1.00	.04	.08	.03
7. Paternal autonomy support	.19**	.09	.16**	.15*	.18**	-.06	1.00	-.04	.34**
8. Marital conflict	-.16**	-.07	-.11	-.11	.00	.03	-.02	1.00	.05
9. Maternal autonomy support	.30**	.07	.23**	.21**	.36**	-.15**	.41**	-.09	1.00

Note. Coefficients above the diagonal are for females, and coefficients below the diagonal are for males.

** $p < .01$.

* $p < .05$.

variable as the first step in a hierarchical regression analysis (i.e., before controlling for other independent variables). In addition, for all models in this study, tolerance was always above .72—indicating that there was not a collinearity problem. An intuitive understanding of the nature of significant interactions was achieved by plotting simple slopes at three values of the moderator: 1 *SD* below the mean, the mean, and 1 *SD* above the mean (Aiken & West, 1991). Although the power to detect interactions is low (McClelland & Judd, 1993), we used a conservative α level of .05 for interactions.

Results

Self-Control

Daughters. Correlations for all study variables were calculated for sons and daughters separately (see Table 1). Marital conflict was the only independent variable that was not significantly correlated with self-control, $r(305) = -.06$, $p = .34$, and paternal and maternal autonomy support were

similarly related to self-control, $r(305) = .26$, $p = .00$, and $r(305) = .28$, $p = .00$, respectively. Multiple regression analysis found that income-to-needs ratio ($\beta = .142$, $p = .012$), child temperament ($\beta = -.182$, $p < .01$), paternal autonomy support ($\beta = .179$, $p < .01$), and maternal autonomy support ($\beta = .176$, $p < .01$) were significant predictors of adolescent daughters' self-control (Table 2). Neither interaction was significant.

Sons. Child temperament was the only independent variable that was not significantly correlated with self-control, $r(308) = -.06$, $p = .27$, and maternal autonomy support had a stronger relationship with self-control than did paternal autonomy support, $r(308) = .30$, $p = .00$, and $r(308) = .19$, $p = .00$, respectively. Regression analysis showed that income-to-needs ratio ($\beta = .115$, $p = .048$), marital conflict ($\beta = -.141$, $p < .01$) and maternal autonomy support ($\beta = .203$, $p < .01$) were significant predictors of sons' self-control (Table 2). The Marital Conflict $\times$ Paternal Autonomy Support interaction was not significant ($\Delta R^2 = .009$, $p = .071$) and the Temperament $\times$ Paternal Autonomy Support interaction was not significant ($\Delta R^2 = .002$, $p = .452$).

Table 2. Hierarchical multiple regression analyses predicting adolescent self-control from paternal autonomy support, child temperament by paternal autonomy support interaction, and marital conflict by paternal autonomy support interaction

Predictor	Child gender			
	Female ($n = 307$)		Male ($n = 310$)	
	ΔR^2	β	ΔR^2	β
Step 1	.161**		.123**	
Income-to-needs ratio		.142*		.115*
Child temperament		-.182**		-.025
Paternal autonomy support		.179**		.086
Marital conflict		-.045		-.141**
Maternal autonomy support		.176**		.203**
Step 2	.005		.009	
Marital Conflict $\times$ Paternal Autonomy Support		-.072		-.101
Second Step 2 (in separate analysis)	.000		.002	
Temperament $\times$ Paternal Autonomy Support		-.002		.041

* $p < .05$.

** $p < .01$.

Resistance to Peer Pressure

Daughters. Child temperament and marital conflict were not significantly related to resistance to peer pressure, $r(300) = .00, p = .95$, and $r(300) = -.03, p = .56$, respectively, and paternal autonomy support and maternal autonomy support were similarly related to resistance to peer pressure, $r(300) = .18, p = .00$, and $r(300) = .14, p = .01$, respectively. The regression model found that paternal autonomy support ($\beta = .133, p = .029$) and income-to-needs ratio ($\beta = .136, p = .020$) were significant predictors of daughters' resistance to peer pressure (Table 3). The Marital Conflict $\times$ Paternal Autonomy Support interaction was significant ($\Delta R^2 = .016, p = .027$) and the Temperament $\times$ Paternal Autonomy Support interaction was significant, as well ($\Delta R^2 = .020, p = .012$). Plotting the interaction with marital conflict indicated that daughters in homes with high marital conflict benefited most from paternal autonomy support but there was not a positive effect for daughters in homes with low marital conflict (Figure 1). The plot of the Temperament $\times$ Paternal Autonomy Support interaction shows that father autonomy support had a positive influence on daughters with easy temperaments, but daughters with difficult temperaments did not benefit from fathers' autonomy support (Figure 2).

Sons. There were no significant correlations between independent variables and sons' resistance to peer pressure (Table 1). None of the main effects or interactions were significant in the regression analysis (Table 3).

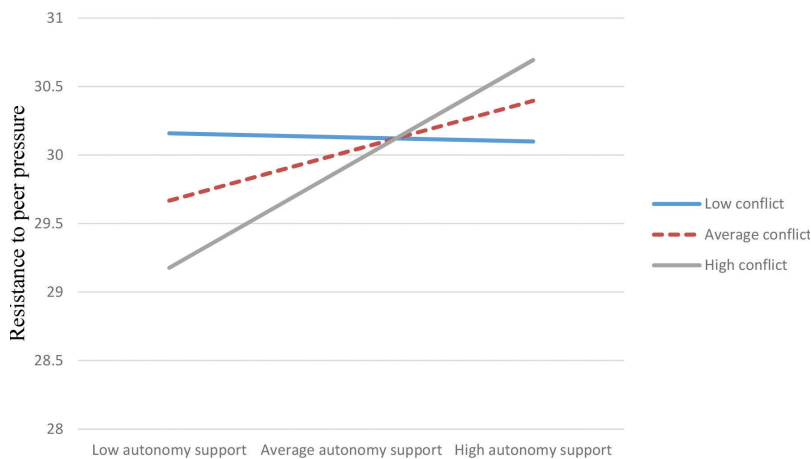


Figure 1. Plot of daughters' resistance to peer pressure in the sixth grade as a function of fathers' autonomy support at low, average, and high levels of parental conflict.

Responsible Behavior

Daughters. Marital conflict was the only independent variable that was not related to responsible behavior, $r(301) = -.01$, $p = .85$, and paternal and maternal autonomy support had the same bivariate relationship with responsible behavior, $r(301) = .23$, $p = .00$. Temperament ($\beta = -.194$, $p < .01$), paternal autonomy support ($\beta = .171$, $p = .010$), and maternal autonomy support ($\beta = .141$, $p = .023$) were significant predictors of daughters' responsible behavior in the regression analysis (Table 4) and the Marital Conflict $\times$ Paternal Autonomy Support interaction was significant, as well ($\Delta R^2 = .012$, $p = .047$). Daughters from high-conflict homes benefited more from father support than did daughters from low-conflict homes (Figure 3).

Sons. Income-to-needs ratio, paternal autonomy support, and maternal autonomy support were significantly related to responsible behavior, $r(303) = .14$, $p = .01$, $r(303) = .16$, $p = .00$, and $r(303) = .23$, $p = .00$, respectively. However, after controlling for all study variables in the regression analysis, the only significant influence on sons' responsible behavior was maternal autonomy support ($\beta = .155$, $p = .019$).

Positive Peers

Daughters. Child temperament was the only independent variable that was not related to positive peers, $r(293) = -.08$, $p = .19$. and paternal autonomy support and maternal autonomy support were similarly

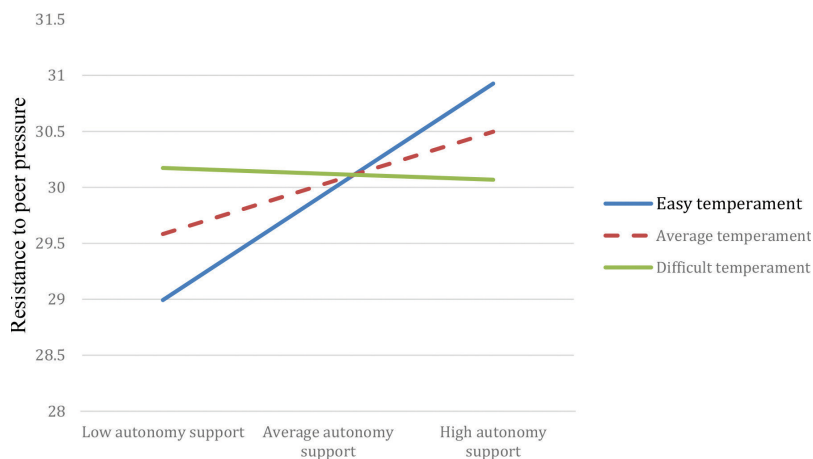


Figure 2. Plot of daughters' resistance to peer pressure in the sixth grade as a function of fathers' autonomy support at easy, average, and difficult levels of temperament.

Table 3. Hierarchical multiple regression analyses predicting adolescent resistance to peer pressure from paternal autonomy support, child temperament by paternal autonomy support interaction, and marital conflict by paternal autonomy support interaction

Predictor	Child gender			
	Female (n = 302)		Male (n = 305)	
	ΔR^2	β	ΔR^2	β
Step 1	.056**		.019	
Income-to-needs ratio		.136*		-.071
Child temperament		-.002		.017
Paternal autonomy support		.133*		.074
Marital conflict		-.034		-.067
Maternal autonomy support		.055		.067
Step 2	.016*		.000	
Marital Conflict $\times$ Paternal Autonomy Support		.127*		.002
Second Step 2 (in separate analysis)		.020*		.006
Temperament $\times$ Paternal Autonomy Support		-.146*		.080

* $p < .05$.

** $p < .01$.

related to resistance to peer pressure, $r(293) = .12, p = .03$, and $r(293) = .15, p = .00$, respectively. After controlling for all study variables in the regression analysis, marital conflict was the only significant main effect. Table 5 shows that the only significant main effect was marital conflict ($\beta = -.114, p = .049$), and the temperament by paternal autonomy support interaction was significant ($\Delta R^2 = .028, p < .01$). Daughters with easy temperaments benefited from paternal autonomy support, but daughters with difficult temperaments were less likely to associate with positive peers if fathers granted those daughters more autonomy (Figure 4).

Sons. Income-to-needs ratio, $r(284) = .14, p = .02$, paternal autonomy support, $r(284) = .15, p = .01$, and maternal autonomy support, $r(284) = .21, p = .00$, were significantly related to positive peers (Table 5). However, there were no significant predictors in the regression analysis (Table 5).

Table 4. Hierarchical multiple regression analyses predicting adolescent responsible behavior from paternal autonomy support, child temperament by paternal autonomy support interaction, and marital conflict by paternal autonomy support interaction

Predictor	Child gender			
	Female (<i>n</i> = 303)		Male (<i>n</i> = 305)	
	ΔR^2	β	ΔR^2	β
Step 1	.127**		.069**	
Income-to-needs ratio		.108		.072
Child temperament		-.194**		.001
Paternal autonomy support		.171**		.088
Marital conflict		.003		-.090
Maternal autonomy support		.141*		.155*
Step 2	.012*		.000	
Marital Conflict $\times$ Paternal Autonomy Support		.109*		.022
Step 2 (in separate analysis)	.005		.000	
Temperament $\times$ Paternal Autonomy Support		.071		.011

* $p < .05$.

** $p < .01$.

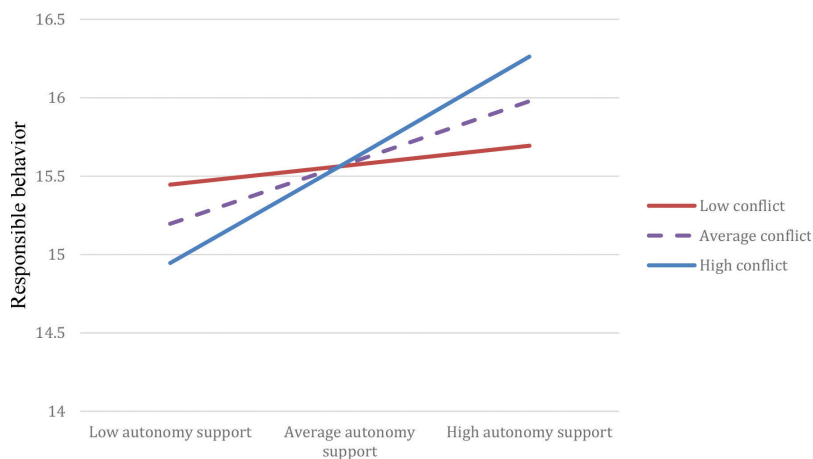


Figure 3. Plot of daughters' responsible behavior in the sixth grade as a function of fathers' autonomy support at low, average, and high levels of parental conflict.

Discussion

In this study, we examined the influence of fathers' sensitive autonomy support on four aspects of social competence and responsibility: self-control, resistance to peer pressure, involvement with mature and socially responsible peers, and personal responsible behavior. To avoid the impact of single-informant bias on results, we used one measure obtained via child report, one via maternal report, and two using a combination of mother and teacher reports. Because the impact of behavior on the part of one parent is conditioned by actions by other caregivers, the broader set of family relationships, and family context, we examined relations between father autonomy support and offspring social responsibility, controlling for maternal behavior, conflict between parents, and household income-to-needs ratio. Recognizing that the impact of parental behavior depends on characteristics of the child, we conducted separate analyses for sons and daughters and also included temperament by parenting interactions in the models. Consistent with expectations, we found that each of the factors examined seemed to matter, but variations were observed in relations for the four outcomes examined. We found that paternal autonomy support was associated with three of the four outcomes, but only for daughters. This finding supports suggestive results from the study by Leidy et al. (2011) that daughters are more sensitive to fathers' affect, whereas boys are more likely to be influenced by fathers' discipline and involvement. We also found that maternal autonomy support was associated with adolescent self-control and responsible behavior for sons and daughters. However, since mothers were reporters pertaining to offspring responsible behavior and self-control, caution should be taken in interpreting the findings. Finally, we observed four interactions between paternal autonomy support and adolescent behavior involving daughters.

Social development is multidimensional, with theory suggesting that many biological and environmental factors help determine developmental course (Deci & Ryan, 2008; Zimmer-Gembeck & Collins, 2003). Accordingly, it is not easy to pinpoint how paternal autonomy support is implicated in multiple dimensions of social behavior for adolescents. Except for the relation between paternal autonomy support and daughters' resistance to peer influence, parental autonomy support was not significantly related to either measure of peer relationships—trends were observable in some pairings, but the relations were not significant. Perhaps the somewhat mixed pattern of findings observed in this study reflects complex individuation processes occurring during adolescence. According to Blos (1967), adolescents begin to distance themselves from ideas that their parents are

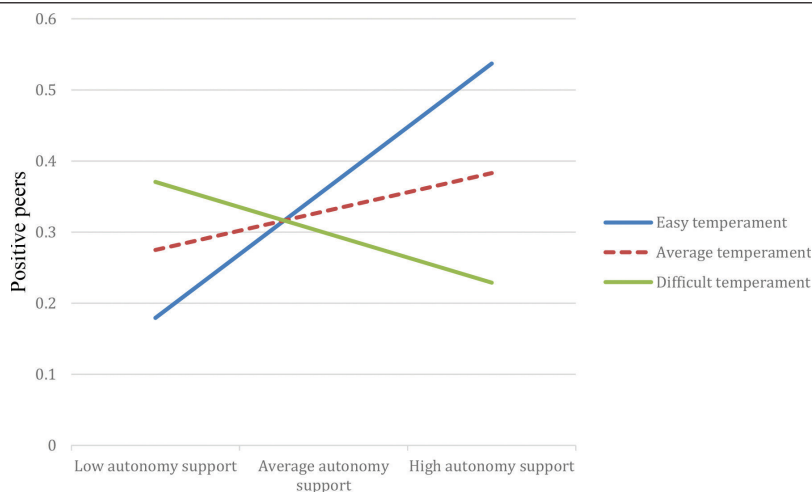


Figure 4. Plot of daughters' positive peers in the sixth grade as a function of fathers' autonomy support at easy, average, and difficult temperaments.

all-knowing and all-powerful, and they begin to separate their own identity from one strongly connected to their parents (Koepeke & Denissen, 2012; Zimmer-Gembeck & Collins, 2003) and rely less on parents as sources of emotional regulation and guidance (Kopp, 1989; Thompson, 1994). As Steinberg and Monahan (2007) reported, it is difficult for adolescents to resist peer pressure, thus perhaps limiting the impact of parental behavior during that period of life.

In some respects, the individuation process may have stronger consequences for same-sex relationships (i.e., father-son and mother-daughter), thus allowing paternal autonomy support to retain some instrumentality as regards daughters' resistance skills. Prior studies have shown that felt closeness to father decreases the likelihood that adolescent girls will associate with deviant peers (Werner & Silbereisen, 2003) and their stress response (Byrd-Craven, Auer, Granger, & Massey, 2012). It appears that adolescent boys find it more difficult to resist peer influences, perhaps accounting for the failure to observe significant relations between either paternal or maternal autonomy support and either of the peer measures used in this study. Thus, whereas warm relationships with fathers may contribute to behavioral adjustment and a general sense of well-being in adolescents (Ben-Zur, 2003; Lam, McHale, & Crouter, 2012), paternal autonomy support may not have a major impact on social responsibility for boys during

Table 5. Hierarchical multiple regression analyses predicting positive peers from paternal autonomy support, child temperament by paternal autonomy support interaction, and marital conflict by paternal autonomy support interaction

Predictor	Child gender			
	Female (<i>n</i> = 295)		Male (<i>n</i> = 286)	
	ΔR^2	β	ΔR^2	β
Step 1	.057**		.063**	
Income-to-needs ratio		.092		.079
Child temperament		-.073		-.062
Fathers' autonomy support		.072		.075
Marital conflict		-.114*		-.088
Mothers' autonomy support		.108		.129
Step 2	.001		.005	
Marital conflict by paternal autonomy support		.033		.076
Step 2 (in separate analysis)	.028**		.000	
Temperament by paternal autonomy support		-.173**		.017

* $p < .05$.** $p < .01$.

midadolescence, and neither maternal nor paternal autonomy support may have strong consequences for peer relationships. This possibility granted, it is important to state that (a) ours was not a clinical sample with a high prevalence of poverty or adult maladjustment, (b) very few fathers or mothers showed low levels of autonomy support, and (c) the results of prior research have been mixed as regards the relative influence of paternal behavior on boys and girls (Crockenberg et al., 1996; Dodge et al., 1990; NICHD Early Child Care Research Network, 2008; Ramanchandi et al., Werner & Silbereisen, 2003).

Another goal of this study was to determine whether paternal support for autonomy mattered more when adolescents lived in high-conflict households. There is evidence that children's responses to parents depend on the level of conflict present at home (Davies & Cummings, 1994; Erel & Burman, 1995; Werner & Silbereisen, 2003). When parents are involved in conflict with each other, there is sometimes negative "spillover" into the parent-child relationship (Buehler & Gerard, 2002). These concerns granted, there were only two instances in eight models tested

where interparental conflict was a significant direct predictor of children's social competence—namely, higher conflict between parents was associated with lower self-control in boys and with reduced interaction with positive peers in girls. However, in two models there was a significant interaction between paternal autonomy support and family conflict; notably, higher levels of paternal autonomy support helped protect daughters from the potentially negative effects of family conflict for both resistance to peer pressure and responsible behavior. This suggests that if fathers continue to show high levels of autonomy support for their daughters during times of marital conflict, it may help promote emotional security and enable the daughters to move toward independence (Bergman, Cummings, & Davies, 2014). Why a similar effect was not observed for sons is not immediately apparent. Again, it may reflect the individuation process that occurs during adolescence, as boys' identity development is less situated in parent-child relationships during this period of life (Koepke & Dennison, 2012).

An additional focus of this study was differential responsiveness to paternal autonomy support by adolescents with difficult temperaments. Findings showed that girls with difficult temperaments were more likely to have problems with self-control and to exercise less responsible behavior, albeit the same was not observed for boys. We also found that paternal autonomy support was particularly helpful to daughters with easy temperaments in matters involving peer relationships. However, the association was the opposite for daughters with a difficult temperament. Although the latter findings could be interpreted as contradicting the idea of differential susceptibility (Pluess & Belsky, 2013), it likely is better interpreted as supporting notions about factors that promote positive social relationships. According to *social relational theory*, partners in a relationship are engaged in an ongoing mutually influential dialectic (Kuczynski, Pitman, & Mitchell, 2009). For a relationship to grow and become mutually supportive, it is critical that parties are comfortable with the behavior of the other. Research shows that fathers are less involved with emotionally intense daughters, and they feel less parenting stress when daughters are perceived as sociable (McBride, Schoppe, & Rane, 2002). In effect, even fathers who are inclined to be nurturing may feel less comfortable engaging a daughter who is highly reactive, thus reducing their overall involvement and deferring to the mother as primary caregiver. This possibility seems even more likely when considered from the daughter's side. There is at least some evidence that there are biological differences in the extent to which boys and girls take pleasure in the kinds of give-and-take that occurs in rough-and-tumble play, with girls more likely to retreat from such

encounters as they find them overwhelming (Eagly & Wood, 2013). Such a gender-based difference in responsiveness to paternal activation behaviors may be all the more difficult for girls who are highly reactive in general. Meanwhile, girls with easy temperaments may form stronger overall relationships with a father who acts in ways to support their own autonomy. Several studies show that daughters who identify with their fathers and feel close to them show higher levels of self-esteem and life satisfaction (e.g., Allgood, Beckert, & Peterson, 2012; Carlson, 2006). In sum, our findings may make clear the need to consider how any particular experience functions in light of a child's broader set of experiences and as part of social relationships.

The primary purpose of this study was to more fully characterize how paternal autonomy support during early and middle childhood was implicated in social development and personal responsibility for sons and daughters in sixth grade. The set of findings that emerged in this study (together with others that have examined parenting behavior) suggests that relations between parenting and the development of social competence and personal responsibility are complex. The findings suggest that paternal autonomy support may have distinct implications for the development of social competence, but that it seems particularly relevant for daughters during middle to late adolescence. Such an interpretation is consistent with the broader notion that mother-child and father-child relationships are somewhat distinct in quality (Russell & Saebel, 1997). Importantly, the impact of paternal autonomy support also seems to depend on whether there is high conflict in the family and depend on daughter's temperament. On the other hand, it is important not to overemphasize the notion of paternal influence, as father-child relationships have a reciprocal quality and our design does not preclude child effects (Crouter & Booth, 2003). It is also important not to equate parental autonomy support (as operationalized in this study) with overall parenting quality. The measure of autonomy support used in this study, although it has been widely used in studies of children's development, does not include all aspects of parenting theoretically associated with the development of social competence and responsibility in children. More specifically, arguments have been made that the impact of any particular parenting practice depends on the quality of adolescents' attachment to parents and on the overall parenting style (Darling & Steinberg, 1993; Engels, Finkenauer, Meeus, & Deković, 2001). Finally, it is also important to bear in mind that the measurement of temperament used in this study was via maternal report at two time points in infancy. Had a different measure of temperament been used or a measurement been taken later in childhood, the results may have changed.

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PARENTAL AUTONOMY-SUPPORT AND PSYCHOLOGICAL CONTROL IN EATING DISORDER PATIENTS WITH AND WITHOUT BINGE-EATING/PURGING BEHAVIOR AND NON-SUICIDAL SELF-INJURY

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The current study examines whether autonomy-supportive and controlling parenting are related to the presence/absence of binge-eating/purging behavior and/or non-suicidal self-injury in adolescents with an eating disorder (ED). Fifty-three ED patients completed validated questionnaires assessing perceived maternal and paternal autonomy-supportive and psychologically controlling parenting. A total

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of 53 mothers and 37 fathers also completed these questionnaires. All patients completed the Self-Injury Questionnaire-Treatment Related to assess non-suicidal self-injury (NSSI). Results showed that patients with binge-eating purging behaviors experienced more maternal psychological control compared to restrictive patients independently of the presence of NSSI. Paternal psychological control or autonomy support did not differ as a function of ED subtype and presence/absence of NSSI. These results suggest that especially mothers of patients engaging in binge-eating/purging behaviors could benefit from family interventions that support parents in diminishing the use of psychological control.

Keywords: eating disorders, non-suicidal self-injury, psychological control, autonomy-support, parental style, self-determination theory

Research on the role of parenting style in the development and the course of eating disorders (EDs) has a long-standing tradition (Tetley, Moghaddam, Dawson, & Rennoldson, 2014). Parental style can be characterized along several dimensions, one of which is defined by the extent to which parents support the autonomy development of their child (parental autonomy support) or the extent to which parents intrude upon their child's thoughts, feelings and behavior in a controlling way (parental psychological control; Barber, 1996; Grolnick & Pomerantz, 2009).

One recent study demonstrated the beneficial effects of a perceived autonomy-supportive parental style on eating disorder patients' autonomous motivation for treatment, which predicts better treatment outcome (i.e., weight gain in patients with anorexia nervosa; Van der Kaap-Deeder et al., 2014). In contrast, several studies demonstrated associations between psychologically controlling parenting and the development of ED symptoms, showing that these associations are mediated by variables such as maladaptive perfectionism, distress, or self-competence (Goddard et al., 2013; Salafia, Gondoli, Corning, Bucchianeri, & Godinez, 2009; Snoek, Engels, Janssens, & van Strien, 2007; Soenens et al., 2008). Only one study has simultaneously examined autonomy-supportive and controlling parenting in relation to ED symptoms. Reilly, Stey, and Lapsley (2016) found, in a sample of undergraduate students, that psychologically controlling (but not autonomy-supportive) parenting was related to ED symptoms. These findings suggest that associations of controlling parenting with ED-relevant behaviors are more pronounced

than associations of autonomy-supportive parenting, a possibility that will be revisited in the current study.

Although there is evidence linking autonomy-supportive and psychologically controlling parenting—at least indirectly—to ED symptoms, it has not been examined specifically whether these parenting variables are related to the presence of binge-eating / purging behaviors (BP) or non-suicidal self-injury (NSSI), which are known to increase the complexity of the ED problems (Claes & Muehlenkamp, 2014). With regard to BP behaviors, higher levels of paternal overprotection (but not maternal overprotection) were found among bulimia nervosa (BN) patients compared with anorexia nervosa (AN) patients (Leung, Thomas, & Waller, 2000). Soenens and colleagues (2008) found higher levels of paternal psychological control in BN patients compared to a control group. Further, the anorexia nervosa, restrictive type (AN-R) group was situated in between the BN and the control group and did not significantly differ from the BN group and the control group. However, other studies did not find any differences in parental style between AN and BN patients (Tereno, Soares, Martins, Celani, & Sampaio, 2008).

Further, despite the high prevalence of NSSI in ED patients, very little research has focused on the relation between parenting and the presence/absence of NSSI in ED patients. One study showed that ED patients with NSSI perceived their fathers to be less caring and to use a more affectionless control style of parenting (i.e., less caring and more controlling) compared to patients without NSSI (Fujimori et al., 2011). Another study showed that ED patients engaging in NSSI reported higher levels of parental criticism than those without NSSI (Claes, Soenens, Vansteenkiste, & Vandereycken, 2012), and felt more external pressure to change (Vansteenkiste, Claes, Soenens, & Verstuyf, 2013). In community samples, preadolescents engaging in NSSI (but not their parents) reported higher levels of parental psychological control compared to preadolescents not engaging in NSSI (Baetens, Claes, Martin et al., 2014).

In sum, research suggests that parents may be more controlling and less autonomy-supportive when patients display BP behaviors and/or engage in NSSI. These associations are important to be examined as theory and research suggest that

autonomy-suppressing and controlling parenting may serve to maintain or worsen ED symptoms (Ryan, Deci, & Vansteenkiste, 2016; Strauss & Ryan, 1987). Thus, adolescent patients and parents may get caught in a negative vicious circle of deteriorating symptoms and quality of interaction.

In this study, the hypothesized association between BP behavior and/or engagement in NSSI and the use of more controlling and less autonomy-supportive strategies by parents is reconsidered, thereby using maternal and paternal ratings of parenting and using multiple informants. The correspondence between adolescents' and parents' reports is often found to be modest, with parents providing a more positive picture than adolescents (Korelitz & Garber, 2016; Sessa, Avenevoli, Steinberg, & Morris, 2001), which raises the question whether the hypothesized association between ED-related behaviors and parental behavior exists only in the eye of the beholder (i.e., in the patients' own perspective), or whether it exists also when considered from the parents' perspective.

METHOD

PARTICIPANTS

This study included 53 female adolescents with an ED and one or both of their parents. In total 53 mother-daughter dyads and 37 father-daughter dyads were included. All patients were admitted to a specialized unit for the treatment of EDs.¹ The mean age of the patients was 17.98 years ($SD = 2.45$, range: 14–25 years). Demographic characteristics of the mothers and fathers are described in Table 1.

All patients were assessed by the psychiatrist of the unit using a clinical interview according to the DSM-IV criteria (American Psychiatric Association, 1994), supplemented with the Eating Disorder Evaluation Scale (EDES; Vandereycken, 1993). Of the 53 patients, 24 (45.3%), were diagnosed as anorexia nervosa, restrictive type (AN-R), 13 patients (24.5%) as anorexia binge-eating/purging type (AN-BP), 8 patients (15.1%) as bulimia nervosa

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TABLE 1. Demographic Characteristics of the Mothers ($N = 53$) and Fathers ($N = 37$)

	Mothers ($N = 53$)		Fathers ($N = 37$)	
	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)
Age mean (<i>SD</i>)	47.93	(3.65)	49.13	(3.93)
	<i>N</i>	(%)	<i>N</i>	(%)
Marital status				
Married/living together	40	(75.4)	36	(97.3)
Living single	6	(11.3)	1	(2.7)
Long distance relationship	3	(5.7)	0	(0.0)
Missing values	4	(7.5)	0	(0.0)
Employment				
Paid employment	45	(84.8)	37	(100.0)
Unemployed/homemaker/sick/retired	4	(7.5)	0	(0.0)
Missing values	4	(7.5)	0	(0.0)

(BN) and 8 (15.1%) as ED not otherwise specified (ED-NOS). For the purpose of this study, patients were clustered into two ED subgroups: 26 patients (49.1%; 24 with AN-R and 2 with ED-NOS) were diagnosed with restrictive behavior (ED-R) and 27 (50.9%; 13 with AN-BP, 8 with BN, and 6 with ED-NOS) with BP behaviors (ED-BP).

Thirty-two patients (60.4%) reported lifetime presence of at least one type of NSSI, whereas 21 patients (39.6%) never engaged in NSSI. The presence of NSSI was significantly higher in BP patients (74.1%) compared to restrictive ED patients (46.2%) ($\chi^2_{(1)} = 4.32, p < 0.05$).

Illness duration was significantly longer in patients with BP behavior than in restrictive patients and also longer in patients with NSSI than in patients without NSSI ($p < 0.05$). No significant age difference was found between the two ED subgroups nor between patients with and without NSSI (Table 2).

PROCEDURE

All patients, mothers, and fathers completed an online survey during the first 4 weeks of admission after having given a writ-

TABLE 2. Clinical Characteristics of the ED-R and ED-BP Patients (N = 53)

	Restrictive group (ED-R) (N = 27)		Binge-eating/purging group (ED-BP) (N = 26)		
	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>t</i> -test
Age	17.65	(2.33)	18.30	(2.57)	0.95
BMI	15.06	(1.96)	19.95	(6.29)	3.85**
Illness duration (years)	2.33	(1.69)	3.76	(2.57)	2.41*
	<i>N</i>	(%)	<i>N</i>	(%)	$\chi^2_{(n)}$
Lifetime presence of NSSI	12	(46.6)	20	(74.1)	4.32*
Scratching	6	(24)	14	(51.9)	4.25*
Biting	3	(12)	7	(25.9)	1.62
Bruising	6	(24)	6	(22.2)	0.23
Cutting	9	(36)	16	(59.3)	2.81
Burning	3	(12)	1	(3.7)	1.26

Notes. **p* < .05; ***p* < 0.01

ten informed consent. The study was approved by the Ethical Committee of the Hospital.

MEASURES

Parental psychological control was assessed with the Psychological Control Scale (PCS; Barber, 1996). In this study, only 7 of the 8 original items were used, since one item (“I am always trying to change the way my daughter is feeling or thinking about things”), diminished the internal consistency of the scale (in particular in the maternal ratings). Items were rated on 5-point Likert scales ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Cronbach’s alpha values for this scale in this study across the 4 ratings (patient versus parent × mother versus father) varied between .60 and .92.

Parental autonomy support was assessed with the 7-item Autonomy Support Scale, a subscale of the Perceptions of Parents Scale (POPS; Grolnick, Ryan, & Deci, 1991; Dutch translation: Soenens et al., 2007). Participants provided separate ratings for perceived paternal and maternal parental style. In addition, both fathers and mothers completed the parent-versions of both

questionnaires. Items were rated on 5-point Likert scales ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Cronbach's alpha values in this study across the 4 ratings varied between .74 and .87.

All patients also completed the Self-Injury Questionnaire-Treatment Related (SIQ-TR; Claes & Vandereycken, 2007), to assess the presence of five specific NSSI behaviors. A patient was assigned to the NSSI category when she answered "yes" to at least one type of NSSI during lifetime. The Cronbach's alpha coefficient of the SIQ-TR in the present study was 0.70.

DATA-ANALYSES

To examine differences in parental style between restrictive and BP ED patients and between patients with or without NSSI and to examine whether these differences depend on the reporter (parent or patient), two Repeated Measures Analyses of Covariance (RM ANCOVA) were performed: one with the responses of 53 mother-daughter dyads and another with the responses of 37 father-daughter dyads. A RM ANCOVA was chosen to take into account the interdependency between the daughters' and mothers'/fathers' responses. The patients' and mothers'/fathers' scores on the Psychological Control Scale and the Autonomy Support Scale were used as dependent variables, informant (mothers vs. patients/fathers vs. patients), was modelled as a within-subjects factor and the presence/absence of BP behavior, the presence/absence of NSSI and their interaction (BP*NSSI) were used as independent variables. A significant association between age/illness and the outcome variables was found (Table 3). Since illness duration and age are positively correlated and since illness duration (but not age) differed significantly between the ED (i.e., with or without BP and with or without NSSI), illness duration will be included as a covariate.

All analyses were performed by means of SPSS version 22. A type I error of 0.05 was used throughout all the analyses.

TABLE 3. Correlations Among Patients' Age, Illness Duration, Psychological Control and Autonomy Support

	M (SD)	Age	Illness duration	MPC			MAS			PPC			PAS		
				PR	MR	FR	PR	MR	FR	PR	MR	FR	PR	MR	FR
Age	N = 53 17.98 (2.45)														
Illness duration	N = 53 3.06 (2.28)	.46**													
MPC	PR	.29*	.37**												
	N = 53 2.22 (1.02)														
MR	N = 53 1.86 (0.49)	.12	.15	.32*											
	N = 53														
PR	N = 53 3.81 (0.75)	-.15	-.44**	-.74**	-.33*										
	N = 53														
MR	N = 53 44.00 (0.68)	-.41**	-.16	-.29	-.51**	.32*									
	N = 53														
PR	N = 37 2.24 (0.98)	.36*	.34	.42**	.17	-.29*	-.19								
	N = 37														
FR	N = 37 31.93 (0.71)	.25	.22	.09	.11	-.03	-.05	.04							
	N = 37														
PR	N = 37 3.62 (0.84)	-.03	.10	-.21	-.04	.28	.25	-.67**	-.19						
	N = 37														
FR	N = 37 33.98 (0.65)	-.45**	-.33*	-.39*	-.41**	.37*	.61**	-.46**	-.44**	.29					
	N = 37														

Notes. PR = Patients' report; MR = Mothers' report; FR = Fathers' report; MPC = Maternal Psychological Control; MAS= Maternal Autonomy Support; PPC = Paternal Psychological Control; PAS= Paternal Autonomy Support. * $p < .05$; ** $p < 0.01$; *** $p < .001$.

TABLE 4. Means (Standard Deviations) of Maternal Psychological Control and Maternal Autonomy Support in Function of ED Group, Presence/Absence of NSSI and Informant (*N* = 53)

	Restrictive group (ED-R)					
	No NSSI <i>N</i> = 14		NSSI <i>N</i> = 12		Total <i>N</i> = 26	
	PR <i>N</i> = 14	MR <i>N</i> = 14	PR <i>N</i> = 12	MR <i>N</i> = 12	PR <i>N</i> = 26	MR <i>N</i> = 26
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
MPC	1.94 (0.71)	1.67 (0.45)	1.72 (0.70)	1.77 (0.31)	1.84 (0.70)	1.72 (0.39)
MAS	4.05 (0.64)	4.20 (0.45)	4.02 (0.61)	3.86 (0.81)	4.04 (0.62)	4.04 (0.66)
	Binge-eating / purging group (ED-BP)					
	No NSSI <i>N</i> = 7		NSSI <i>N</i> = 20		Total <i>N</i> = 27	
	PR <i>N</i> = 7	MR <i>N</i> = 7	PR <i>N</i> = 20	MR <i>N</i> = 20	PR <i>N</i> = 27	MR <i>N</i> = 27
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
MPC	2.41 (1.22)	2.14 (0.63)	2.64 (1.15)	1.95 (0.51)	2.58 (1.15)	2.00 (0.54)
MAS	3.67 (0.86)	3.67 (0.91)	3.56 (0.81)	4.06 (0.62)	3.59 (0.81)	3.96 (0.71)

Notes. PR = Patients' report; MR = Mothers' report; MPC = Maternal Psychological Control; MAS = Maternal Autonomy Support. * $p < 0.05$.

RESULTS

The RM ANCOVA with maternal autonomy support and maternal psychological control as dependent variables, informant (mothers vs. patients) as within-subjects factors, and NSSI and ED subgroup as independent variables showed a main effect of ED subtype, Wilks' $\lambda = 0.88$, $F(2, 47) = 3.12$, $p = 0.05$, (see Table 4). Subsequent univariate analyses showed elevated levels of psychological control ($p < 0.05$) in mothers of BP patients compared to those of restrictive patients. This effect was not moderated by type of reporter, indicating that it was robust across informants. Further, there was no main effect of the presence/absence of NSSI, Wilks' $\lambda = 0.99$, $F(2, 47) = 0.17$, *ns*, nor a significant interaction between ED*NSSI subgroup, Wilks' $\lambda = 0.94$, $F(2, 47) = 1.37$, *ns*. No main effect of informant emerged, Wilks' $\lambda = 0.99$, $F(2, 47) = 0.14$, *ns*. Further, no significant interactions between informant and NSSI/ED subgroups were found. Illness duration was a significant covariate, Wilks' $\lambda = 0.88$, $F(2, 47) = 3.21$, $p = 0.05$: less maternal autonomy support ($p < 0.05$) and more maternal psychological control ($p = 0.05$) is reported in patients with

TABLE 5. Means (Standard Deviations) of Paternal Psychological Control and Paternal Autonomy Support in Function of ED Group, Presence/Absence of NSSI and Informant (N = 37)

	Restrictive group (ED-R)					
	No NSSI N = 9		NSSI N = 9		Total N = 18	
	PR N = 9	FR N = 9	PR N = 9	FR N = 9	PR N = 18	FR N = 18
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
PPC	2.11 (0.88)	1.59 (0.60)	2.06 (1.19)	2.01 (0.67)	2.09 (1.02)	1.80 (0.66)
PAS	3.49 (0.84)	4.24 (0.54)	3.81 (0.94)	4.17 (0.53)	3.65 (0.88)	4.21 (0.52)
	Binge-eating / purging group (ED-BP)					
	No NSSI N = 6		NSSI N = 13		Total N = 19	
	PR N = 6	FR N = 6	PR N = 13	FR N = 13	PR N = 19	FR N = 19
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
PPC	2.55 (1.13)	2.19 (0.53)	2.31 (0.91)	1.98 (0.84)	2.38 (0.96)	2.04 (0.75)
PAS	3.45 (0.86)	3.55 (0.89)	3.67 (0.85)	3.87 (0.62)	3.60 (0.83)	3.77 (0.70)

Notes. PR = Patients’ reports; FR = Fathers’ report; PPC = Paternal Psychological Control; PAS = Paternal Autonomy Support. *p* < 0.05.

a longer illness duration. In sum, more maternal psychological control was reported in presence of BP behavior independently of the presence/absence of NSSI and independently of informant (Table 4).

A similar RM ANCOVA with paternal autonomy support and paternal psychological control as dependent variables showed no main effect of ED subgroup, Wilks’ $\lambda = 0.96$, $F(2, 31) = 0.68$, *ns*, no main effect of the presence/absence of NSSI, Wilks’ $\lambda = 0.95$, $F(2, 31) = 0.88$, *ns*, and no significant interaction between ED subgroup and the presence/absence of NSSI, Wilks’ $\lambda = 0.97$, $F(2, 31) = 0.45$, *ns*. A main effect of informant emerged, Wilks’ $\lambda = 0.81$, $F(2, 31) = 3.66$, $p < 0.05$. Univariate analyses showed that paternal autonomy support was rated significantly higher by fathers than by patients ($p < 0.05$). The patients’ illness duration as a covariate was not significant, Wilks’ $\lambda = 0.99$, $F(2, 31) = 0.12$, *ns*, (Table 5).

DISCUSSION

The main finding of this study is that mothers of ED-BP patients use more psychological control than mothers of restrictive ED

patients independently of type of reporter. We discuss some of the possible underlying mechanisms of this association. First, as a rather visible and troubling signal of eating pathology, BP behavior may elicit parental feelings of powerlessness and incompetence (e.g., feeling unable to prevent their child from BP behavior), leading to an increase in psychologically controlling behavior toward a daughter with an ED (Pomerantz & Eaton, 2001). Second, maternal psychological control may increase the likelihood of BP behavior. High levels of parental psychological control might predict deficits in emotion regulation that, in turn, might lead to an increased vulnerability for BP behavior in ED patients (McEwen & Flouri, 2009; Salafia et al., 2009). Further, based on Self-Determination Theory (Deci & Ryan, 2000), it has been argued and found that controlling parenting frustrates children's basic psychological needs for autonomy, competence, and relatedness (Soenens & Vansteenkiste, 2010). Adolescents might develop BP behavior to cope with this need frustration (Verstuyf, Vansteenkiste, Soenens, Boone, & Mouratidis, 2013). In a controlling environment an adolescent with ED will feel like she has no choice but to act in the way that is dictated by her parents. Then, BP behavior might become a strategy to solve the inner conflict between complying with her parents' request to eat and pursuing her personally endorsed goals (i.e., no gain weight; Botta & Dumlao, 2002).

Interestingly, BP behavior was unrelated to maternal autonomy-support. This finding confirms that controlling parenting (as an expression of the "darker side" of parenting) is more relevant to predict maladaptive outcomes and psychopathology and that autonomy-supportive parenting (as an expression of the "brighter side" of parenting) is more relevant to predict adaptive developmental outcomes and well-being (Costa, Cuzzocrea, Gugliandolo, & Larcan, 2016). Further, the association between parental psychological control and BP behavior was not found in the father-daughter dyads. This might be explained by the fact that mothers are more strongly involved in the nutritional aspects of parenting (e.g., preparing meals), might witness ED behavior of their daughters more frequently than fathers (Raenker et al., 2013), and consequently may get more affected by ED behavior than fathers (Depestele et al., 2016; Martín et al., 2011). However,

this difference in findings might also be due to the smaller subsample size. Against our hypotheses, no association was found between parenting and the presence/absence of NSSI in ED patients. This is in contrast with previous findings in community samples that preadolescents engaging in NSSI (but not their parents) reported higher levels of parental psychological control compared to preadolescents not engaging in NSSI (Baetens, Claes, Martin et al., 2014). However, older adolescents and adolescents with a clinical diagnosis of ED might have developed more sophisticated methods of hiding their NSSI behaviors. As such, parents of older adolescents and of patients with a clinical diagnosis might not always be aware of their child's NSSI behavior. Thus, parental awareness of NSSI may be an important moderating factor (with NSSI eliciting psychologically controlling parenting only when parents know about the behavior) and a factor explaining discrepancies between studies (Baetens, Claes, Onghena et al., 2014).

Further, no significant differences were found between mothers' and patients' reports on psychological control and autonomy support. However, we found that paternal autonomy support was rated as significantly higher by fathers than by patients. This is in line with a general tendency for parents to rate their parenting style more positively than children (Korelitz & Garber, 2016), and with our previous research showing that patients mostly differ with their fathers in their perception of family variables (Depestele et al., 2015).

Finally, this study showed that patients reported less maternal autonomy support and more psychological control as their illness duration was longer. This might indicate that the longer the illness takes, the more profoundly the parent-child relationship might be affected in a negative way, resulting in psychologically controlling parenting. However, it is also possible that patients who experience a higher level maternal psychological control are more vulnerable to develop more persistent ED symptoms.

This study has some limitations. The small sample size and the selection of inpatients only set limits to the generalizability of our results. Not all fathers filled out the questionnaires, which

prevented us from directly comparing mothers' and fathers' parental style. Further, although the reliability for the Psychological Control Scale was generally good, it was low for one specific rating, that is, mothers' self-report ($\alpha=0.60$). This is likely due to low rates of endorsement of some of the items especially by mothers. Finally, due to the cross-sectional design of the study, it is difficult to draw any conclusion about the causal mechanisms underlying the associations obtained. Longitudinal research in larger ED samples (inpatients/outpatients) with a control group with and without NSSI is needed to examine the direction of effects in associations of NSSI and BP behavior with parenting and to come to a deeper understanding of the underlying mechanisms in these associations.

This was the first study simultaneously investigating associations of BP behavior and/or NSSI with parenting in ED patients, including ratings of both mothers and fathers. The association between higher levels of maternal psychological control and BP behavior in ED patients might indicate that in these families special attention is needed for the mother-daughter dynamic. Mothers of ED-BP patients probably could benefit from family interventions that support parents in diminishing the use of psychological control to cope with ED symptoms in their child.

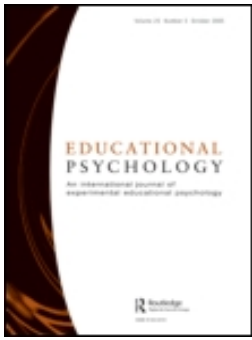
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Parent involvement and academic outcomes among urban adolescents: examining the role of school engagement

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The present study examined the extent to which parent involvement in education was directly and indirectly (via school engagement) related to academic outcomes in an effort to more fully understand the school experiences of urban adolescents. Participants (80% racial/ethnic minority; $n = 108$) were in grades 6, 7 or 8. In the Fall and subsequent Spring youth completed in-school surveys with items on parental involvement in education, school engagement (affective, behavioural, cognitive engagement) and perceived academic competence. Grades were obtained from official school records. Findings showed that parental involvement was positively associated with behavioural and cognitive engagement, which in turn contributed to academic competence and achievement. Results underscore the importance of parental involvement in adolescents' engagement and academic success and highlight the importance of examining the multiple components of school engagement simultaneously, as we found differential effects for affective, behavioural, and cognitive engagement on academic competence and achievement.

Keywords: parent involvement; school engagement; academic achievement; middle school; urban adolescents

Early adolescence is a time when many youth experience declines in academic achievement (Barber & Olsen, 2004; Dotterer, Lowe, & McHale, 2013) and urban adolescents are particularly at-risk because of the additional pressures these youth face (Jeynes, 2007; Long, Monoi, Harper, Knoblauch, & Murphy, 2007). Parental involvement has been widely recognised by researchers, policy-makers and professionals as an important factor related to school achievement in middle school (Hill & Tyson, 2009; No Child Left Behind, 2002). Findings in extant literature, however, have not provided clear evidence that parental involvement is directly linked to academic achievement; studies have shown that parental involvement may benefit, hinder or be unrelated to achievement (Hill & Tyson, 2009; Karbach, Gottschling, Spengler, Hegewald, & Spinath, 2013; Marchant, Paulson, & Rothlisberg, 2001). These mixed findings have prompted researchers to investigate the pathways through which parental involvement may be associated with achievement in order to further elucidate the relation between parental involvement and academic achievement during middle school.

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Previous research has suggested that adolescent school engagement, a multidimensional construct comprised of behavioural, emotional and cognitive components, is important to consider because of its links to both parental involvement and school success (Wang & Eccles, 2012a, 2012b). Studies have shown that parental involvement improves student outcomes by increasing parents' social capital and social control which are associated with adolescents' behavioural engagement (Hill et al., 2004). Behaviour is just one facet of student engagement; emotional and cognitive engagement may also be underlying mechanisms that help explain the relation between parental involvement and student achievement, as parental involvement may also reinforce the importance of school and provide adolescents with a sense of relatedness (Fredricks, Blumenfeld, & Paris, 2004; Hoover-Dempsey & Sandler, 1995). It is important to examine these indirect effects via all three facets of engagement, as they may have implications for programmes and policies aimed at improving adolescent academic achievement.

Theoretical framework

The present study is grounded in an ecological perspective which is concerned with the dynamic interplay of person characteristics and ecological conditions (Bronfenbrenner & Morris, 2006). The *microsystem* describes aspects of the environment that directly influence the individual and includes contexts such as the home and school (Hill & Taylor, 2004). An ecological perspective posits that human development occurs as a result of active participation in progressively complex, reciprocal interactions with persons, objects and symbols in the individual's immediate environment. These interactions in the immediate environment are referred to as proximal processes (Bronfenbrenner & Morris, 2006). Parental involvement is one such interaction occurring between adolescents and their parents over time (Bogenschneider, 1997). Bronfenbrenner speculated that whether and how individuals learn in educational settings was a result of the interactions an individual engaged in within their immediate environments (e.g. home, school, peer group) as well as the relations and interconnections that exist between environments within the microsystem (Bronfenbrenner, 1976). The linkages between contexts such as family and school are referred to as the *mesosystem* (Bronfenbrenner & Morris, 2006). An ecological perspective is complimented by a conceptual model of school engagement which views engagement as multidimensional and as an interaction between the individual and the environment (Fredricks et al., 2004). Research in this tradition contends that by understanding the mechanisms that link antecedents and outcomes of school engagement, more nuanced interventions can be designed to promote school success (Wang & Holcombe, 2010).

Parent involvement

Parental involvement in education has been defined as parents' work with their child and their child's school to promote positive academic development (Hill et al., 2004). Theorists have posited that parental involvement includes a variety of parenting practices that include both home-based and school-based involvement strategies (Epstein, 2001; Grolnick & Slowiaczek, 1994; Hoover-Dempsey, Ice, & Whitaker, 2009). One of the most widely adopted models of parental involvement is Epstein's overlapping spheres model, which emphasises that proximate environments educate

and socialise children and that the interactions between family and school organisations jointly influence student learning and development. Epstein's model includes home-based involvement strategies such as engaging in educational activities at home- and school-based involvement strategies such as volunteering at school. Grolnick and Slowiaczek (1994) also developed a model of parent involvement in education that includes school-based strategies such as going to the child's school and home-based strategies that includes showing an interest in academics and doing stimulating activities with the child. Grolnick and Slowiaczek posited an indirect effect model such that parent involvement would be related to children's school performance through its effect on children's motivation. In the present study, we extended this work to examine the indirect effect of parent involvement in academic competence and achievement via school engagement, which shares some overlap with motivational variables (see Fredricks et al., 2004 for review).

Across the multiple frameworks and conceptualisation of parental involvement, scholars have emphasised home-based and school-based involvement strategies (Crosnoe, 2001; Hill & Taylor, 2004; Seginer, 2006; Steinberg, Lamborn, Dornbusch, & Darling, 1992). Home-based involvement often includes parents' help with homework and knowledge of school performance. It is thought that home-based involvement benefits youth because it reinforces what students are learning at school (Comer, 1995) and may entail parents providing direct instruction or modelling school work as a priority (Hoover-Dempsey et al., 2009). School-based involvement often includes parents' work with their child's teacher or school. When parents are involved at school, they are demonstrating that school is important, which may help adolescents become more invested in their school and school work, and in turn improve academic achievement (Fredricks et al., 2004; Grolnick & Slowiaczek, 1994; Hoover-Dempsey & Sander, 1995). Parental involvement in school may also increase parents' knowledge about school expectations and policies, allowing them to reinforce adolescent behaviours that are beneficial for school success (Hill et al., 2004; Hoover-Dempsey et al., 2009). Therefore, in the present investigation, we used a measure of parental involvement that has been used extensively with adolescents (Crosnoe, 2001; Steinberg et al., 1992) and that taps both home-based and school-based aspects of parent involvement that have been noted in the literature.

Parental involvement has been positively associated with academic achievement for children in elementary school (Jeynes, 2005), but findings have been somewhat mixed for adolescents (e.g. Karbach et al., 2013; Marchant et al., 2001; Spera, 2006; Van Voorhis, 2011). A large body of literature has documented that parental involvement is beneficial for adolescent academic achievement. For example, in a recent meta-analysis by Hill and Tyson (2009) parental involvement was positively associated with adolescents' academic achievement. Additionally, Cheung and Pomerantz (2012) found a positive link between involvement and achievement in their longitudinal study of parental involvement with seventh- and eighth-grade students: increased parental involvement was associated with higher levels of motivation and self-regulated learning, which lead to better school grades for adolescents in China and the United States. Hill and colleagues (2004) also found that increased parental involvement was associated with higher grades and standardised test scores for African-American adolescents. In contrast, other studies have found no association between parental involvement and academic achievement (Hill & Tyson, 2009; Spera, 2006). For example, Karbach and colleagues (2013) studied parents'

autonomy-supportive involvement but found that it was unrelated to academic achievement after controlling for general cognitive ability.

While findings have generally shown that parental involvement benefits adolescents' academic achievement, other mixed findings regarding parental involvement in education and academic achievement have prompted scholars to investigate indirect pathways to help elucidate these links (Chen, 2005; Hill et al., 2004; Marchant et al., 2001). For example, Grolnick and Slowiaczek (1994) found that parental involvement improved adolescents' perceived competence and perceptions of control, which in turn were positively linked to academic outcomes. Hill and colleagues (2004) found that parental involvement in seventh grade was negatively associated with school behaviour problems in eighth grade, which then benefitted adolescents' school achievement in ninth grade.

School engagement

School engagement has been operationalised as a multidimensional construct that includes affective, behavioural and cognitive dimensions which describe students' school-related thoughts, feelings and behaviours (Fredricks et al., 2004; Jimerson, Campos, & Greif, 2003). The affective dimension reflects an emotional link to school and refers to students' sense of belonging to school (e.g. school bonding; Libbey, 2004). School bonding has been operationalised as the extent to which students feel close to people at their school, feel a part of their school and are happy to be at their school (Johnson, Crosnoe, & Elder, 2001). The behavioural dimension of school engagement includes students' observable actions in the learning environment and includes involvement in academic and social activities in the classroom including conduct, attention and following rules. For example, the construct school trouble indicates students' difficulties with adhering to positive conduct within the learning environment, such as paying attention and getting along with teachers and peers (Finn & Rock, 1997) and has been used as a measure of behavioural engagement (Lowe & Dotterer, 2013). The cognitive dimension of school engagement refers to students' perceptions and beliefs related to the self, such as students' sense of self-efficacy or school self-esteem (Jimerson et al., 2003). School self-esteem is one measure of cognitive engagement that draws on the idea of self-regulated learning (Fredricks et al., 2004) because students use metacognitive strategies to monitor and evaluate their performance in school.

With some important exceptions (Dotterer, McHale, & Crouter, 2009; Wang & Eccles, 2012a) most empirical investigations have measured school engagement as a unidimensional construct or included just one or two indicators of school engagement. This approach precludes researchers from investigating differences in the predictors of the various components of school engagement or understanding the independent contribution of each type of engagement to academic achievement (Fredricks et al., 2004). Researchers have also noted differences in the patterns of school engagement such that some students reported high cognitive and behavioural engagement but low affective engagement, whereas other students reported high engagement across all three types (Blumenfeld et al., 2005). These findings underscore the importance of investigating the three dimensions of school engagement simultaneously. Therefore, the present investigation conceptualised school engagement as a multidimensional construct and operationalised adolescents' school

engagement as school bonding to reflect affective engagement, school trouble to reflect behavioural engagement and school self-esteem to reflect cognitive engagement.

There is consensus among researchers that being engaged in school is critical to students' school success and educators, psychologists, and sociologists have devoted considerable attention to understanding how to enhance engagement in school as a way to ameliorate problems of low academic achievement and high dropout rates. The view of school engagement as a malleable construct, responsive to variations in the environment (Fredricks et al., 2004), has spurred a solid research base demonstrating that family and school contexts contribute to engagement (Connell & Wellborn, 1991; Dotterer & Lowe, 2011; Fan & Williams, 2010; Li, Lerner, & Lerner, 2010; Ryan & Patrick, 2001). Much of this work has focused on school and classroom features as they related to school engagement (Dotterer & Lowe, 2011; Hughes & Kwok, 2006; Wang & Holcombe, 2010), but a growing body of literature has also demonstrated the importance of the family context. Positive relationships with parents can influence students' engagement in school (Connell & Wellborn, 1991; Furrer & Skinner, 2003). More specifically, parental involvement, which bridges family and school contexts, is predictive of school engagement (Fan & Williams, 2010; Li et al., 2010; Simons-Morton & Crump, 2003). Fan and Williams (2010) found that when parents participated in extracurricular activities with their children, had more school-initiated contact, and held high aspirations for their children's achievement, youth reported more behavioural engagement at school. Further, Li and colleagues (2010) reported that adolescents' perceived parental involvement, which included helping with schoolwork, and going to meetings or events at school, predicted emotional engagement, which in turn predicted behavioural engagement. These studies, however, have only examined one or two dimensions of school engagement.

A robust body of literature documents positive links between dimensions of school engagement and academic achievement among adolescents (Goodenow, 1993; Ryan & Patrick, 2001; Steinberg et al., 1992). This research has shown that when students are behaviourally engaged in school and attend school regularly, follow school rules and concentrate on learning, they are more likely to earn better grades and perform better on standardised tests of achievement (Connell, Spencer, & Aber, 1994; Dotterer & Lowe, 2011; Finn & Rock, 1997; Wang & Holcombe, 2010). Research on affective engagement also demonstrates a positive link to academic achievement and has shown that when students feel like they are a part of their school and have positive feelings towards school, teachers and peers, they have higher grade point averages and standardised test scores (Dotterer & Lowe, 2011; Voelkl, 1997; Wang & Holcombe, 2010). Similarly, cognitive engagement has also been positively linked to academic achievement. For example, Wang and Holcombe (2010) indexed cognitive engagement as self-regulated learning strategies and found that when adolescents used strategic approaches to learning such as planning, they had higher grade point averages.

School engagement has been described as a mediational construct that links ecological contexts and youth's success in school (Fredricks et al., 2004; Hughes & Kwok, 2006). For example, two recent studies examined the mediating role of school engagement during early adolescence (Li et al., 2010; Wang & Holcombe, 2010). In their investigation, Wang and Holcombe (2010) explored perceptions of the school environment as predictors of school engagement and subsequent academic achievement. They found that when adolescents in seventh grade reported

experiencing supportive, mastery-oriented school environments, they had greater school engagement and higher grade point averages in eighth grade. Li and colleagues (Li et al., 2010) examined fifth graders' personal (e.g. competence, self-regulation) and ecological (e.g. parental involvement and monitoring) assets as predictors of behavioural and emotional school engagement, which in turn was used to predict perceptions of school performance (termed academic competence) in sixth grade. They found that personal and ecological assets had indirect effects on academic competence via school engagement (Li et al., 2010). The present study builds on the literature in this area by focusing on parental involvement in education as a predictor of three dimensions of school engagement and evaluating the extent to which behavioural, emotional and cognitive engagement in turn predict academic competence and achievement.

Current study

The current study investigated links between parental involvement in education, school engagement, academic competence and academic achievement among a diverse sample of urban adolescents in middle school. Informed by an ecological perspective (Bronfenbrenner & Morris, 2006), we hypothesised that the associations between parental involvement and the two academic outcomes would be mediated by school engagement. We conceptualised behavioural engagement as school trouble, emotional engagement as school bonding, and cognitive engagement as school self-esteem and expected that more parental involvement in education would be associated with lower levels of school trouble and more school bonding and school self-esteem, which in turn would be related to academic competence and academic achievement.

Method

Participants

Participants included 108 adolescents (60% female) in grades six through eight from a public, Title 1 (72% of students qualify for free lunch), urban school in the Midwest of the United States. Adolescents identified as African-American (52%), Caucasian (20%), multiracial (19%), Latino (7%) and Asian-American (2%), which reflected the demographics of the school district (National Center for Education Statistics, 2010). Thirty-three per cent of students were in sixth grade, 43% were in seventh grade and 24% were in eighth grade. Just over half (52%) of adolescents reported their mother's and father's highest levels of education as a college degree or more, 19% indicated their parents had attended some college and 29% indicated their parents' education level as high school diploma or less. This level of educational attainment is somewhat higher than the educational attainment in this locality based on data from the US Census (American Community Survey, 2010).

Procedure

Participants were drawn from a short-term longitudinal study examining school and family experiences of urban youth. Participants were recruited at school registration and via letters to parents of enrolled students. Parental consent and adolescent assent

were obtained prior to participation in the study. Adolescents completed a self-report survey at school in the fall and in the spring. Research assistants were on hand to answer questions. Adolescents who were absent from school on the day of data collection were mailed a survey and a postage-paid envelope to return the survey. Following parental consent, adolescent grades were obtained from official school records. Participants were compensated \$10 for each survey they completed.

Measures

Parental educational involvement

Adolescents reported the extent to which their mothers and fathers were involved in school-related activities at home and at school during the fall semester using a scale that has been used extensively in prior research (Crosnoe, 2001; Steinberg et al., 1992) and has been reported as the most consistently used measure of parent involvement in education (Hill & Tyson, 2009). This measure has an established reliability of .74, has been used with multiethnic samples and is predictive of academic achievement (Crosnoe, 2001; Steinberg et al., 1992). This measure has an established reliability of .74, has been used with multiethnic samples and is predictive of academic achievement (Crosnoe, 2001; Steinberg et al., 1992). An example item was 'Helps with homework when I ask'. Items were rated on a three-point scale (1 = *Never*; 3 = *Always*). Adolescents responded for mothers (four items) and fathers (four items) separately and reports for mothers' and fathers' involvement were significantly correlated, $r = .39$, $p < .001$. A total involvement score was calculated by taking the sum of reports for mothers and fathers ($\alpha = .74$).

School engagement

Adolescents reported their school engagement in the spring semester on three scales: school trouble, school self-esteem and school bonding. School trouble assessed students' behavioural difficulties at school such as paying attention in class with four items from the National Longitudinal Study of Adolescent Health (Add Health; Udry, 1998), a school-based study of health outcomes for adolescents who are representative of the US population enrolled in secondary school in 1995. This measure has been used in previous research and has a reported alpha reliability ranging from .68 to .80 (Kramer, Burke, & Charles, 2015; Staff, VanEseltine, Woolnough, Silver, & Burrington, 2012). An example item was 'I have trouble getting my homework done'. Adolescents responded using a five-point scale (1 = *Strongly Disagree*, 5 = *Strongly Agree*). Items were summed to create a total school trouble score for which higher values indicated higher levels of school trouble ($\alpha = .76$).

School self-esteem assessed students' evaluation of their feelings about their school performance and abilities and was measured using 10 items from the Hare (1996) school self-esteem scale. This measure has been used in previous research and has established retest reliability of .61 (Hare, 1996) and reported alpha reliability ranging from .76 to .80 (Cunningham, Hurley, Foney, & Hayes, 2002; Dotterer et al., 2009). An example item was 'I usually have been proud of my report card'. Adolescents responded using a four-point scale (1 = *Strongly Disagree*, 4 = *Strongly Agree*). Items were summed to create a total score for school self-esteem such that higher scores indicated higher levels of school self-esteem ($\alpha = .80$).

School bonding was measured with a scale that was adapted from the National Longitudinal Study of Adolescent Health (Add Health; Udry, 1998). This scale has been used in previous research and has reported alpha reliability ranging from .77 to .80 (Johnson et al., 2001; Kramer et al., 2015; Staff et al., 2012). Recent psychometric analysis on this scale with over 500,000 adolescent respondents, indicated that this scale is unidimensional, has acceptability reliability ($\alpha = .82-.88$) and concurrent validity ($r = .44-.55$) across 18 sociocultural groups (defined by adolescents' racial/cultural identity). This five-item scale assessed students' feelings of connectedness with their school and a sample item was 'I feel like I am part of my school'. Adolescents responded using a five-point scale (1 = *Strongly Disagree*, 5 = *Strongly Agree*). A total school bonding score was calculated by taking the sum of the items such that higher scores indicated higher levels of school bonding ($\alpha = .83$).

Academic achievement

To measure academic achievement, grades were obtained from official school records. Letter grades were assigned numerical scores on a scale from 0 to 4. Then, students' Math, Language Arts, Science and Social Studies grades were averaged to calculate a year-long grade point average (GPA).

Perceived academic competence

Using a scale adapted from Jacobs, Lanza, Osgood, Eccles, and Wigfield (2002) that has demonstrated reliability ranging from .76 to .93, adolescents' perceived academic competence was calculated by averaging the sums of adolescents' reports of perceived English and math competence during the spring semester. Adolescents responded to five items such as 'How good at reading are you?' and 'How good would you be at learning something new in math?' using a seven-item scale (1 = *Not at all good*, 7 = *Very good*). Higher scores indicated higher levels of perceived academic competence ($\alpha = .78$).

Control variables

Adolescent race and gender (male = 0; female = 1) were included as control variables for academic competence and achievement. Adolescents were asked to report their race/ethnicity given the following options: black or African-American, white/Caucasian, American-Indian, Hispanic or Latino, and Asian or Asian-American. Race was then coded as a dichotomous variable, 0 = white, 1 = Non-white.

Results

Descriptive statistics

Descriptive statistics and correlations among study variables can be found in Table 1. Parental involvement was positively correlated with GPA and perceived academic competence, and was correlated with each school engagement construct in the expected direction (positively correlated with school bonding and school self-esteem, and negatively correlated with school trouble). Each school engagement construct was also correlated with academic achievement and perceived academic competence in the expected directions; school bonding and school self-esteem were

Table 1. Correlations and descriptive statistics ($N = 108$).

Variables	1	2	3	4	5	6
1. Parental involvement	—					
2. School bonding	.19*	—				
3. School self-esteem	.38***	.57***	—			
4. School trouble	-.36***	-.54***	-.64***	—		
5. Year-long GPA	.26**	.22*	.49***	-.47***	—	
6. Perceived academic competence	.31***	.28**	.49***	-.45***	.34***	—
<i>M</i>	17.10	16.23	29.85	9.33	2.93	28.03
<i>SD</i>	5.05	4.72	4.53	3.51	.74	3.88
Range	6–24	5–25	17–40	4–18	.89–4	17–34

* $p < .05$; ** $p < .01$; *** $p < .001$.

positively correlated with GPA and perceived academic competence, and school trouble was negatively correlated with both outcomes. All three school engagement constructs were also correlated with each other.

Significant differences in GPA or perceived academic competence based on adolescent gender or race were examined with *t*-tests. For GPA, there was not a significant mean difference for boys vs. girls, $t(108) = -.05$, *n.s.*, but white adolescents did have significantly higher GPAs ($M = 3.55$, $SD = .07$) than Non-white adolescents ($M = 2.77$, $SD = .08$), $t(108) = -4.82$, $p < .001$. For perceived academic competence, there were no significant differences by gender, $t(108) = -1.52$, *n.s.*, or race, $t(108) = -.15$, *n.s.*

Analytic strategy

Using path analysis in StataIC 13, analyses were conducted to examine the direct and indirect links among parental involvement, school engagement constructs (school bonding, school self-esteem, and school trouble) and academic outcomes (GPA and perceived academic competence). More specifically, analyses tested for direct associations between parental involvement in the fall and academic outcomes in the spring, as well as indirect associations between parental involvement and academic outcomes via all three dimensions of school engagement. Multiple group comparisons were conducted for white vs. Non-white adolescents but there was no evidence of race moderation, therefore results for the whole sample are reported.

Path analytic models were estimated using maximum likelihood. Mediation effects were evaluated using the product of coefficients method (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). In this method, the path coefficient for the effect of the independent variable to the mediator is multiplied by the path coefficient for the effect of the mediator to the outcome. The standard error of this product was calculated using the delta method (Oehlert, 1992). Significance of the indirect effect was used as evidence for mediation (i.e. the confidence interval must not contain zero). This approach provides the ability to estimate indirect effects for multiple mediators, and was chosen over the causal steps approach (Baron & Kenny, 1986) because of limitations to the causal steps approach (e.g. no direct estimate of the size of the indirect effect, no ability to construct confidence intervals for indirect effects). Model fit was assessed using the obtained chi-square (χ^2), Confirmatory Fit

Index (CFI), Tucker Lewis Index (TLI) and root mean square error of approximation (RMSEA). Values above .95 for CFI and TLI indicate excellent fit and values above .90 for CFI and TLI indicate adequate fit (Bentler & Bonett, 1980; Hu & Bentler, 1999; Tucker & Lewis, 1973). RMSEA values below .05 indicate excellent fit and values below .10 are generally considered to indicate adequate model fit (Browne & Cudeck, 1993; Steiger & Lind, 1980).

Parental involvement, school engagement, and GPA

Results for GPA indicated that model fit was good, $\chi^2(6, N = 108) = 9.62, n.s.$ Additionally, other global fit indices were at acceptable values, RMSEA = .08, CFI = .98, TLI = .94. Parental involvement and school engagement measures accounted for 48% of the variance in GPA.

Parental involvement was directly associated with all three facets of school engagement. As can be seen in Figure 1, higher levels of parental involvement were associated with higher levels of school bonding, $\beta = .19, p < .05$, 95% CI [.01, .37], which were in turn negatively associated with GPA, $\beta = -.17, p = .05$, 95% CI [-.35, -.00]. The indirect effect linking parental involvement to GPA via school bonding was not significant, $\beta = -.00, n.s.$, 95% CI [-.08, .03] (see Table 2).

As predicted, higher levels of parental involvement were associated with higher levels of school self-esteem, $\beta = .37, p < .001$, 95% CI [.21, .53], which were then positively associated with GPA, $\beta = .28, p < .01$, 95% CI [.09, .48] (see Figure 1). The indirect effect linking parental involvement to GPA via school self-esteem was significant, $\beta = .11, p < .05$, 95% CI [.02, .19], providing evidence for school self-esteem as an intermediary variable linking parental involvement and GPA (see Table 2).

Regarding school trouble, greater amounts of parental involvement were associated with lower levels of school trouble, $\beta = -.36, p < .001$, 95% CI [-.52, -.20] (see Figure 1). School trouble was also negatively linked to GPA, $\beta = -.41, p < .001$, 95% CI [-.59, -.22] (see Table 2). The indirect effect was significant, $\beta = .15, p < .01$, 95% CI [.05, .24], suggesting that school trouble mediates the association between parental involvement and GPA (see Table 2).

Parental involvement, school engagement, and perceived academic competence

Results for perceived academic competence indicated that model fit was good: $\chi^2(6, N = 107) = 10.29, n.s.$ and other global fit measures were at acceptable values,

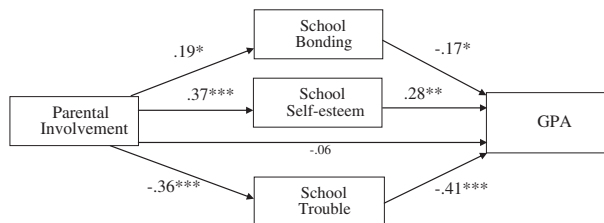


Figure 1. Standardised coefficients of pathways linking parental involvement, school engagement and academic achievement.

Notes. Adolescent race and gender were included as control variables; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 2. Direct and indirect effects for parental involvement and school engagement variables predicting GPA and perceived competence ($N = 108$).

Predictors	GPA						Perceived competence					
	Direct			Indirect			Direct			Indirect		
	<i>b</i>	SE	<i>b</i>	<i>b</i>	SE	<i>b</i>	<i>b</i>	SE	<i>b</i>	<i>b</i>	SE	<i>b</i>
			β			β			β			β
Parental involvement	-.01	.01	-.06	-.00	.00	-.03	.07	.07	.11	-.01	.02	-.01
School bonding	-.03	.01	-.17*				.08	.08	-.05			
School self-esteem	.05	.02	.28***	.02	.01	.11*	.23	.10	.27*	.08	.04	.10*
School trouble	-.09	.02	-.41***	.02	.01	.15**	-.34	.13	-.30**	.08	.04	.11*

* $p < 0.05$; ** $p < 0.01$; *** $p < .001$.

RMSEA = .08, CFI = .97, TLI = .92. Parental involvement and school engagement measures accounted for 33% of the variance in perceived academic competence.

As was the case with the GPA model, parental involvement was linked to all three facets of student engagement (see Table 2). Greater amounts of parental involvement were associated with greater amounts of school bonding, $\beta = .19$, $p < .05$, 95% CI [.01, .37]. School bonding, however, was not associated with perceived academic competence, $\beta = -.05$, *n.s.*, 95% CI [-.24, .15]. The indirect effect for school bonding was also not significant, $\beta = -.01$, *n.s.*, 95% CI [-.05, .03] (see Table 2).

Regarding school self-esteem, higher levels of parental involvement were associated with higher levels of school self-esteem, $\beta = .37$, $p < .001$, 95% CI [.21, .53], which were in turn positively associated with perceived academic competence, $\beta = .27$, $p < .05$, 95% CI [.05, .49] (see Figure 2). The indirect effect linking parental involvement to perceived academic competence via school self-esteem was significant, $\beta = .10$, $p < .05$, 95% CI [.01, .19], providing evidence that school self-esteem mediates the association between parental involvement and perceived academic competence (see Table 2).

As predicted, higher levels of parental involvement were associated with lower levels of school trouble, $\beta = -.36$, $p < .001$, 95% CI [-.52, -.20]. Higher levels of school trouble were associated with lower perceived academic competence, $\beta = -.30$, $p < .01$, 95% CI [-.52, -.09] (see Figure 2). As shown in Table 2, the indirect effect was significant, $\beta = .11$, $p < .05$, 95% CI [.02, .20], suggesting that parental involvement is associated with perceived academic competence via school trouble.

Discussion

Grounded in an ecological perspective, the goal of this study was to examine links among parent involvement in education, school engagement, and academic competence and achievement among urban early adolescents. School engagement has been conceptualised as a multidimensional, mediational construct that links social contexts and academic outcomes. Therefore, this investigation tested whether the links between parental involvement and academic outcomes were mediated by behavioural, emotional and cognitive school engagement. We built upon the existing literature in three important ways. First, although there is an extensive body of research that documents family school links, this is the first investigation to examine

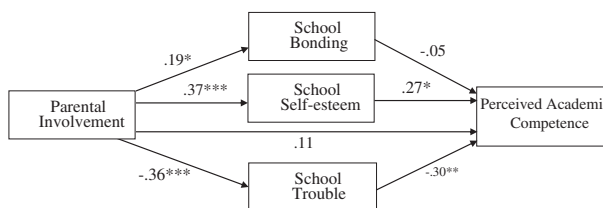


Figure 2. Standardised coefficients of pathways linking parental involvement, school engagement and perceived academic competence.

Notes. Adolescent race and gender were included as control variables; * $p < .05$; ** $p < .01$; *** $p < .001$.

parental involvement in education as a predictor of three dimensions of school engagement and subsequent academic competence and achievement. Second, school engagement is widely recognised as a multidimensional construct, but all three dimensions of school engagement have rarely been studied in mediational models (Fredricks et al., 2004; Wang & Holcombe, 2010). Finally, we tested our proposed mediational model with two academic outcomes, GPA and academic competence, which represents a more comprehensive picture of academic functioning among early adolescents.

Findings from this study largely supported our hypotheses, as we found that behavioural engagement and cognitive engagement mediated the links between parent involvement in education and academic competence and achievement. Specifically, more parental involvement was associated with less school trouble (our index of behavioural engagement), and less school trouble, in turn was associated with higher grades and greater academic competence. This finding is in line with past research that found parental involvement in seventh grade was associated with less school behaviour problems in eighth grade, and higher academic achievement in ninth grade (Hill et al., 2004). However, in our study, we formally evaluated the indirect effect of behavioural engagement with our test of mediation using the product of coefficients method (MacKinnon et al., 2002) in path analysis. School trouble, such as inattention and not getting along with others, likely interferes with learning. Our results indicate that when parents are more involved, youth are less likely to engage in these problem behaviours, which in turn improves academic outcomes. Coleman and others have suggested that parent involvement in education creates a source of social constraint that influences the child's behaviour (Coleman, 1987; Hill et al., 2004). Thus, when parents are involved in education, they are sending messages to their children that education is important and child are then more likely to be comply with the norms and values of school.

We also found that more parent involvement was associated with more school self-esteem (our index of cognitive engagement), and in turn was related to higher grades and greater academic competence. Past research has shown that among elementary school children and high school students, parent involvement is related to perceived academic competence (Fan & Williams, 2010; Grolnick & Slowiaczek, 1994). Our findings extend this to early adolescents in an urban context. Motivational models posit that individuals have a basic need to feel a sense of relatedness to others (Ryan & Deci, 2000). Parent involvement in education may foster a sense of relatedness, in which youth feel supported by their parents. Parents' involvement in their child's education sends a message that their child is important and this may boost one's self-confidence. For example, past research has shown that positive relationships with parents can promote a healthy sense of competence and autonomy within the home which then becomes internalised and used in other settings such as school (Connell & Wellborn, 1991; Furrer & Skinner, 2003).

Contrary to our expectations, school bonding (e.g. emotional engagement) did not mediate the links between parent involvement in education and academic competence and achievement. Although school bonding was significantly and positively related to parent involvement, academic competence, and achievement at the bivariate level, the indirect effect was not significant. One explanation for these findings is that school bonding may be more responsive to school and classroom predictors than it is to parenting practices. For example, Wang and Holcombe (2010) reported that aspects of the classroom environment such as mastery and performance goal

structure were moderately associated with emotional engagement (standardised coefficients ranged from .39 to .40). Similarly, Li et al. (2010) found that the effect of school climate on emotional engagement was eight and a half times stronger than the effect of parent involvement in emotional engagement. Results from our study showed that the effect of parent involvement in behavioural and cognitive engagement was two times stronger than the effect of parent involvement in emotional engagement, which also may explain the lack of mediation, providing further justification that factors other than parental involvement should be included in future studies predicting emotional engagement.

A strength of the current study was the examination of three dimensions of school engagement. Extant research and theory has conceptualised school engagement as multidimensional, but empirical studies have rarely examined the antecedents and outcomes of all three dimensions simultaneously. This is an important contribution to the literature, as we found differential effects of parent involvement in academic competence and achievement via school engagement. Specifically, behavioural and cognitive engagement mediated the links between parent involvement and academic competence and achievement, but emotional engagement did not, which underscores the importance of examining all three dimensions of school engagement. Consistent with what others have reported (e.g. Li & Lerner, 2013), we found that behavioural, affective and cognitive engagement were moderately correlated with one another (coefficients ranged from .36 to .58), indicating that these are overlapping but distinct constructs. The strength of association among predictors and outcomes differed by dimension of engagement, thus researchers are encouraged to include the multiple components in future work.

Taken together, findings from this study indicate that parental involvement in education is linked to urban early adolescents' academic competence and achievement through behavioural and cognitive engagement. Importantly, these findings were consistent across two indicators of academic functioning – grade point average and perceptions of academic competence. While grade point average is a more objective indicator of academic functioning, perceptions of academic competence reflect a subjective evaluation of youth's school experience. The consistency in the pattern of results also lends credence to the ecological validity of our findings.

Results from this study highlight implications for practice. Although levels of parental involvement tend to decline as children enter middle school (Hill & Taylor, 2004; Hoover-Dempsey et al., 2009; Milgram & Toubiana, 1999), our findings underscore the continued significance of involvement for adolescents' academic engagement and achievement. This may be particularly important for policy-makers and school administrators as they design programmes and policy aimed at improving engagement and achievement for urban students. For example, policies written vaguely that generally encourage parental involvement (No Child Left Behind, 2002) can more clearly justify its importance and point to specific pathways through which parent involvement is beneficial, including adolescent behavioural and cognitive engagement. School programmes geared towards increasing parental involvement might also communicate these findings directly to parents; parents who have a deeper understanding of how their efforts may impact their adolescent may be more likely to engage in parental involvement programmes, which are likely to benefit their adolescent (Jeynes, 2012).

The current study has several limitations. First, the correlational design of the study prevents us from drawing firm conclusions regarding causality. Although we

tested a mediational model in which the predictor, parent involvement, was assessed in the fall and school engagement, academic competence and achievement were assessed in the spring, it is possible that the processes are dynamic. For example, students who are more (or less) engaged in school may elicit more involvement from their parents. Future research may use cross-lagged longitudinal models in order to investigate reciprocal links among these constructs. Another limitation was that most of the data were self-reported, which raises the issue of mono-reporter bias. We utilised adolescent reports because past research has shown that parents and children have moderate to low agreement when reporting on parent behaviours (Tein, Roosa, & Michaels, 1994) and children's perceptions of their parents' behaviour is as important an influence on their development as actual behaviour (Bronfenbrenner, 1979; Steinberg et al., 1992). However, future research would benefit from the inclusion of teacher reports of engagement or observational measures of engagement. Our measure of parent involvement was limited to home- and school-based involvement strategies, yet recent research indicates that academic socialisation, which includes communicating parental expectations for education and its value, linking schoolwork to current events, and making preparations and plans for the future, is especially salient during the developmental period of early adolescence (Hill & Tyson, 2009). Future research might also investigate whether the various components of parental involvement are differentially related to school engagement and subsequent academic achievement.

In conclusion, the current study contributed to the literature on parent involvement and academic functioning during early adolescence. Early adolescence is a critical time because school engagement and academic achievement began to decline in this period and urban adolescents are particularly at-risk for declines. However, when parents are involved and supportive, youth are less likely to experience these declines and findings from our research demonstrate that parent involvement in education can bolster behavioural and cognitive engagement, which in turn contributes to academic competence and achievement.

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The Link Between Perceived Maternal and Paternal Autonomy Support and Adolescent Well-Being Across Three Major Educational Transitions

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To what extent does maternal and paternal autonomy support enhance well-being across the major transitions of high school? We tested the degree to which perceived autonomy supportive parenting facilitated positive changes in self-esteem and life satisfaction and buffered against negative changes in depressive symptoms and school related burnout in 3 Finnish longitudinal studies, each with a measurement point before and after a major transition (middle school, $N_1 = 760$, 55.7% girls; high school, $N_2 = 214$, 51.9% girls; post high school, $N_3 = 858$, 47.8% girls). Results showed that perceived parental autonomy support was negatively related to depressive symptoms and positively related to self-esteem. The findings for the effects on depressive symptoms were replicated across all 3 transitions, while effects on self-esteem were only found for the high school and post high school transitions. Moreover, evidence of coregulation was found for depressive symptoms. Depressive symptoms before the transition were found to decrease autonomy support after the transition for both the high school and post high school transitions. Maternal and paternal autonomy support was of equal importance. Importantly, the effects on depressive symptoms increased as children developed, suggesting the continual importance of parents throughout high school and into emerging adulthood.

Keywords: educational transition, well-being, autonomy support, parenting, self-determination theory

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One of the many developmental tasks navigated by youth and their parents is educational transition (e.g., transition into high school, post high school transition; Dietrich & Salmela-Aro, 2013; Salmela-Aro, 2009). Educational transitions are focal points for development and often coincide with developmental tasks in a number of life domains. Understanding how young people navigate these changes, while maintaining mental health and well-being, is a priority area of research (Zarrett & Eccles, 2006).

Parents can potentially support young people in the transition by providing resources and psychological need support (Ryan & Deci, 2017). Findings of a variety of developmental contexts indicate that parental autonomy support and parental involvement predicts adaptive outcomes for children, such as school achievement and well-being (e.g., Dietrich, Kracke, & Nurmi, 2011; Grolnick & Ryan, 1989; Guay, Senécal, Gauthier, & Fernet, 2003; Ryan & Deci, 2017; Salmela-Aro & Little, 2007). Developmental tasks such as educational transitions are events which trigger the need for increased responsibility and independence (Zarrett & Eccles, 2006), autonomy support before the transition thus may prepare children for this increase allowing them to flourish. However, only a small amount of research has been conducted on the role of parental supports in educational transitions (see Grolnick, Kurovski, Dunlap, & Hevey, 2000; Ratelle, Guay, Larose, & Senécal, 2004), and little of this research takes into account bidirectional influences (i.e., coregulation; Dietrich, Parker, & Salmela-Aro, 2012).

Here we will investigate whether autonomy supportive ties can protect and/or enhance well-being for all major educational transitions of high school. Inspired by the work on secondary data analysis by Elder, Pavalko, and Clipp (1993), we utilize multiple existing longitudinal databases of Finnish young people. These databases help us to consider the role of autonomy supportive parenting for the transition into middle school, transition into high school, and transition from high school.

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Research on transition is important given major developmental tasks at educational transitions generally require an increase in independence (Zarrett & Eccles, 2006). Autonomy support prepares young people for this enhanced independence and consequently promotes flourishing. Having multiple databases at our disposal allows us to do what no research on autonomy supportive parenting has been able to do before in a single study: (a) articulate the degree to which autonomy supportive parenting is important across all three transitions surrounding high school; b) consider whether autonomy support from mothers and fathers differ in strength and exert equal influence at the different transitions; and c) examine whether these effects are bidirectional, making it possible to see not only how adolescents react to their parents, but also how parents may change their parenting approach according to how their child is functioning. This study will test the extent that parents can improve their child's experience of a successful transition, which may be especially helpful for children who are at risk of unsuccessful transitions. Additionally, the examination of bidirectional effects will provide further understanding of maternal and paternal coregulation mechanisms (Dietrich et al., 2012) across three educational transitions.

Educational Transitions and Well-Being

The Potential Issues

High school provides an important developmental context for adolescents (Eccles, 2004). During this time adolescents face both the largest number, and most wide ranging set of developmental tasks with critical implications for lifelong development (e.g., Dietrich et al., 2012; Zarrett & Eccles, 2006). Educational transitions are part of these developmental tasks and are, as a result, associated with a significant increase in vulnerability of the psychological, social, and intellectual well-being of students. These vulnerabilities include negative effects on students such as increased stress, decreased self-esteem, and reduced effort (e.g., Litalien, Lüdtke, Parker, & Trautwein, 2013; Vasalampi, Salmela-Aro, & Nurmi, 2010).

Youth must deal with changes in the organizational and social structure of the educational setting for each educational transition. School may become less personal, and peer networks may change for both the transition to middle school and high school (Eccles, 2004; Frey, Hirschstein, Edstrom, & Snell, 2009; Midgley, Middleton, Gheen, & Kumar, 2002). For some students these changes provide too much stress, compromising academic and emotional functioning (e.g., Salmela-Aro, Kiuru, & Nurmi, 2008). The social change, in combination with concern about social acceptance, often causes a loss of self-esteem, decrease in academic performance, and rising anxiety and depression levels (Akos, 2006).

Although the middle and high school transitions seem quite similar, the middle school transition is a relatively minor transition in Finland, although similarly associated with social changes, it has fewer implications for the future of an individual. The high school transition in Finland can be more stressful as it is additionally associated with educational choices that are most critical in directing an individual's further education and career trajectory (Malmberg, 1996). The stress of choices that impact the future is akin to that of the post high school transition. Similar changes in peer groups take place with the post high school transition, how-

ever, leading to an even more depersonalized educational setting where greater independence is required, or employment where there are significant changes to the quantity and quality of social relationships (Cohen, McCabe, Michelli, & Pickeral, 2009; Midgley et al., 2002). Although middle school transition may not be associated with important career choices the middle-, high school-, and post high school transitions are still quite similar as the effects come down to the same issues. The social environments and required degrees of independence suddenly change, and when not appropriately prepared for this, may lead to declines in well-being.

Consideration of the Positive Side

While problems with well-being triggered by educational transitions are of concern, many youth handle educational transitions well, not only experiencing no decline in well-being but even an increase (Litalien et al., 2013; Parker, Lüdtke, Trautwein, & Roberts, 2012). Indeed, a successful transition eases feelings of distress, resulting in a sense of well-being which may lead to better outcomes for developmental tasks (Eccles & Midgley, 1989). Well-being is important for the quality of our lives, cognitive capacity, physical health, and social productivity over the life course (Huppert, 2007), and so successful educational transition is an important concern.

In the current study well-being is used as an operational definition and is identified through a combination of well-being (i.e., life satisfaction and self-esteem) and lack of psychological distress (i.e., depressive symptoms and emotional exhaustion). This approach follows Keyes' model of complete state mental health, in which it is important to explore both the presence and absence of mental illness and mental health symptoms (Keyes, 2002, 2005). In the current research the presence of mental health will be examined with subjective well-being measures of life satisfaction and self-esteem, and the absence of mental illness with subjective well-being measures of depression and emotional exhaustion. However, in this study emotional exhaustion has specifically been measured in the school context (see Parker & Salmela-Aro, 2011).

The Generalization Approach

We hypothesize that autonomy support from parents is a significant determinant of the posttransition experience of adolescents. To deal with issues of internal validity we have used longitudinal data, but interpretation of results can still be limited by problems regarding external validity (see Campbell, 1986). This can be overcome, however, by applying the same theorized model to multiple samples that vary in threats to external validity (e.g., maturation, instrumentation), and then see whether the pattern of results are consistent across these samples (Shadish, Cook, & Campbell, 2002). We provide a stronger test by applying our model to multiple developmental periods (i.e., maturation), context (i.e., educational transition), and instrumentation (i.e., different measures used to assess the central construct, see Method). Testing multiple educational transitions rather than a single transition in isolation is not only important from a developmental perspective, but different samples make it possible to apply pattern matching with consistent results across contexts increasing the external validity of those results (for a review see Shadish et al., 2002; for an example of this approach see Parker, Schoon, et al., 2012).

Determinants of Well-Being at Educational Transitions

How an adolescent deals with transitional changes depends on intrapsychic factors, their social network, and wider conditions that are shaped by structural constraints (e.g., societal, cultural, and institutional conditions). Successful engagement in educational transitions is often facilitated by goal setting, identity negotiation, and coregulation (Dietrich et al., 2012). Coregulation refers to the idea that a transition represents shared projects and goals between youth, and typically, their parents. This does not only mean that parents influence their children, but also that youth influence their parents. Parents remain important across adolescence and into emerging adulthood (Oswald & Clark, 2003; Parker, Lütke, et al., 2012). It is a common misconception that parents become less important as children grow up. As argued by Ryan and Lynch (1989) even as adolescents gain independence in various domains in life, parental supports for autonomy continue to be critical to well-being. Indeed, transition success is not only affected by personal capacities, but also by support from the family context (Dietrich et al., 2012; Salmela-Aro & Little, 2007).

Coregulation and the effectiveness of autonomy supportive parenting during transitions can be explained via the stage-environment fit theory. This theory outlines how optimal development occurs when the needs of a person fit with opportunities in different stages of life (Eccles & Midgley, 1989). In the present study, the important fit occurs between a young person's need in the transition (e.g., increased autonomy) and the social environment (e.g., autonomy supportive parenting). A mismatch between the needs and environment can have negative influences on behavior, motivation, and well-being (Eccles et al., 1993; Gutman & Eccles, 2007). The mismatch between autonomy need and autonomy support may be particularly problematic during transitions in which children are expected to take on more responsibility and direct control over the course of their lives (Tanner, 2006; Zarrett & Eccles, 2006). We thus expect autonomy support to increase in importance from childhood to young adulthood.

In line with coregulation, parental autonomy support may be seen as a resource, which eases the strain of developmental tasks and allows young people to take advantages of the new affordances offered by educational transitions and thus experience greater well-being (Salmela-Aro & Little, 2007). With this connection in mind, it is hypothesized that parents that are responsive and developmentally sensitive to the adolescent's needs and experience serve as a resource that buffers against detrimental resources of stress and a promotive resource that increases general well-being. Here we focus specifically on the concept of autonomy supportive parenting using a self-determination framework (e.g., Grolnick & Ryan, 1989).

Self-Determination and Well-Being

Self-determination theory (SDT) is a theoretical framework that emphasizes the importance of autonomous motivation in psychological development and positive coping (Deci & Ryan, 1985; Ryan & Deci, 2017). This theoretical framework has been applied to education research in numerous empirical studies (for review, see Ryan & Deci, 2017). The theory argues that there are basic psychological needs that must be fulfilled across the life span for autonomous motivation and well-being to be maintained or enhanced (Ryan, Deci, & Vansteenkiste, 2016). More specifically,

psychological needs are those that are required for sustenance, growth, and health. Within the frame of SDT there are three essential or basic psychological needs: the need for autonomy, competence, and relatedness (Deci & Ryan, 1985). Autonomy refers to the feeling that one's behavior is volitional and self-endorsed, not pressured or controlled (Ryan & Deci, 2017). When others support autonomy, they are nurturing capacities for self-regulation, and contributing to wellness. This study focusses on the autonomy need because a great number of studies have shown that autonomy support alone increases not only autonomy, but also competence and relatedness satisfaction (e.g., Deci, Ryan, Gagné, Leone, Usunov, & Kornazheva, 2001; Grolnick, 2003; Ryan & Grolnick, 1986; Soenens & Vansteenkiste, 2005).

It is recognized by SDT that social environments may work against the development of the psychological needs. Environments where the psychological need satisfaction is neglected or thwarted promote psychological distress and psychopathology. Particularly critical in this respect is parental autonomy support which has been empirically shown to facilitate greater mental health and lower psychopathology (Ryan et al., 2016). Thus, in the current study, we will focus on the autonomy support that parents provide.

The Role of the Parent

Autonomy support allows individuals to actively reflect upon and adapt values and interests as their own. Parental behaviors that are consistent with autonomy support include taking the child's perspective, providing relevant choices, and encouragement to take initiative and explore (Grolnick, 2003; Ryan et al., 2016; Soenens & Beyers, 2012). Consequently, adolescents with awareness of personal interests, values, and goals, will be better at making decisions throughout their developmental tasks, as they have something to base their own actions on (Grolnick, 2003; Van der Giessen, Branje, & Meeus, 2014). Overall, autonomy support encourages an adaptive style of development, characterized by age-appropriate behavior and well-being.

During development, parents can be thought of as a resource. Parents who meet the adolescents' changing needs (e.g., by providing opportunities of increased autonomy) provide a better match for the adolescent and the developmental task at hand. This positive role of parents in the adolescents' development has, in turn, shown to be associated to a greater overall well-being (Chirkov & Ryan, 2001). In fact, autonomy support is positively associated with adolescent well-being across all ages and gender (La Guardia, Ryan, Couchman, & Deci, 2000; Soenens, Park, Vansteenkiste, & Mouratidis, 2012).

It is shown in a variety of studies that an autonomy supportive environment is essential to the child's adjustment (Guay et al., 2003). Higher autonomy support has been shown to relate to low emotional exhaustion (e.g., Roth, Assor, Kanat-Maymon, & Kaplan, 2007; Van den Berghe et al., 2013). Autonomy supportive parenting has been associated with less depressive symptoms in youth (Chirkov & Ryan, 2001; Ryan et al., 2016). Moreover, perceived parental autonomy also promotes a sense of well-being by increasing life satisfaction (Park, 2004) and self-esteem (Soenens et al., 2007). In fact, most positive educational outcomes and well-being are associated with autonomous motivation (see Vallerand, Fortier, & Guay, 1997). This includes positive educational outcomes such as greater achievement and easier adjustment

to school (see Joussemet, Landry, & Koestner, 2008; Lord, Eccles, & McCarthy, 1994). We expect autonomy support to influence well-being (both general and school related) across educational transitions.

It is important to note, however, that parents are likely to be influenced by factors other than the developmental transitional period. Specifically, parents may adjust their level of autonomy support based on their child's particular circumstances, including their level of mental health and well-being. Current research suggests parents and adolescents can mutually influence, or "co-regulate," each other (Dietrich et al., 2012; Nurmi, 2004). Therefore, a young person's well-being may influence what parenting style is used. However, the mechanisms behind coregulation are not well defined (Dietrich et al., 2012). Therefore, it is difficult to hypothesize the extent that well-being is an antecedent to changes in parenting style during educational transitions. As such we leave this coregulation influence as a research question.

Influence of Parental Gender

Despite the increasing influence and involvement of fathers in a child's upbringing (Lindsey & Mize, 2001), there are several developmental psychologists that claim that mothers and fathers play different roles. Such theorists suggest that mothers have more influence on the adolescents' direct social environment (e.g., friendship), while fathers are more influential for goal oriented activities (e.g., career development; Grolnick, Weiss, McKenzie, & Wrightman, 1996; Tynkynen, Nurmi, & Salmela-Aro, 2010). Because educational transitions often include goal oriented activities such as career choice, it is possible that fathers exert more influence with autonomy support in the current study. On the other hand, social environments are also affected by transitions (Parker, Lütke, et al., 2012), making it likely that maternal autonomy support is also influential in the current study.

Most autonomy support research does not mention any distinction between parental genders (e.g., Brenning, Soenens, Van Petegem, & Vansteenkiste, 2015; Soenens et al., 2007). Studies that do make a distinction report a difference between effects of maternal and paternal autonomy support on self-determination and achievement, but none of these differences have been explored for effects on well-being (e.g., Grolnick, Ryan, & Deci, 1991; Soenens & Vansteenkiste, 2005). Given a lack of evidence on differential effects of paternal and maternal autonomy support on well-being, we present this as a research question.

The Current Study

Educational transitions are a critical period for the development of well-being (Larose & Boivin, 1997). The current study will explore perceived parental autonomy support and its relationship with change in well-being across all major educational transitions of high school. The social context in which an adolescent develops can either facilitate or thwart developmental tasks such as school transitions. Parents seem to have a great influence on this by providing autonomy support (Ryan & Deci, 2017). Perceived parental autonomy support, in turn, is expected to contribute to the adolescents' successful educational transition as characterized by greater general- and school related well-being. Because this relationship is bidirectional according to coregulation, we will also

look at the effects of well-being on parental autonomy support across the transitions via cross-lagged structural equation modeling (SEM). On this basis we propose the following hypothesis and research questions:

Hypothesis

We hypothesize that perceived autonomy support would promote positive changes in well-being (i.e., life satisfaction and self-esteem) and buffer against declines in well-being (i.e., depressive symptoms and emotional exhaustion) during the transitions surrounding high school. As children are expected to take on more responsibility over time, it is expected that autonomy support becomes increasingly important. A series of longitudinal cross-lagged SEM will be used to test this hypothesis. We explore the influence of perceived autonomy supportive parenting on changes in well-being during three major educational transitions (i.e., middle school transition, high school transition, and post high school transition). Given that we cannot use directly comparable measures across all three transitions due to differences in measures and samples (see below), our focus will be on effects that are consistent across transitions and thus display evidence of generalizability across educational transitions (see Parker, Schoon, et al., 2012, for an example).

Research Question 1

Coregulation theory suggests that parents and youth will demonstrate bidirectional influences during developmental tasks such as educational transitions (Dietrich et al., 2012). Therefore, it is possible that perceived autonomy support does not only affect well-being but also that well-being affects perceived autonomy support. Where data allows, our research tests the statistical significance and direction of these bidirectional relationships.

Research Question 2

Given limited existing research we explore whether perceived autonomy support, and its effect on well-being, is contingent on parental gender.

Method

Secondary Data Analysis

Research in developmental psychology has profited greatly from secondary data analysis (e.g., Elder, 1998). Secondary or archive data analysis can be defined as the repurposing of existing data sets to answer new questions of significance and it represents both a central objective of major funding bodies (e.g., Commonwealth of Australia, 2011, 2012) and a developing science in its own right (Elder et al., 1993). There exists a paucity of databases that covers multiple educational transitions from the perspective of autonomy supportive parenting and its influence of well-being. However, leveraging off a series of large scale databases from Finland we are able to develop reliable and construct valid measures of perceived autonomy supportive parenting (see supplementary material) and use them to explore all major educational transitions of high school. In addition, we were able to leverage off

unique aspects of two of the transitions to compare and contrast young people's perception of the autonomy support they receive from their father and/or mother. Thus, the current research provides a novel approach to leveraging value from existing data.

Participants and Procedure

The current research consisted of three samples from two Finnish longitudinal databases: the Mind the Gap (MtG) study and the Finnish Educational Transitions (FinEdu) study. Three transitions were explored. See Table 1 for an overview of the samples used for each transition in addition to the description below.

Middle school transition. The MtG study is a longitudinal follow-up study (2013–2016) of a sample of Finnish adolescents from Helsinki. The aims of the MtG are to examine challenges in development, including the effects of social and cultural context, particularly educational practices. Two waves of MtG data are used in the current study for the middle school transition consisting of data before the middle school transition (MS-pre; T1, Grade 6, $N = 760$ [55.7% girls]; mean age = 12) and after the middle school transition (MS-post; T2, Grade 7, $N = 483$ [55.8% girls]; mean age = 13). The participants were distributed across 34 schools from Helsinki at MS-pre. Of these students 68% lived with both their mother and father. Regarding the parents, 93% of the mothers and 94% of the fathers were employed, and 89% of the mothers and 91% of the fathers spoke Finnish as their first language. Questionnaires of MS-pre and MS-post were administered during school hours around the middle of the school year, with one year taking place between data collection points.

High school transition. Data for the high school and post high school transition comes from the FinEdu study which is a seven wave longitudinal follow-up study (2004–2013/2014) of a sample of ninth grade students in Finnish high schools from an industrial town. The FinEdu research aims to study the educational transition and the choices that people face after compulsory comprehensive education. A subset of only two schools had measures for perceived autonomy support in the first wave of the high school transition waves, therefore only this subset was used consisting of data before the school transition (HS-pre; T1, Grade 9, $N = 214$ [51.9% girls]; mean age = 16, $SD = 0.23$) and after the high school transition (HS-post; T2, Grade 10, $N = 189$ [55.9% girls]; mean age = 17, $SD = 0.20$). After the high school transition 59% of the students transferred to the university track, 27% to vocational education, 5% started employment, 6% was unemployed without education, and 3% started something else. Of these stu-

dents 63% lived with both their parents. Regarding the parents, 93% of the mothers and 88% of the fathers were employed. Ninety-nine percent of both parents spoke Finnish as their mother tongue. Questionnaires for both HS-pre and HS-post were administered during school hours around the middle of the school year (i.e., January, after the winter holidays), with 1 year taking place between data collection points.

Post high school transition. For the post high school transition we used the full available FinEdu data consisting of data before the post high school transition (PHS-pre; T1, Grade 11, $N = 858$ [47.8% girls]; mean age = 18) and after the post high school transition (PHS-post; T2, 1 year after the transition, $N = 607$ [52.6% girls]; mean age = 21). In this case the survey design had transitioned from collecting parental data from a subset to the whole sample. The participants from the PHS-pre sample came from 12 different schools from an industrial town in Finland. After the post high school transition 36% of the students started university, 13% vocational education, 34% employment, 14% was unemployed without further education, and 2% stayed in high school. Fifty-eight percent of the students lived with both their parents. Questionnaires for PHS-pre were administered during school hours, whereas questionnaires for PHS-post were completed at home of which 75% was done on paper and the rest was taken online. The data was collected around the middle of the school year for PHS-pre. For PHS-post the questionnaires were sent out around the middle of the school year of which the last few questionnaires were returned in April. Data collection of PHS-pre and PHS-post took place around 2 years apart from each other.

Measures

Autonomy supportive parenting index. In the MtG, at MS-pre, the autonomy supportive parenting index was developed from items contained in a modified version of the Child Rearing Practices Report (CRPR; Aunola & Nurmi, 2004; Roberts, Block, & Block, 1984). Participants indicated how well each item describes their relationship with their mother and father (1 = *not at all true*; 7 = *completely true*). From this data we composed an index of three items that assess perceived autonomy support from the mother and father individually which includes items such as: "My mother/father takes my thoughts into consideration, when planning family matters" (see supplementary material). Reliability scores of

Table 1
Overview of Data and the Associated Attributes for Each Transition Wave

Transition wave	Database	Data collection	Sample use	Sample size	Autonomy measure	Parents	Average age
MS-pre	MtG	2013	Full sample	760	Present	M & F	12
MS-post	MtG	2014	Full sample	483	Absent	n/a	13
HS-pre	FinEdu	2004	Subsample	214	Present	M & F	15
HS-post	FinEdu	2005	Subsample	189	Present	M & F	16
PHS-pre	FinEdu	2006	Full sample	858	Present	Unspecified	18
PHS-post	FinEdu	2008	Full sample	607	Present	Unspecified	21

Note. MS-pre = before middle school transition; MS-post = after middle school transition; HS-pre = before high school transition; HS-post = after high school transition; PHS-pre = before post high school transition; PHS-post = after post high school transition; MtG = Mind the Gap database; FinEdu = Finnish Educational Transition database; M = mother; F = father.

the autonomy support index showed a Cronbach's alpha of .76 and a greater lower bound (glb) value of .78.¹

Autonomy supportive parenting in FinEdu, at HS-pre and HS-post, were measured by completing a modified version of the CRPR (Aunola & Nurmi, 2004; Roberts et al., 1984). Participants had to indicate how well each item describes their relationship with the mother and father separately (1 = *does not fit me at all*; 7 = *fits me completely*). The autonomy support index is composed of five items that assess perceived autonomy support with items such as: "My mother/father respects my opinions" (see supplementary material). Alpha of the autonomy support index ranged from .86 to .87, the glb value ranged from .85 to .90.

For PHS-pre and PHS-post a shortened and modified version of the CRPR questionnaire was used. Here participants had to indicate how well each item describes their relationship with both their parents (1 = *not at all true*; 7 = *very true*). The scale is composed of four items that assess perceived autonomy support with items such as: "My parents have supported me in my own decisions" (see supplementary material). Reliability of the modified autonomy support index showed both alpha and glb ranging from .78 to .82.

General well-being. General well-being for all time waves were measured by completing the DEPS depression scale (Salokangas, Poutanen, & Stengård, 1995), a short version of Rosenberg's Self-Esteem Scale (Rosenberg, 1965), the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985), and the School Burnout Inventory (SBI; Salmela-Aro, Kiuru, Leskinen, & Nurmi, 2009; Salmela-Aro & Näätänen, 2005). On the DEPS depression scale participants report on the occurrence of 10 types of moods in the past month (1 = *not at all*; 4 = *very much*), with items such as "I have felt all the joy had disappeared from my life." Reliability of the original DEPS was .86 (Salokangas et al., 1995), in the current study the alpha ranged from .91 to .92 and the glb ranged from .94 to .95. Rosenberg's Self-Esteem Scale comprises of five items that assess one's agreement (1 = *completely disagree*; 7 = *completely agree*) on acceptance, self-respect, and overall attitude toward oneself with items such as "I think I have many good qualities." Reliability of the original self-esteem scale ranged from .77 to .88 (Rosenberg, 1965), in the current study the alpha ranged from .71 to .83 and the glb ranged from .82 to .91. The Satisfaction with Life Scale consists of five items on which participants had to indicate how much they agree (1 = *completely disagree*; 7 = *completely agree*) with statements such as "For the most part my life is near my ideal." The original Satisfaction of Life Scale's reliability was .87 (Diener et al., 1985), in the current study the alpha ranged from .87 to .89 and the glb ranged from .88 to .91.

On the SBI participants rate how well the 10 items (nine items for HS-pre and HS-post) describe their school situation (1 = *completely disagree*; 7 = *completely agree*) with items such as "I feel overwhelmed with my school work." A subset of three items from the SBI was averaged to create a subscale of emotional exhaustion (Salmela-Aro & Näätänen, 2005). Reliability of the original emotional exhaustion subscale was .80 (Salmela-Aro et al., 2009), in the current study the alpha ranged from .56 to .79 and the glb ranged from .60 to .80. The subscale of emotional exhaustion originally consists of four items (Salmela-Aro & Näätänen, 2005), however, because only three out of four items are available for HS-pre and HS-post we decided to use only those three items

for all the transition analyses for consistency. Sensitivity analysis with four items suggested almost identical findings and made no difference to the interpretation of results or effect sizes in any case. At PHS-post the SBI focused on work instead of school related burnout, items changed accordingly (e.g., "I feel overwhelmed with my work").

Statistical Analysis

Measurement invariance. Multiple-group SEM invariance tests were utilized to test differences in parental gender for perceived autonomy support and to test longitudinal measurement invariance for all the variables. First, invariance testing was used for each construct separately, to confirm that the construct was invariant across time, and where relevant, across group (Widaman, Ferrer, & Conger, 2010). Measurement invariance testing starts with the least restrictive configural model (M1), where all model parameters are freely estimated across time and between parental gender independently. This model is then compared to a model (M2) where factor loadings of each indicator were constrained to be equal across time points and for both mother and father. Invariance in the measurement models is an assumption of covariance-based models such as the cross-lagged SEM models analyzed in the current study (Nagengast et al., 2011). These results are provided in the supplementary material and show support for measurement invariance in all cases.

Structural invariance. When considering differences in regression parameters between ratings of mother's and father's autonomy support we considered structural invariance. The first model (S1) for structural invariance testing consisted of the full cross-lagged SEM with factor loadings constrained to be equal across time and parental gender but regression parameters were allowed to vary across groups. This model was then compared with a model (S2) that additionally held regression constant across the groups. Standardized loadings for all transition points have been presented in Table 2. No difference between parental genders in the influence of perceived autonomy supportive parenting on well-being was supported when there is little difference between chi-square values and fit between models.

As explained, evidence of invariance comes from comparing a baseline model with good fit to alternate nested models. Comparisons are made with the corrected difference between chi-square values of the two models. The corrected difference for models using weighted least squared with mean and variance (WLSMV) was based of the *diff*test command in Mplus (Muthén & Muthén, 2015), all other corrected differences use the formula from Satorra and Bentler (2010). We further used the criteria by Cheung and Rensvold (2002) who suggested invariance between the nested models if the difference in comparative fit index (CFI) is $\leq .01$ (we applied the same criteria for Tucker Lewis Index; TFI), and, as suggested by Chen (2007), that the difference in root mean square error of approximation (RMSEA) is $\leq .015$.

Structural equation modeling. Structural equation modeling (SEM) was used to test the predictive pathways between students'

¹ There are quite serious issues with alpha which suggests alternatives should be considered (Sijtsma, 2009). Although glb is a better measure of reliability than alpha (Bentler & Woodward, 1980), continued persistence of alpha in the literature led us to retain the alpha.

Table 2

Descriptive Statistics, Differences Across the Educational Transitions, and Standardized Factor Loadings of the Cross-Lagged Models for the Well-Being Variables and Perceived Parental Autonomy Support

Variable per model	<i>M (SD)</i>		<i>t</i>	95% Confidence interval		<i>d</i>	Factor loadings range	
	Pretransition	Posttransition						
Middle school transition								
Autonomy support mother	5.99 (1.08)	—	—	—	—	—	.71	.72
Autonomy support father	5.74 (1.28)	—	—	—	—	—		
Depression	1.62 (.64)	1.56 (.62)	−3.66***	.06	.19	−.16	.82	.83
Life satisfaction	5.21 (1.26)	4.81 (1.34)	−7.41***	.30	.52	−.25	.76	.80
Self-esteem	4.73 (1.12)	4.64 (1.19)	.80	−.15	.06	.03	.58	.61
Emotional exhaustion	2.57 (1.10)	2.78 (1.18)	2.81***	−.28	−.05	.11	.62	.68
High school transition								
Autonomy support mother	5.68 (1.09)	5.55 (1.13)	−1.21	.05	.23	−.07	.73	.75
Autonomy support father	5.35 (1.26)	5.21 (1.18)	−.91	−.09	.24	−.06		
Depression	1.61 (.55)	1.50 (.52)	−2.16*	.01	.18	−.16	.78	.80
Life satisfaction	4.79 (1.31)	4.94 (1.06)	2.32*	−.39	−.03	.18	.74	.75
Self-esteem	4.56 (1.09)	4.89 (1.02)	4.47***	−.41	−.16	.25	.60	.63
Emotional exhaustion	2.77 (.92)	2.74 (1.05)	−.67	−.09	.19	−.05	.58	.74
Post high school transition								
Autonomy support	5.39 (1.13)	5.65 (1.16)	5.23***	−.40	−.18	.23	.64	.69
Depression	1.57 (.56)	1.62 (.58)	2.66***	−.12	−.02	.11	.74	.80
Life satisfaction	4.88 (1.24)	4.69 (1.25)	−4.26***	.13	.34	−.17	.78	.80
Self-esteem	5.02 (1.16)	4.98 (1.17)	−.85	−.05	.14	−.03	.72	.72
Emotional exhaustion	2.65 (1.05)	2.75 (1.06)	.23	−.13	.10	.01	.67	.77

* $p < .05$. *** $p < .001$.

perceived autonomy support and well-being across the three transitions (models S1 and S2; see Figure 1). Cross-lagged models allow for analysis of multiple waves of data and allow the researcher to explore plausible alternate explanations for the relationships among the variables, such as reversed or reciprocal effects (Burkholder & Harlow, 2003). Therefore, a cross-lagged model made it possible consider the major hypothesis: that parental autonomy support before the transition enhances well-being and/or protects against declines in well-being. However, in several cases we could also explore the alternative perspective: that well-being before the transition is associated with changes in the amount of autonomy support parents give to their child.

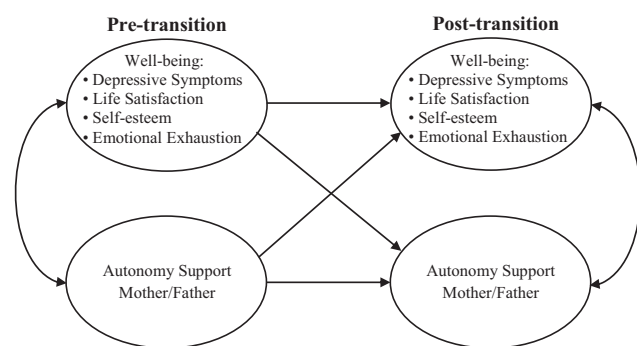


Figure 1. Multigroup cross lagged structural equation model of long-term relationships between variables measuring well-being (i.e., depression, life satisfaction, self-esteem, and emotional exhaustion) and perceived parental autonomy support, with the distinction of mother and father autonomy support as groups. Each well-being variable is analyzed in a separate model. For the middle school transition this model does not include posttransition autonomy support.

This study further followed the use of the CFI, TLI, and the RMSEA, in addition to the chi-square value to assess model fit (Hoyle & Panter, 1995), considering its sensitivity to sample size (McDonald & Marsh, 1990). For a model to be considered an excellent fit, both a TLI and CFI of .95 or above are expected, however, values of .90 or higher are also acceptable (Byrne, 2012). Furthermore, RMSEA “close-fit” to “acceptable fit” values range from .05 or below to .08 or below, respectively (Browne & Cudeck, 1993).

Attrition is common with research that tracks individuals across developmental trajectories, especially with research that involves many participants. To account for such missing data, the full-information maximum likelihood estimator was used. Because the depressive symptoms response scale consisted of only four categories and because the data was not normally distributed and highly skewed, as would be expected from frequency response scale, we treated the items as ordered categorical and used the WLSMV estimator for models using depression. The other well-being factors had indicator items with more than five response categories and thus, consistent with Rhemtulla, Brosseau-Liard, and Savalei (2012), were better suited to being treated as continuous and estimated using maximum likelihood. We have used robust maximum likelihood (MLR) to account for departures from multivariate normality. Last, interdependence due to participants rating both mothers and fathers in a single model was accounted for using cluster robust standard errors (i.e., the TYPE = COMPLEX command in Mplus). Student gender was used as a covariate in all the models. We used Mplus version 7.4 (Muthén & Muthén, 2015) for the main analyses (i.e., invariance testing and cross-lagged SEM) and R version 3.2.0 (R Core Team, 2015) on Windows for descriptive analyses (e.g., reliability, t tests, and correlations).

Results

The results section is organized by transition. We first report results for the middle school transition, followed by the high school transition, and then the post high school transition. Within each transition we first report descriptive results, then, where pertinent, test a model in which the effect of perceived maternal and paternal autonomy support on well-being is free to differ versus constrained to be equal. After, we focus on the individual parameters by considering the role that autonomy support plays in changes in well-being and ill-being across the transition. The models we use also allow us to consider the reciprocal path for the high school and post high school transition, in which we consider whether young people's pretransition well-being/ill-being influences the change in perceived parental autonomy support after the transition. Finally, we consider the correlated residual between change in well-being/ill-being and changes in autonomy support as a proxy for considering the association in change between these variables where possible (see Parker, Lüdtke, et al., 2012). Such an association would suggest that some unobserved latent or set of latent variables (i.e., the nature of the transition itself) leads to changes in both the perceived autonomy support parents provide and the well-being/ill-being of the participant themselves.

Regarding missing data, the attrition rate of the middle school transition, high school transition, and post high school transition were 36%, 10%, and 23%, respectively and item-level nonresponse was very small ranging from 1.6% (PHS-pre) to 6.8% (MS-pre). Such attrition rates are expected for transitional data and are similar to large government run and funded longitudinal databases that also cover transitions (e.g., The Longitudinal Study of Australian Youth). The missing completely at random (MCAR) test (MissMech package in R; Jamshidian, Jalal, & Jansen, 2014) revealed that data was not missing complete at random, $p < .01$. This is unsurprising given missing data was typically due to attrition. We next explored potential missing data mechanisms. For the high school and post high school transitions boys were significantly more likely to drop out of the study than girls at the high school transition, $t = 2.6$, $p < .05$ and at the post high school transition, $t = 4.55$, $p < .00$. Participants with lower GPA were also significantly more likely to drop out of the study at the high school transition, $t = 3.04$, $p < .01$ and the post high school transition, $t = 2.87$, $p < .00$. Missing data was not associated with autonomy supportive parenting, or any of our key dependent variables.

In all analyses, we operated under the assumption that data were not MCAR but were missing at random. This was a reasonable assumption given longitudinal data provides a good basis for imputing missing data due to attrition. To account for missing we used full-information-maximum-likelihood, which uses all available information (Enders, 2010). In order to provide a coherent and succinct results section we do not report measurement invariance across time and, where relevant, across parents. This information, along with zero-order correlation matrices can be found in the supplementary material. As noted above, in all cases there was convincing evidence of measurement invariance.

Middle School Transition

Descriptives. The data from MtG did not include a measure of posttransition autonomy support. As a result, we were unable to

include any data on posttransition autonomy support at the middle school transition. Descriptive statistics of the sample used for the middle school transition can be found in Table 2. The descriptive statistics show that reported depressive symptoms decreased across the transition, while on the other hand, life satisfaction decreased and emotional exhaustion increased. Additionally, mothers were found to provide more autonomy support than fathers before the transition with $t(702) = 6.21$, $p < .00$, 95% CI [0.16, 0.31].

Structural invariance testing. Model invariance results show that there was little difference between the fit of models S1 and S2 for every well-being variable (see Table 3). This suggested regression coefficients were similar regardless of whether support measures were focused on mothers or fathers. The fit of the model was adequate in all cases (see Table 3).

Model results. Having noted the similarity of the models across parents, we now turn our attention to the specific model results in which we considered the potential reciprocal relationships between perceived autonomy support and well-being (i.e., depression, life satisfaction, self-esteem, and emotional exhaustion) over the middle school transition (see Table 4). In only one case was a significant cross-lagged effect observed, with higher levels of autonomy support before the transition significantly predicting a decline in depression as children moved into middle school. Results for R^2 of the endogenous variables are provided in the supplementary material.

High School Transition

Descriptives. Descriptive statistics of the sample used for the high school transition can be found in Table 2. They show that reported depressive symptoms decreased across the transition and life satisfaction and self-esteem increased while emotional exhaustion showed no significant change. Although these changes are not all big, it shows that most students managed the high school transition well. Additionally, mothers were seen as providing more autonomy support than fathers both before and after the transition with $t(194) = 4.25$, $p < .00$, 95% CI [0.16, 0.43] and $t(221) = 5.12$, $p < .00$, 95% CI [0.20, 0.46], respectively.

Structural invariance testing. Invariance testing for SEM worked the same as described for the middle school transition. The model invariance results show that there were again no substantial differences between model fits, apart from the models that test self-esteem (see Table 3). This indicated that perceived autonomy support from mothers and fathers predicted changes in depression, life satisfaction, and emotional exhaustion in a similar manner across the high school transition, but not self-esteem. The CFI, TLI, and RMSEA fit were adequate for all models (see Table 3).

Model results. Having shown invariance in cross-lagged parameters across parents, we next explored the model results. A significant relationship was found between pretransition autonomy support and a posttransition depression (see Table 4). A reciprocal effect was found for depression, in which higher levels of depression before the transition significantly predicted a decrease in perceived autonomy support after the transition. Higher paternal autonomy support before the transition was significantly related to an increase in self-esteem. This effect on self-esteem was only found for fathers because structural invariance between parents was not found for the self-esteem model. However, this difference

Table 3
*Fit Indices for Cross-Lagged SEM Models for All Transitions Including Structural Invariance
 Fits Differences Accounting for Student Gender and Interdependence*

Model per transition	χ^2	df	CFI	TLI	RMSEA
Middle school transition					
Depression model					
S1	1,446	574	.98	.98	.034
S2	1,380	576	.99	.99	.032
Difference	1.10	2	.01	.01	.001
Life satisfaction model					
S1	601	164	.95	.94	.045
S2	607	166	.95	.94	.045
Difference	1.92	2	.00	.00	.000
Self-esteem model					
S1	508	156	.92	.91	.045
S2	602	158	.92	.91	.046
Difference	1.60	2	.00	.00	.001
Emotional exhaustion model					
S1	137	74	.98	.97	.025
S2	139	76	.98	.97	.025
Difference	.01	2	.00	.00	.001
High school transition					
Depression model					
S1	1,265	940	.97	.97	.037
S2	1,233	944	.97	.97	.034
Difference	1.28	4	.00	.00	.003
Life satisfaction model					
S1	590	390	.94	.93	.045
S2	597	394	.94	.93	.045
Difference	6.31	4	.00	.00	.000
Self-esteem model					
S1	613	386	.93	.930	.048
S2	621	390	.93	.930	.048
Difference	11.00*	4	.00	.00	.000
Emotional exhaustion model					
S1	313	236	.96	.96	.034
S2	316	240	.96	.96	.035
Difference	7.49	4	.00	.00	.000
Post high school transition					
Depression model	1,237	395	.95	.95	.053
Life satisfaction model	405	145	.95	.94	.049
Self-esteem model	400	142	.95	.94	.049
Emotional exhaustion model	184	81	.96	.95	.041

Note. S1 = constrained factor loadings between time waves and parent groups; S2 = constrained factor loadings between time waves and parent groups and constrained regression between parent groups.

* $p < .05$.

between parents was only found because of the parental difference for the relationship between pretransition well-being and posttransition autonomy support. There was no parental difference for the relationship between pretransition autonomy support and posttransition well-being. When parental gender invariance was assumed for the self-esteem model, pretransition autonomy support from both the mother ($\beta = .14, p < .05$) and father ($\beta = .13, p < .05$) was significantly related to an increase in posttransition self-esteem. Results for R^2 of the endogenous variables are provided in the supplementary material.

To provide a proxy for a relationship between change in both perceived autonomy support and well-being we also explored the correlated residuals in the posttransition wave (e.g., Ferrer & McArdle, 2010; Sturaro, Denissen, van Aken, & Asendorpf, 2008; Sutin & Costa, 2010). This provides an opportunity to consider if a common unmeasured variable (e.g., the relative success of the transition) influenced the development of both autonomy support and

well-being. Change in perceived maternal autonomy support was positively related to change in life satisfaction, $r = .40, p < .00$, but not related to change in depression ($r = -.04, ns$), self-esteem ($r = .16, ns$), and emotional exhaustion ($r = .13, ns$). Whereas change in paternal autonomy support was positively related to change in life satisfaction, $r = .45, p < .00$ and self-esteem, $r = .34, p < .01$, but not related to change in depression ($r = -.14, ns$) and emotional exhaustion ($r = -.04, ns$).

Post High School Transition

Descriptives. A similar model as for the high school transition was used to explore the post high school transition, but without differentiating gender of perceived parental autonomy support. Descriptive statistics of the sample used for the post high school transition can be found in Table 2. The descriptive statistics

Table 4

Standardized Beta Coefficients and Standard Error for Multigroup SEM of the Effect of Autonomy Supportive Parenting on Educational Transition Well-Being Accounting for Student Gender and Interdependence

Variable per model	Mother		Father	
	Posttransition well-being	Posttransition autonomy support	Posttransition well-being	Posttransition autonomy support
Middle school transition				
Depression				
Pretransition well-being	.51*** (.05)	—	.51*** (.05)	—
Pretransition autonomy support	-.22*** (.06)	—	-.25* (.05)	—
Life satisfaction				
Pretransition well-being	.59*** (.05)	—	.60*** (.05)	—
Pretransition autonomy support	.04 (.06)	—	.08 (.07)	—
Self-esteem				
Pretransition well-being	.49*** (.06)	—	.47*** (.06)	—
Pretransition autonomy support	.07 (.06)	—	.11^ (.06)	—
Emotional exhaustion—school				
Pretransition well-being	.47*** (.07)	—	.46*** (.07)	—
Pretransition autonomy support	.04 (.06)	—	.01 (.06)	—
High school transition				
Depression				
Pretransition well-being	.44*** (.07)	-.21* (.09)	.45*** (.08)	-.24** (.08)
Pretransition autonomy support	-.24*** (.08)	.64*** (.05)	-.22*** (.07)	.73*** (.04)
Life satisfaction				
Pretransition well-being	.41*** (.12)	.09 (.11)	.34*** (.13)	-.04 (.11)
Pretransition autonomy support	.09 (.11)	.60*** (.09)	.15 (.12)	.71*** (.11)
Self-esteem				
Pretransition well-being	.67*** (.06)	.13 (.09)	.66*** (.06)	-.06 (.05)
Pretransition autonomy support	.10 (.07)	.61*** (.08)	.16* (.07)	.72*** (.05)
Emotional exhaustion—school				
Pretransition well-being	.70*** (.09)	-.14 (.09)	.71*** (.08)	-.08 (.09)
Pretransition autonomy support	-.13 (.09)	.63*** (.07)	-.08 (.08)	.71*** (.06)
Combined parents				
Post high school transition				
Depression				
Pretransition well-being	.58*** (.04)	-.27*** (.05)	—	—
Pretransition autonomy support	-.39*** (.05)	.52*** (.05)	—	—
Life satisfaction				
Pretransition well-being	.52*** (.05)	.20** (.07)	—	—
Pretransition autonomy support	.01 (.06)	.38*** (.06)	—	—
Self-esteem				
Pretransition well-being	.60*** (.05)	.10 (.06)	—	—
Pretransition autonomy support	.12* (.05)	.44*** (.06)	—	—
Emotional exhaustion				
Pretransition well-being	.47*** (.06)	-.04 (.05)	—	—
Pretransition autonomy support	-.12* (.06)	.46*** (.06)	—	—

Note. Reporting standardized regression (β), with standard error in parentheses.

^ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .00$.

showed that autonomy support and depression increase across the transition and that life satisfaction decreases.

Model results. Because no parental gender distinction was made for autonomy support at the post high school transition we next explored model results. We found a significant relationship between higher pretransition perceived autonomy supportive parenting and a decrease in both depression and emotional exhaustion across the transition (see Table 4). A similar pattern occurred for self-esteem, for which pretransition autonomy support predicted an increase in self-esteem after the transition. The CFI, TLI, and RMSEA fit excellent to the data for all well-being models (see Table 3). Results for R^2 of the endogenous variables are provided in the supplementary material.

Significant reversed effects were also found. Depressive symptoms before the post high school transition significantly predicted a decrease in autonomy support after the transition. Additionally, pretransition life satisfaction was found to significantly predict an increase in perceived autonomy supportive parenting after the transition.

The residual correlation was tested again in the posttransition wave to provide a proxy for a relationship between change in both perceived autonomy support and well-being. Change in autonomy supportive parenting was negatively related to change in depression, $r = -.33$, $p < .00$ and emotional exhaustion, $r = -.24$, $p < .00$, and positively related to change in life satisfaction, $r = .52$, $p < .00$ and self-esteem, $r = .37$, $p < .00$.

Differences between transition models. Although the size of the relationship between pretransition autonomy support and post-transition depressive symptoms appeared to get stronger throughout the three transitions, z tests suggested this increase was rarely significant. The difference in effects of autonomy support on depressive symptoms was only found between the high school and post high school transition where they were near significant ($z = 1.59, p < .10$) for maternal parenting and significantly different ($z = 1.98, p < .05$) for paternal parenting.

Discussion

The current study examined whether perceived autonomy supportive parenting increases well-being across educational transitions surrounding high school (i.e., middle school transition, high school transition, and post high school transition). We focused on whether perceived autonomy support from parents before an educational transition was associated with decreases in depression and emotional exhaustion, and increases in life satisfaction and self-esteem across the transition. We tested whether this relationship existed across all the major transitions of high school in order to identify whether the processes under investigation were generalizable. The results across the transitions provided strikingly similar results indicating that the role of autonomy support was as important for transitions out of high school as it was for transitions into and within high school. We further looked at whether there was a difference between the effects of perceived autonomy support from mothers and fathers. Our research showed that mothers tended to provide more autonomy support than fathers but autonomy support tended to have similar relationships with change in well-being regardless of the gender of the parent. Perceived autonomy support before the transition tended to be an important protective factor in reducing depression across each transition. Likewise, autonomy support was positively associated with an increase in self-esteem for both the high school and post high school transitions. Moreover, emotional exhaustion was shown to decrease after the transition when autonomy support from parents was perceived, but only at the post high school transition.

Autonomy Support a Protective Factor, Promotive Factor, and Consistent?

In SDT autonomy supportive parenting is associated with well-being (Ryan & Deci, 2017). Well-being is often negatively affected by transition (Eccles et al., 1993), and therefore, general well-being after the transition is an important indicator of a successful transition (Eccles & Midgley, 1989). Educational transitions provide a potent natural experiment to explore how changes in parental support relate to a change in well-being (Dietrich et al., 2012; Eccles & Midgley, 1989).

In support of the literature (Roeser, Eccles, & Freedman-Doan, 1999; Rudolph, Lambert, Clark, & Kurlakowsky, 2001), perceived autonomy support was found to be consistently associated with declines in depression across the three high school transitions. According to SDT, the satisfaction of the autonomy need results in greater intrinsic motivation, leading to reduced depressive symptoms (Chirkov & Ryan, 2001). Additionally, through a similar

mechanism as SDT, stage-environment fit shows that even when the child experiences a lack of autonomy need satisfaction in a new educational environment, parents are able to provide autonomy need satisfaction as a substitute (e.g., Midgley et al., 2002).

It is posited in SDT that autonomy support facilitates the construct of a coherent sense of self which in turn leads to a stable self-esteem (Deci & Ryan, 1995). As with depressive symptoms, the idea that satisfaction of the autonomy need leads to greater self-esteem was generally supported by our results, which showed that autonomy support from parents accounted for an increase in self-esteem across both the high school transition and post high school transition. One admittedly speculative possibility, as to why this effect was not observed for the middle school, is that the middle school transition is a relatively minor transition in Finland, and therefore, may not trigger a major increase in independence. Indeed, this transition usually does not involve a change of school. This may explain the lack of significant effects for this transition and the smallest effect size for depressive symptoms out of the three tested transitions. However, given the difference in samples between this transition and the other transitions (e.g., from a big city compared with country town, and collected years after the other sample), **future research is needed to evaluate this interesting possibility.**

Emotional exhaustion literature shows that autonomy support, and thus autonomy need satisfaction, decreases emotional exhaustion that is experienced because of greater intrinsic motivation and a resulting feeling of accomplishment (Roth et al., 2007). In accordance with this literature, we found that perceived autonomy support decreased emotional exhaustion, but only for the post high school transition. This specificity of findings could relate to the characteristics of the post high school transition in which many youth will be moving into high stakes university education or the labor market and thus emotional exhaustion becomes increasingly relevant. However, because this effect was only found for a single transition it is important that such interpretations remain tentative until supported by **future research.**

The consistency of the effects of parental autonomy support on depressive symptoms and self-esteem shows that autonomy support remains important throughout high school and beyond. This is an important finding because adolescence is usually associated with a growing importance of friends—as opposed to parents—as a source of social support (e.g., Conger & Little, 2010; Salmela-Aro & Nurmi, 1997). Arnett (2006) suggests that emerging adulthood is recognized by great change in relationships, specifically with parents. This change however, does not have to be negative; in fact, it can lead to more positive and supportive relationships (Conger & Little, 2010; Parker, Lüdtke, et al., 2012; Tanner, 2006). The benefit of autonomy supportive parenting seemed to be especially clear for depressive symptoms. The size of the effects appeared to get stronger as adolescents moved through the post high school transition by which time autonomy from parents may play a more important role (see Zarrett & Eccles, 2006). However, z tests suggested this increase was rarely significant.

The way in which an individual responds to stressful life events, such as educational transition, may be a result of protective and promotive factors that the individual has at its disposal (Dagenais-Desmarais, Forest, Girouard, & Crevier-Braud, 2014; Patel & Goodman, 2007). Protective factors are factors which decrease psychological distress. Promotive factors in contrast, actively en-

hance psychological well-being (Patel & Goodman, 2007). The current results, however, show that autonomy support may act as both a protective and promotive factor. Perceived parental autonomy support helped lower ill-being and increased well-being across transitions. Our results are consistent with the theory that autonomy support buffers adolescents against the effects of depression, while promoting a sense of self-esteem. Put simply, parental investment in autonomy support before major educational transitions may facilitate their child's ability to flourish in the new environment and to gain from the new affordances offered by transitioning through their educational careers. Receiving autonomy support from parents, while experiencing a mismatch in the need for autonomy from the educational environment after transition, may serve as a substitute for autonomy satisfaction from the direct educational environment (Midgley et al., 2002; Ryan & Deci, 2017).

Coregulation for Autonomy and Well-Being

Because coregulation states that the youth and parent relationship is bidirectional (Dietrich et al., 2012), it is likely that autonomy supportive parenting does not only affect the children, but that their children may also affect their approach to parenting. The strength of the study design allowed us to explore the coregulation hypothesis by testing directionality of the effects we found. Interestingly, instances were found where well-being affected perceived autonomy support. Depression before the transition predicted a decrease in autonomy support after the transition for both the high school and post high school transition. Additionally, life-satisfaction before the transition predicted an increase in perceived autonomy support after the post high school transition, while autonomy support before transitions was not significantly related to changes in life satisfaction after any transition. Although it is not clear why autonomy support did not predict life satisfaction, it is possible that other environmental factors that play a role in SDT moderate this relationship, such as a structured home environment, parental mental health, and socioeconomic status (SES; e.g., Conger, Ge, Elder, Lorenz, & Simons, 1994). We suggest that future studies examine what other environmental factors may affect the perceived parental autonomy support and well-being relationship. The bidirectional relationship between well-being and autonomy support is consistent with the idea of coregulation. Developmental influences are rarely unidirectional, and so it should be considered that parents adapt their parenting approach to how adolescents deal with, and progress with, their development (Dietrich et al., 2012; Nurmi, 2004).

The significant relationship between pretransition life satisfaction and an increase in posttransition parental autonomy support was only found for the post high school transition, and may have come from life satisfaction being seen as a proxy for general quality of life conditions. Accordingly, when general life conditions and resources are high and satisfaction is therefore high, parents may be more willing to increase autonomy support. Alternatively, low life satisfaction may lead parents to attempt to have more control in their child's life in order to boost satisfaction. Indeed, when a child's life satisfaction is already sufficient in the eyes of a parent, the parents have no reason to be worried about their child's well-being and can thus provide the child with greater flexibility in autonomy. Likewise, parents that have children with

depressive symptoms may feel more of a need to control their child with the thought of helping the child. Whether this is an adaptive or maladaptive response to poor mental health represents an important future research direction. It has to be kept in mind that in the current research we focus on patterns of relationships that were consistent across multiple transitions, as a measure of generalizability. The relationship between pretransition life satisfaction and posttransition autonomy support was only found for the post high school transition. As such, we would suggest caution in interpreting these results until further research can be done.

Differences in Effects Between Mothers and Fathers?

Most of the parental autonomy support research deals with either mothers' autonomy support or a composite of the parents. Little is known or understood about how mothers and fathers differ with regards to the effects of the autonomy support that they offer. Past research does suggest that there might be differences. Specifically, mothers and fathers have been shown to influence adolescents in different areas of their lives. While mothers are more influential on the adolescents' social environment, fathers appear to be more influential for goal oriented activities (e.g., Grolnick et al., 1996). Moreover, there are studies that have recorded differences between the effects of maternal and paternal autonomy support (e.g., Grolnick & Ryan, 1989; Grolnick et al., 1991; Soenens & Vansteenkiste, 2005), but a difference between the effects on well-being has not been tested before.

Our research focused on differences in maternal and paternal autonomy support. We found that autonomy support was similar in structure across mothers and fathers. We also found that mothers tended to provide more autonomy support than fathers. Finally, a similar pattern of relationships between perceived autonomy support and well-being was found regardless of parental gender.

Taken together, the results suggest that adolescents benefit from autonomy support regardless of which parent it comes from. However, the lower mean levels of autonomy support from fathers indicated that this may be a particularly important group to target for parenting interventions. It is possible that lower levels of perceived paternal autonomy support were found because goal oriented activities, for which fathers are more influential, are generally less critical in adolescence than guidance in the social environment, for which mothers are more influential (Grolnick et al., 1996). Although consideration of the phrasing of the autonomy support questions should also be taken into account, the questions provided neutral conditions in which support was provided. Future research should aim to explore whether differentiation between mothers' and fathers' influence on adolescence truly affects the different autonomy need satisfaction across transitions, or whether fathers are simply perceived as less autonomy supportive. Additionally, previous research has found gender differences between effects of maternal and paternal parenting (e.g., Van der Giessen et al., 2014). Although we have controlled for student gender in the current study, future research can look at the differential effects of each parent on their sons and daughters across transitions.

Evidence for Relation Between Changes?

Changes in perceived autonomy support and well-being tended to be moderately related during the transition. Specifically,

changes in life satisfaction and self-esteem showed changes concurring with the transitions. It is known in the literature that well-being changes with educational transitions (Eccles & Midgley, 1989), and that relationships with parents change during adolescence, particularly as a result of transitions (Parker, Lüdtke, et al., 2012). Throughout educational transitions adolescents do not only establish new relationships in the educational environment, but also modify existing relationships in other social environments (Parker, Summerfeldt, Hogan, & Majeski, 2004). One of the most prominent examples of change in existing relationships is with parents. In this relationship greater independence is developed which often leads to an improved relationship, resulting in greater social support from parents (Tanner, 2006). This idea is reflected by the increasing effect of parental autonomy support on depressive symptoms throughout the transitions in the current study. Because both well-being and relationships with parents change with educational transitions, it is reasonable to speculate that the common agent of the change we found in autonomy support and well-being is the transition. Thus further research should gather data on the specifics of the transition, how it was managed, any notable events, and other adjustment indicators to identify the common factors that influence both well-being and the manner in which parents relate to their children.

Limitations

The current research has several strengths, including the use of longitudinal data and a focus on multiple transitions. However, there are also several limitations that readers should consider when interpreting the results. First, as with all longitudinal designs, there is a chance of third variable explanations of our findings (Morgan & Winship, 2007). Although, cross-lagged models are commonly used to provide evidence of causal ordering (Duncan, Duncan, & Strycker, 2006), they cannot rule out unobserved variables that might influence the associations between perceived autonomy support and well-being across the transitions (Clark & Ladd, 2000). We have established the total effect of autonomy support on well-being for the educational transitions. Future research should investigate the potential mechanisms behind this relationship. For example, research has shown that the relationship between autonomy support and well-being is mediated by need satisfaction (e.g., Costa et al., 2015). Further studies can test this mediation at the educational transitions to see whether this is present at all transitions, helping explain mechanisms behind the effect that we have found.

Further limitations are the use of self-report data, making the data subject to social desirability and common variance bias. This is particularly important in relation to autonomy support which was perceived on the part of the child but may not represent objective support the parents actually provide. Indeed, it is unclear whether results that show well-being affects autonomy support indicate an actual change in autonomy support or indicate that children with more depressive symptoms perceive their parents as becoming less autonomy supportive. While measures of objective support are likely to be difficult and costly, future studies could include observational methods and parent's perception of autonomy support. This would provide evidence of general levels of agreement but also provide a means of understanding whether perceptions of the child, regardless of the feelings of the parents or

objective reality, are what drive the results observed here. Furthermore, future studies could examine what types of autonomy supportive parenting behavior (e.g., taking the child's perspective, providing relevant choices) in particular may affect a child's perception of autonomy support.

The current study consisted of secondary data, which can be seen as another limitation. The use of secondary data has both benefits and costs. Because it is secondary data, we had no say in the scales or items that are used for the variables that we used. With no control over available items, it often happens that short scales are used in replacement of long scales. This furthermore resulted in the need to form an ad hoc measure of perceived autonomy support. There was inconsistency between items available for the autonomy support index at differing time points. Because of this, we had to create an autonomy support index that was different at each transition (see supplementary material). Although the creation of this index was done through both empirical and qualitative investigation with the help of a leading researcher in the field, the lack of a consistent scale across transitions made it difficult to compare the transition results on a quantitative basis. In all cases, however, construct validity and reliability was very strong and there was strikingly similar relationships across all three transitions. Similarly, despite differences in the sampling methods of the post high school transition data, the results related to well-being remained remarkably consistent. Based on the work of Shadish, Cook, and Campbell (2002) this can be seen as a strength given that consistency in results across transitions rules out several potential confounding explanations including historical or period effects and, to some degree, instrument specific effects.

Given the use of secondary data, there were some differences from transition to transition. In the first transition autonomy supportive parenting was only available for the pretransition wave. Likewise, autonomy support for the post high school transition did not distinguish between mothers and fathers. These differences meant that we focused exclusively on generalizability across transition in order to identify common processes. A primary study designed using consistent measures and following adolescents across major transitions is an important future step in order to consider differences between transitions. Furthermore, no covariates were available that have previously been associated with quality of the parent-child relationship, such as parent's mental health, family stressors, SES, or youth's temperament.

Although secondary data analysis has limitations, there are considerable benefits. Secondary data analysis made it possible to include three major educational transition points, and compare these transitions in a single study. Data on transition is often scarce, and those that cover multiple transitions are even rarer. In short, while using secondary data provided complications, the current research provides a novel approach to leveraging value from existing data where primary sources are not currently available.

Conclusion

Findings that were statistically significant in at least two studies provide strongest evidence of generalizability and thus have the strongest implications for theory and practice. In the current study we found that autonomy support from parents accounted for a decrease in depressive symptoms across all high school related

educational transitions. In addition, a bidirectional effect was found for the high school and post high school transition for which depressive symptoms before the transition predicted decreased autonomy support across the transitions.

These findings also provide a better understanding of social contextual influences on transition by showing that autonomy support from both mother and father can function equally as a protective factor against ill-being during the educational transitions surrounding high school. Results further provide evidence of coregulation. Not only does parenting affect the youth's well-being, but youth's well-being also appears to affect parenting. The reaction of parents who lower parental autonomy in response to a child's depression may be well meaning but ultimately maladaptive. Alternatively, knowing whether to change parenting styles at educational transitions, in response to the individual circumstances of the child, could be beneficial. Future research needs to explore this problematic cycle.

The only other consistent finding (significant in high-school and post high-school transition and near significant for one group in the middle school transition) was that pretransition parental autonomy support predicted increases in self-esteem across the transition. This suggests that autonomy support from parents not only helps prevent ill-being, but also promotes well-being. Based on these results it is important that parents understand the role they play in preparing their adolescents for educational transitions and that their autonomy support can provide a platform for adolescents' flourishing as they move through their educational careers.

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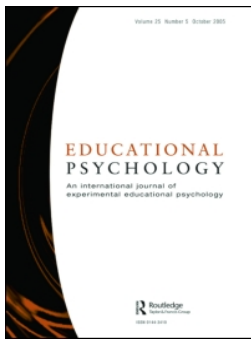
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Parental autonomy support, community feeling and student expectations as contributors to later achievement among adolescents

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ABSTRACT

This longitudinal study examined the relationships among parental autonomy support, student intrinsic life goals (i.e. community feeling), student expectations for long-term educational attainment and later academic performance (measured by GPA) in 227 students in an ethnically and racially diverse high school. Hypotheses were tested with structural equation models, which included gender, parent education and prior GPA as control variables. As self-determination theory suggests, parental autonomy support was indirectly and positively related to academic performance via intrinsic life goals. Intrinsic life goals and student expectations were moderately and positively related and both contributed to growth in academic performance, which suggests that self-determination theory and expectancy-value theory provide additive insight in predicting educational achievement. Fifty per cent of the variance in intrinsic life goals was explained by parental autonomy support and 77% of the variance in later GPA was explained collectively by variables in the study. The way in which student expectations and intrinsic life goals work in concert to promote achievement should be examined in future intervention studies. The significant indirect effect of parental autonomy support on GPA via intrinsic life goals and student expectations suggests that students will benefit from parents fostering intrinsic life goals through autonomy supportive communication.

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Intrinsic motivation; autonomy support; achievement; high school students; expectation; life goals

Numerous studies across the world have shown that intrinsic motivation to learn (e.g. enjoying learning and finding it interesting) promotes achievement and behavioural engagement with learning opportunities (e.g. Froiland, 2015; Froiland, Mayor, & Herlevi, 2015; Froiland & Oros, 2014; Worrell, Roth, & Gabelko, 2006). Intrinsic motivation is also moderately positively associated with learning goals (e.g. caring more about actual learning than grades or impressing others; Froiland & Worrell, 2016; Kover & Worrell, 2010). Learning goals also predict achievement above and beyond intrinsic motivation (Froiland & Worrell, 2016; Grolnick, Farkas, Sohmer, Michaels, & Valsiner, 2007). Learning goals can be seen as a subtype of intrinsic life goals, which include goals to develop as a person (a focus on learning), goals to help others or make the world a better place (community feeling) and goals to become more healthy (Kasser, 2014; Kasser & Ryan, 1996; Kasser, Ryan, Couchman, & Sheldon, 2004).

Self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000a, 2000b) posits that individuals have a need for competence, autonomy and relatedness. Moreover, if students' needs for competence,

autonomy and relatedness are met, their intrinsic motivation and academic achievement will increase. Intrinsic life goals in general have been repeatedly linked to psychological health and happiness (e.g. Froiland, 2011; Kasser & Ryan, 1996; Kasser et al., 2004; North, Holahan, Carlson, & Pahl, 2014), but few studies have specifically examined whether the intrinsic life goal of helping others (community feeling) promotes academic achievement longitudinally. An intervention that focused on teaching adolescents to deal with money wisely and use it to help others led to decreases in materialism (i.e. financial life goals, such as emphasising the accumulation of expensive possessions) and increases in self-esteem (Kasser et al., 2014). In the current study, we are the first to examine whether parental autonomy support predicts long-term growth in achievement via community feeling and student expectations.

Parental autonomy support, intrinsic life goals and achievement

Parental autonomy support regularly predicts achievement (Pomerantz, Ng, Cheung, & Qu, 2014), but the relationship is weaker than the relationship between parental autonomy support and motivational variables, such as autonomous motivation (Froiland, 2014; Vasquez, Patall, Fong, Corrigan, & Pine, 2015). However, very few studies have examined the relationship between parental autonomy support and intrinsic life goals (Vasquez et al., 2015), but those that have find that parental autonomy support predicts intrinsic life goals (Kasser, Ryan, Zax, & Sameroff, 1995; Lekes, Gingras, Philippe, Koestner, & Fang, 2010). In fact, intrinsic life goals partially mediate the association between parental autonomy support and well-being (Lekes et al., 2010). Likewise, extrinsic life goals (e.g. desire for popularity, fortune and looking good) partially mediate the association between parental autonomy support and unhealthy behaviours among high school students, such as smoking cigarettes and drinking alcohol (Williams, Hedberg, Cox, & Deci, 2000).

In the realm of education, learning goals (e.g. preferring rigorous and challenging learning activities over easy activities and impressing others) are an expression of an intrinsic life goal (i.e. personal development) that has been linked to greater achievement (e.g. Dweck, 2006; Froiland & Worrell, 2016). However, it is unclear whether community feeling in particular promotes the development of achievement. Froiland (2011, 2014, 2015) found that a parental autonomy support intervention that taught students to develop intrinsic life goals (both helping others and learning or personal growth goals) led to students becoming more positive about school and intrinsically motivated to learn, but the effects of intrinsic life goals on achievement were not examined. Vansteenkiste, Timmermans, Lens, Soenens, and Van den Broeck (2008) found that community feeling promotes intrinsic motivation and deeper conceptual learning of a text in a short-term experiment, but it is important to examine whether community feeling promotes the development of achievement over a longer period of time, especially in conjunction with parental autonomy support.

Yeager et al. (2014) found that telling students that many high school students hold a self-transcendent purpose for learning (e.g. making the world a better place), providing peer examples of such purposes, and writing about self-transcendent purposes for learning led to a higher GPA in science and math courses during the fourth quarter of the school year. Longer studies are needed in order to see if the relationship between self-transcendent goals and achievement persists into the subsequent school year and if general GPA is affected. Wisely, Yeager et al. (2014) chose methods that they determined would be autonomy supportive (e.g. providing examples of self-transcendent purposes), rather than demanding that students adopt self-transcendent life goals. In a longitudinal study, Mouratidis, Vansteenkiste, Lens, Michou, and Soenens (2013) found that intrinsic life goals (an aggregate of scores on personal development, community feeling and developing good relationships) predict mastery goals and achievement. They also suggested that intrinsic life goals may energise learning or mastery goals, which can be viewed as more immediate. Although their study did not examine parental autonomy support, they found that perceived parent-promoted intrinsic life goals had positive effects. This finding is intriguing because parents who are autonomy supportive may subtly reveal that they promote intrinsic life goals.

In a related field, Baard, Deci, and Ryan (2004) found that autonomy support from managers predicted employees' intrinsic need satisfaction directly and indirectly predicted performance evaluations via need satisfaction. Within the realm of education, Soenens and Vansteenkiste (2005) found that perceived autonomy supportive parenting predicted intrinsic motivation (and other forms of autonomous motivation, such as identification), which concomitantly predicted achievement. We expect that perceived autonomy support will also predict achievement via community feeling (an intrinsic life goal).

Student expectations as predictors of achievement

The expectancy-value model of achievement posits that youth's expectations for success directly affect achievement (Eccles & Wigfield, 2002). Student expectations for long-term educational attainment are an important predictor of achievement in various academic subjects, above and beyond control variables, such as prior achievement, gender and parent education (Froiland, Peterson, & Davison, 2013). In general, hope in the future is an important resilience factor for adolescence, which predicts the successful completion of high school (Worrell & Hale, 2001). Research on expectancy-value theory has found that expectancy for success and value are moderately and positively associated (e.g. Nagengast et al., 2011). Likewise, Suárez-Álvarez, Fernández-Alonso, and Muñiz (2014) found that youth expectations and motivation work in concert to predict math achievement in Spain.

Vansteenkiste, Lens, Witte, and Feather (2005) have shown that expectancy-value theory (Eccles & Wigfield, 2002) and self-determination theory (Ryan & Deci, 2000a) can be used simultaneously to more effectively predict job search efforts, than either theory can alone. For instance, intrinsic motivation (from self-determination theory), such as enjoying learning about the job market during the search, adds explained variance above and beyond the expectation of finding a job and importance placed upon finding a job in predicting job search efforts. Vansteenkiste and colleagues concluded by suggesting that education researchers could also utilise both theories simultaneously to better explain academic outcomes. This integrative approach has also been recommended by Brophy (2013). Perhaps student expectations that they will succeed in obtaining a college or graduate degree are enhanced when they see an intrinsic purpose for obtaining a high level of education. Namely, when students believe that their learning in high school is preparation for contributing to society and giving back to their community (community feeling), they may also see college, professional and graduate school as further training along those lines. Applying intrinsic life goals (e.g. studying in order to better contribute to the community) to learning is a powerful example of valuing learning, such that it is likely that intrinsic life goals will be positively associated to expectations for success academically.

Other correlates of achievement

There are other important variables that contribute to students' academic performance, including parent education, gender and prior achievement. For instance, girls often have higher GPAs than boys (Froiland & Davison, 2014b). Interestingly, girls have slightly stronger behavioural engagement in the classroom, but are not usually more intrinsically motivated to learn (e.g. Froiland & Worrell, 2016). Prior achievement is a robust predictor of later achievement among youth and is a key control variable for longitudinal studies examining achievement (Froiland & Oros, 2014; Froiland et al., 2013; Jeynes, 2012). Many studies have also found that parent education is positively associated with achievement (e.g. Froiland, Powell, Diamond, & Son, 2013; Jeynes, 2012; Powell, Son, File, & Froiland, 2012).

The present study and hypotheses

Numerous studies have linked parental autonomy support to achievement (e.g. Su & Reeve, 2011; Vasquez et al., 2015), but the effect of parental autonomy support on achievement via intrinsic life goals is important to examine because facilitating autonomy in adolescents may also contribute indirectly to academic achievement, given the claims of self-determination theory. In addition, this is the first study

Table 1. Descriptive statistics for variables in study.

	Range	Mean	SD
Parent interest	1.00–4.00	3.45	.83
Listens	1.00–4.00	3.45	.81
Allows decisions	1.00–4.00	3.03	.90
Give to community	1.00–5.00	3.55	1.13
Help society	1.00–5.00	4.00	1.07
Student expectations	1.00–4.00	3.26	.65
Parent education	1.00–5.00	3.82	1.16
Age	14.00–17.00	15.54	.57
GPA 2010	.33–4.00	3.14	.72
GPA 2011	.58–4.00	3.08	.76

we know of to examine the joint contribution of parental autonomy support, intrinsic life goals and student expectations to academic achievement. Such a study has implications for the importance of researchers considering self-determination theory and expectancy-value theory simultaneously when predicting and promoting student achievement.

We used structural equation modelling to examine our hypotheses. The structural equation model included parental autonomy support, student intrinsic life goals, student expectations, demographic variables (gender and parent education) and academic achievement (GPA in 2010 and 2011). Controlling for parent education, gender and prior GPA, we hypothesised that (a) parental autonomy support would be positively associated with intrinsic life goals, (b) intrinsic life goals would be positively associated with student expectations, (c) intrinsic life goals would be positively associated with GPA and (d) student expectations would be positively associated with GPA. We also hypothesised that (e) parental autonomy support would also be indirectly and positively related to GPA via intrinsic life goals.

Method

Participants

Participants consisted of 227 sophomores followed into their junior year (55.1% female) from a diverse high school in the San Francisco Bay Area. The major race/ethnicity designations were as follows: European American (43.6%), African-American (21.6%), Latino (17.6%), Asian American 7% and mixed race/ethnicity (10.1%). Students ranged in age from 14 to 17 years old ($M = 15.54$, $SD = .57$).

Parent education was obtained from district records. A third of the parents (31.3%) had graduate degrees, 27.8% had undergraduate degrees, 16.7% had some college classes, 8.8% had a high school diploma, 4.4% did not complete high school and no information was available on 11%. The Bay Area is known for adult education levels that are well above the national average. For instance, 53% of adults in the city of San Francisco have a bachelor's degree or higher (U.S. Census Bureau, 2013); thus, the parents of the students in this diverse sample had levels of education that are representative of the area. Sixty-seven per cent of students lived with both parents and 33% lived with one parent or guardian. In terms of further description of living situation, .9% were homeless, none lived in foster care, 2.2% lived in a home with multiple families, .9% lived in a hotel or motel, .4% lived in a friend's home, .4% lived in migrant housing and .4% lived in a shelter. See Table 1 for further descriptive statistics.

Measures

Major variables

Parental autonomy support in 2010 was a latent variable derived from students' ratings on three items assessing parenting taken from the California Healthy Kids Survey, Resilience and Youth Development Module (California Department of Education, 2015). Items were chosen that reflected parental autonomy support. The three items were (a) 'I help make decisions with my family'; (b) 'In my home, there

is a parent or some other adult who listens to me when I have something to say' and (c) 'In my home, there is a parent or some other adult who is interested in my school work'. Parental autonomy support and broader adult autonomy support in the realm of education regularly include allowing children to contribute to decisions, listening to children and expressing an interest in children's learning (Froiland, 2011; Su & Reeve, 2011; Vasquez et al., 2015). Responses to all items were on a 1–4 Likert-type scale (e.g. 1 = *not at all true*; 2 = *a little true*; 3 = *pretty much true*; 4 = *very much true*). The internal consistency estimate (α) for these scores was .74, and exploratory factor analysis indicated that the items formed a single factor with coefficients all greater than .59.

Community feeling in 2010 was a latent variable derived from students' ratings on the two items assessing students' reports of reasons to do well in school. The items include (a) 'If I do well in school, it will give me a way to give back to my community' (b) 'If I do well in school, it will give me a chance to contribute to society'. These items were rated on the same 1–5 Likert-type scale (e.g. 1 = *strongly disagree*; 5 = *strongly agree*), and their scores were strongly correlated ($r = .70$). These items are theoretically aligned with previous measures of community feeling as an intrinsic aspiration or life goal ('To work to make the world a better place' and 'To help people in need'; Kasser & Ryan, 1993, p. 422), which have been positively associated with intrinsic motivation, psychological well-being and achievement (e.g. Kasser & Ryan, 1996; Vansteenkiste et al., 2008). However, the current items focus on community feeling related to education as a form of preparation for helping others.

Student expectations in 2010 were measured using a single item variable based on their long-term educational attainment goals (1 = *graduate from high school*; 2 = *graduate from a 2-year or community college*; 3 = *graduate from a four-year college or university*; 4 = *graduate from professional or graduate school*). Such single item measures of student educational expectations have predicted achievement above and beyond rigorous controls such as prior achievement and parent education in previous studies among adolescents (e.g. Froiland et al., 2013).

Students' academic achievement was based on their cumulative GPA in the spring of 2011. GPA data for students in the study were obtained from administrative records at the district's research office. GPA in high school has a strong predictive relationship with first-year GPA in college (Sawyer, 2013; Wolfe & Johnson, 1995).

Control variables

GPA one year earlier (GPA in 2010), gender and parental education were included as control variables in the model. Gender was coded such that 1 = *Girl* and 0 = *Boy*. Parent's education level was coded as follows: 1 = *Less than high school*; 2 = *High school diploma*; 3 = *some college or Associate's degree*; 4 = *four year college degree*; and 5 = *graduate or professional degree*. Parental education is an important control variable in that it has predicted long-term motivation, student expectations and achievement in many studies (e.g. Froiland & Oros, 2014; Powell et al., 2012).

Procedure

Data were obtained from an ongoing study at the high school. The high school collects data on a variety of variables (e.g. motivation, school climate and student achievement) to inform decisions by the leadership team. As the data collection is approved by the district's research office and used by the school and district administration to inform educational decision-making at the school site, the district uses student assent for participation. Thus, the survey is administered to all students, but students do not have to participate if they choose not to. The school administers the surveys and when the survey data are entered, these data are merged with demographic data from the district using student identification numbers as the linking variable. One of the researchers assists the school in developing the surveys, analysing the data from the surveys and preparing a report for the school leadership team every fall. In return for these services, de-identified data files are made available for research, and this research has been approved by the institutional review board of the researcher's institution. All of the variables in the study with the exception of the GPA variables were collected on the 2010 survey.

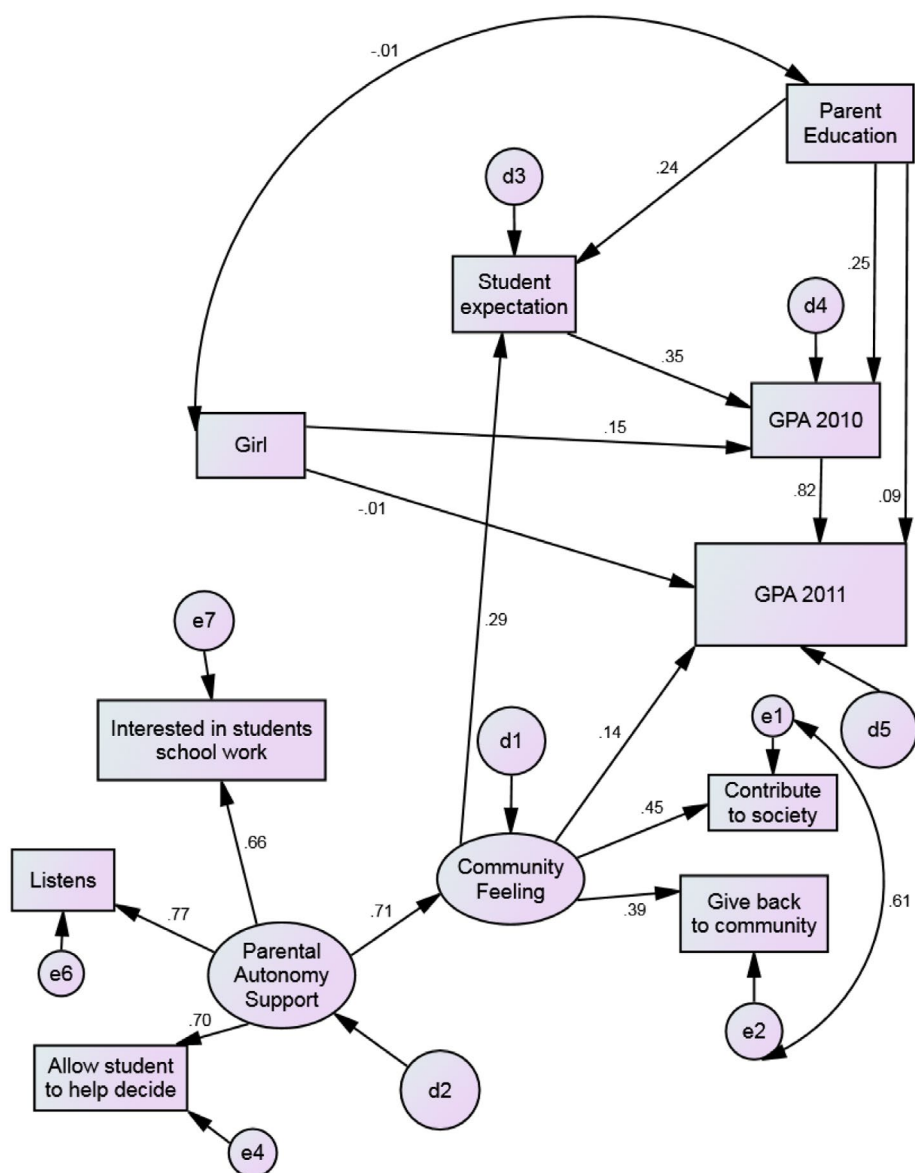


Figure 1. CFI = .97, TLI = .94, IFI = .97, RMSEA = .06. Path coefficients refer to standardised variables (mean = 0 and variance = 1.0). Standardised indirect effect of .29 of student expectation on GPA 2011 via GPA 2010. Standardised indirect effect of .15 of parental autonomy support on GPA 2011 via community feeling. All coefficients are significant at $p < .05$, with the exception of girl to GPA 2011. R -squared for the model of 2010 variables predicting GPA in 2011 = .77.

Data analysis plan

Structural equation modelling (SEM) in AMOS 19 was implemented to test the primary model (see Figure 1), affording a simultaneous examination of the multivariate relations between parental autonomy support in 2010, community feeling in 2010, student expectations in 2010 and GPA in 2011, while controlling for parent education, gender and prior GPA (GPA in 2010). Model fit was determined by a comparative fit index (CFI), an incremental fit index (IFI) and a Tucker-Lewis Index (TLI) of .95 or higher, as well as a root mean square error of approximation (RMSEA) less than .06 (Hu & Bentler, 1999). Because a moderate N makes the model unlikely to have a non-significant chi-square (Kenny, 2015), the Hoelter

Table 2. Bivariate correlations for non-categorical variables relevant to parental autonomy support, expectations, motivation and achievement.

	1	2	3	4	5	6	7	8
1. Parent interest	–							
2. Listens	.50*	–						
3. Decisions	.42*	.56*	–					
4. Give back	.27*	.15	.19	–				
5. Help society	.35*	.20	.20	.68*	–			
6. Expectations	.25*	.09	.11	.10	.12	–		
7. Parent ed.	.18	–.06	–.11	.02	.00	.20	–	
8. GPA 2010	.08	–.03	–.12	.00	.05	.43*	.31*	–
9. GPA 2011	.13	.02	–.04	.05	.09	.44*	.34*	.86*

Notes: Decisions = allows decisions; Parent ed. = parent education.

* $p < .001$.

Index was utilised, which indicates how small the sample size would need to be in order for the chi-square to become non-significant (Kenny, 2015). Due to the moderate sample size in the current study, the CFI, IFI, TLI and RMSEA were given more weight (Froiland & Davison, 2014a). Errors of the observed community feeling variables were allowed to correlate due to their strong relationship (Byrne, 2001).

SEM analyses were conducted with 227 cases, including some missing data, which was handled through full information maximum likelihood (FIML) estimation. The amount of missing data ranged from 0% (e.g. GPA in both 2010 and 2011) to 11% (parent education). FIML is one of the most advanced and effective ways of handling missing data in SEM (Enders & Bandalos, 2001). In order to test indirect relations between parental autonomy support and GPA in 2011 via community feeling and student expectations, the bootstrapping test was used to examine the significance of the indirect effect (Shrout & Bolger, 2002).

Results

Preliminary findings

Table 2 shows bivariate correlations among each of the non-categorical variables used in the study. As expected, GPA in 2010 was strongly related to GPA in 2011, indicating that it is a rigorous control variable. Student expectations were moderately and positively correlated with GPA and were also positively correlated with parent education, although that relationship was modest. The parental autonomy support variables (parent interest, listens and decisions) were moderately positively correlated with each other and were positively, but modestly correlated with the observed community feeling variables (i.e. give back and help society).

Structural equation model findings

The primary structural equation model (see Figure 1) provided a good fit to the data as indicated by the following fit statistics: CFI = .97, TLI = .94, IFI = .97, RMSEA = .06 (90% C.I. = .03–.08). Although a significant chi-square, $\chi^2(28) = 48.33$, $p < .05$, suggested that the data differed significantly from the model, the Hoelter Index indicated that 194 cases or fewer would lead to a non-significant chi-square, indicating that significance was due to the size of the sample and not model fit. Overall, the model fit was adequate.

In keeping with Hypothesis 1, parental autonomy support was strongly and positively associated with community feeling (see Figure 1 for standardised coefficients). Hypothesis 2 was also corroborated in that community feeling (an intrinsic life goal) and student expectations were positively associated. As predicted in Hypothesis 3, community feeling in 2010 was positively associated with GPA in 2011.

In keeping with Hypothesis 4, student expectations in 2010 moderately predicted GPA in 2010. The standardised indirect effect of student expectations on GPA in 2011 via GPA in 2010 was .29 ($p < .05$). As predicted in Hypothesis 5, parental autonomy support was indirectly and positively related to GPA

in 2011 via community feeling and student expectations (standardised indirect effect = .15, $p < .05$). Additionally, the standardised indirect effect of parental autonomy support on student expectations via community feeling was .20 ($p < .05$). This model explained 50% of the variance in community feeling and 77% of the variance in GPA in 2011, both of which reflect large effect sizes.

Discussion

In this study, we examined the relationship among several variables, including parental autonomy support, community feeling, student expectations and academic achievement. Results indicated that parental autonomy support explains half of the variance in community feeling among high school students, providing further evidence that parental autonomy support promotes intrinsic life goals (Kasser et al., 1995; Lekes et al., 2010; Williams et al., 2000). This finding is important because community feeling, as operationalised in this study, is almost diametrically opposed to the extrinsic life goal of amassing wealth and materialism (Grouzet et al., 2005), which is associated with unhealthy behaviour and low levels of psychological well-being among youth and adults across the world (Kasser, 2011). Overall, the variables in this study explained 77% of the variance in later GPA, indicating that parental autonomy support, intrinsic life goals and student expectations join prior achievement, gender and parent education as meaningful predictors of achievement among adolescents.

Parental autonomy support had an indirect positive effect on achievement via community feeling and student expectations. Although it is possible that the relationship between parental autonomy support and community feeling is bidirectional, these findings support the value of integrating expectancy-value theory and self-determination theory in coming to a deeper understanding of contributors to student achievement. Nagengast et al. (2011) and Brophy (2013) have both highlighted the importance of integrating expectancy-value theory and self-determination theory to better explain educational outcomes, and this study has started to answer their calls. This study suggests that parental autonomy support is a resilience factor in that it increases the likelihood of stronger achievement a year later via community feeling and student expectations. Community feeling (an intrinsic life goal) is positively associated with student expectations, which suggests that motivation to help others and long-term expectations work in concert to promote achievement. Interventions that teach parents to be autonomy supportive could further focus on student expectations (Froiland, 2011, 2015; Joussemet, Mageau, & Koestner, 2013) by specifically teaching parents of high school students to talk about how the knowledge and skills gained in college will prepare them to help more people (Froiland, 2014). This strategy may help parents convey high expectations without creating unnecessary pressure, which is a happy medium that parents struggle to find from Asia to the United States (Pomerantz et al., 2014).

Others have found that the positive effects of parental autonomy support on achievement are mediated by intrinsic motivation (e.g. Grolnick, Ryan, & Deci, 1991; Soenens & Vansteenkiste, 2005). This study adds to the literature by finding that perceived autonomy support also predicts achievement via community feeling (an intrinsic life goal). Future studies are needed that examine how intrinsic motivation to learn and intrinsic life goals may work in concert to promote achievement. Froiland and Worrell (2016) found that intrinsic motivation and learning goals are highly related, but that intrinsic motivation affected achievement indirectly through classroom engagement, whereas learning goals exerted a direct effect on achievement. Thus, it may be wise to study parental autonomy support, intrinsic life goals, intrinsic motivation and classroom engagement longitudinally in order to gain more insight into how these variables mediate the effect of parental autonomy support on achievement.

Limitations

It will be important for future studies to use a more robust measure of community feeling (e.g. the five-item scale from the Aspirations Index; Kasser & Ryan, 1996), as the current study used a two-item composite. In addition, multi-year longitudinal studies that follow both parental autonomy support and community feeling over a longer period of time and at multiple data points will be able to examine

possible bidirectionality between the constructs, because children who exhibit a high community feeling may elicit more autonomy support from parents. Furthermore, intervention studies among high school students that seek to elevate parental autonomy support, intrinsic life goals, student expectations and achievement can provide further insight into the role of each in increasing achievement. Using a parent-completed measure of parental autonomy support (e.g. Deci, Schwartz, Sheinman, & Ryan, 1981; Reeve, Bolt, & Cai, 1999) will also enhance the validity of findings and reduce the potential inflation of statistical estimates due to shared variance among multiple self-report variables. Furthermore, a more comprehensive measure of parental autonomy support will enable researchers to measure the construct more broadly (e.g. see Su & Reeve, 2011).

Implications

Parental autonomy support promotes the development of achievement in high school via community feeling and student expectations. Thus, intervention researchers and psychologists may wish to study parental autonomy support interventions more frequently, as Su and Reeve (2011) found only three parental autonomy support interventions in their meta-analysis of autonomy support interventions, and only Froiland (2011) was focused on the academic realm. Since then, Joussemet et al. (2013) and Froiland (2015) have further studied parental autonomy support interventions with children, but neither study was with high school students. Because parental autonomy support has also been linked to intrinsic life goals, psychological well-being and healthy behaviours, it is important for research in this area to accelerate (Froiland, 2011; Kasser et al., 1995; Lekes et al., 2010).

Further research should examine the relationship between community feeling (or intrinsic life goals in general) and student expectations. The current findings complement the findings of a couple of other studies in suggesting that expectancy-value theory and self-determination theory can be used in tandem to explain more variance in achievement and other positive outcomes. Perhaps intervention research will reveal that greater improvement in achievement is obtained when *both* intrinsic life goals and student expectations are enhanced.

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Mothers' and Fathers' Autonomy-Supportive and Controlling Behaviors: An Analysis of Interparental Contributions

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Mothers' and Fathers' Autonomy-Supportive and Controlling Behaviors: An Analysis of Interparental Contributions

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SYNOPSIS

Objective. The goal of this study was to examine how mothers and fathers contribute to each other's autonomy supportive and controlling behaviors toward their child. **Design.** The participants were heterosexual parental dyads from two prospective studies (Study 1, $n = 289$; Study 2, $n = 202$). Mothers and fathers completed questionnaires assessing their autonomy supportive and controlling behaviors toward their adolescent child. **Results.** In both studies, results from structural equation modeling revealed reciprocal partner effects where mothers' autonomy support at Time 1 predicted fathers' autonomy support at Time 2, and fathers' autonomy support at Time 1 predicted mothers' autonomy support at Time 2. Reciprocal partner effects were also observed for controlling behaviors. These reciprocal relations were not statistically different across mothers and fathers. **Conclusions.** These results provide support for interparental contributions regarding autonomy supportive and controlling parenting behaviors. Mothers and fathers should thus be aware that their parenting behaviors can be influenced by each other, including both positive and negative parenting behaviors.

INTRODUCTION

Family systems theory posits that cohesion between mothers and fathers in their parenting practices helps their adolescents to negotiate various developmental challenges (Chen & Johnston, 2012). Some studies have examined the degree of cohesiveness between mothers' and fathers' parenting behaviors (e.g., Beiswenger & Grolnick, 2010; Duchesne & Ratelle, 2010), but few have examined the possibility that one parent's behaviors shape the other parent's behaviors (Pleck & Hofferth, 2008; Schofield et al., 2009). Hence, this study examined the influences mothers and fathers have on each other with respect to autonomy support and control toward their child (Grolnick, 2009). This analysis will improve our understanding of dyadic predictors of these parenting behaviors, thereby contributing to the explanatory power of the family systems approach. Below, we define these behaviors and explore why they are often found to be similar in mothers and fathers.

Autonomy Supportive and Controlling Behaviors

Self-determination theory (Ryan & Deci, 2009) identified autonomy support and control as categories of behaviors that respectively promote and hinder children's

adjustment (Grolnick & Pomerantz, 2009). *Autonomy support* refers to behaviors that involve recognizing adolescents' perspectives, allowing them to take initiatives and hold age-appropriate responsibilities, offering them opportunities to be autonomous, and providing them with meaningful rationales for parental rules and expectations. *Control* refers to behaviors such as intrusiveness, dominance, and pressure (e.g., the use of rewards, threats, and punishments) to motivate adolescents' behaviors (Soenens & Vansteenkiste, 2010). This definition of parental control is thus similar to the one of psychological control proposed by Barber (2002).

The degree of behavioral similarity among co-parents is relatively high: maternal and paternal levels of autonomy support and control are moderately positively correlated, even when children or parents are asked to report these parenting behaviors. Studies that examined children's perceptions of their parents' autonomy supportive (e.g., Beiswenger & Grolnick, 2010; Gillet, Vallerand, & Lafrenière, 2012; Guay, Ratelle, Larose, Vallerand, & Vitaro, 2013; Roth, 2008) and controlling (De Haan, Soenens, Deković, & Prinzie, 2013; Kins, Soenens, & Beyers, 2012; Miller, 2012; Oudekerk et al., 2014; Stevens & Hardy, 2013; Wei & Kendall, 2014; Yoo, Feng, & Day, 2013) behaviors showed that mothers and fathers are generally perceived to be a moderately similar. Research that focused on parents' self-reports is scarcer. To our knowledge, only two studies reported correlations between mothers' and fathers' self-reported autonomy support, although others assessed both parents but failed to report the association between them. One study reported small-to-moderate amounts of shared variance between mothers' and fathers' self-reports (Annear & Yates, 2010), and the other reported larger amounts (Kins, Beyers, Soenens, & Vansteenkiste, 2009). With respect to parents' controlling behaviors, there are more studies that examined mothers' and fathers' self-perceptions, although most do not report correlations. Overall, the relation between mothers' and fathers' reported control ranged from moderately low to strong (e.g., Aunola, Tolvanen, Viljaranta, & Nurmi, 2013; Jubber, Olsen Roper, Yorgason, Poulsen, & Mandleco, 2013; McCoy, George, Cummings, & Davies, 2013; Nelson, Yang, Coyne, Olsen, & Hart, 2013; Seward, Yeatts, Zottarelli, & Fletcher, 2006; Tynkkynen, Vuori, & Salmela-Aro, 2012).

The positive associations found in the literature between mothers' and fathers' autonomy supportive behaviors and between mothers' and fathers' controlling behaviors support similarity rather than compensatory effects within the parental dyad. Compensatory effects would occur when parenting behaviors of partner A, who does not provide autonomy support to the child, are compensated by parenting behaviors of partner B, who provides this resource to the child, leading to a negative correlation between mothers' and fathers' scores on this type of parenting behaviors. Because past findings suggest that parents do not compensate for each other but, rather, report similar behaviors, a key question arises as to what explains similarities between them.

Mothers' and Fathers' Mutual Influence

Family systems theory (see Bronte-Tinkew, Scott, & Lilja, 2010) and the family process model (Belsky, 1984) stress the notion of interdependent influence between mothers and fathers. Behavior contagion could accordingly be one of the processes that explains their interdependent influence (Rhule-Louie & McMahon, 2007) as proposed by social learning theory (Bandura, 1963). Behavior contagion, as a socialization process, entails a causal effect from one partner's behaviors to those of the other partner

(and vice versa). In other words, the similarity between parenting behaviors could result from partners' mutual influence. Behavior contagion has been used to explain phenomena such as partners' emotional convergence (Anderson, Keltner, & John, 2003).

Behavior contagion between parents may be more salient during their child's adolescence, a period where children face important developmental challenges, like school transitions, changes in the social network, puberty, and a developing need for independence. During this period, there are more discrepancies between adolescents' expectations and those of their parents (Collins, 1990), which can lead to conflicts between them (Zimmer-Gembeck & Collins, 2003). These conflicts could be resolved using autonomy support and/or control. In time of conflicts, autonomy supportive or controlling parenting behaviors may be manifested more frequently, and this higher frequency may be detected and emulated by the other parent (Bandura, 1997). More specifically, fathers and mothers may observe each other during interactions with their adolescent child and use this information to become a more effective caregiver. Because there is no absolute value of proficiency related to parenting behaviors, modeling between partners is important. Parents must, therefore, appraise their parenting capacities in relation to the attainment of a similar other, which in this context is their co-parent (Bandura, 1997). Unfortunately, social learning between parents could occur even when one spouse shows ineffective parenting such as using controlling behaviors. From parents' perspective, this strategy could be perceived as beneficial to motivate their child and modeled on across parents. Studies in the motivation field have supported contagion. For example, simply observing a target person's motivational orientation increases the observer's level of motivation (Friedman, Deci, Elliot, Moller, & Aarts, 2010). Moreover, maternal autonomy support predicts increased autonomy support in sibling interactions (Van Der Kaap-Deeder et al., 2015).

Another important question regarding interparental influences is whether maternal parenting behaviors have a stronger influence on paternal parenting behaviors than the opposite. Some studies found that mothers were more likely to influence fathers than vice versa. It was proposed that modeling is a key mechanism through which men learn parenting (Hawkins, Christiansen, Sargent, & Hill, 1993). Fathers may observe mothers during childcare and use this information to learn how to behave toward their children (Masciadrelli, Pleck, & Stueve, 2006). Moreover, some authors suggested that fathers' behaviors are more malleable and vulnerable to environmental influences and, consequently, more readily influenced by mothers' parenting behaviors (Cabrera, Tamis-LeMonda, Bradley, Hofferth, & Lamb, 2000). In a similar vein, Pleck and Hofferth (2008) found that fathers' involvement in positive activities with the child, closeness and responsiveness, and monitoring and decision-making were positively predicted by mothers' involvement, but that mothers' involvement was not predicted by that of fathers. No similar studies were found for autonomy support and control. One study focused on parenting behaviors (i.e., warmth, monitoring, and harshness) but found no support for the hypothesis that mothers were more influential on fathers than the opposite (Schofield et al., 2009). The inconsistency of these findings may be explained by differences in sample size, the method used to assess parenting behaviors (children's report versus parental self-report), or choice of control variables.

The Present Research

The goal of this research was to test a behavioral contagion hypothesis for autonomy support and control in two prospective studies involving mothers and fathers of

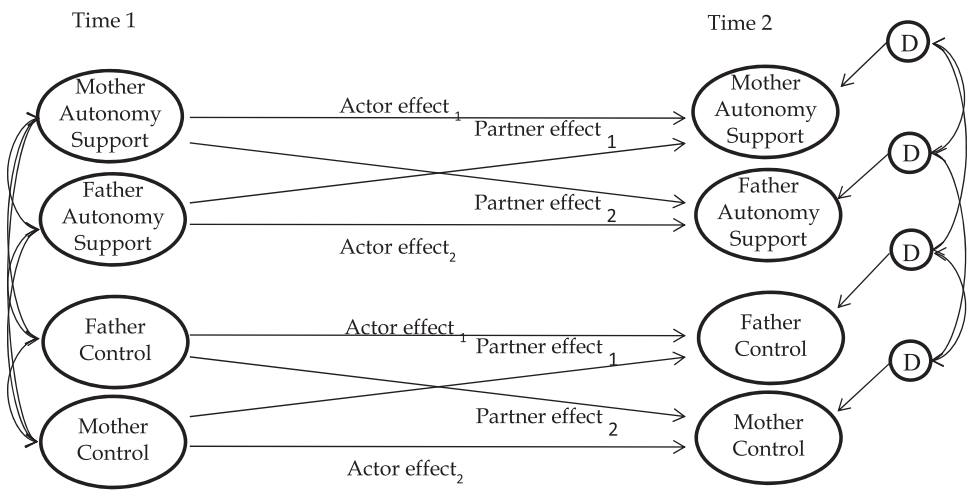


FIGURE 1
Proposed Model. D = disturbance.

adolescents from intact families. First, we hypothesized reciprocal relations between both partners where one partner’s self-reported behaviors will predict those of the other (see Figure 1). Second, we tested whether parents had equivalent contributions to their co-parent’s behaviors, for both autonomy support and control. In light of the inconsistencies in previous findings, and the fact that different parenting behaviors were examined, we did not formulate specific hypotheses regarding which parent, if any, would have the stronger contribution.

This research contributes to existing knowledge in three ways. First, to our knowledge, it is one of the first to test reciprocal relations between co-parents’ autonomy supportive and controlling behaviors. Such an analysis will increase our understanding of dyadic predictors of these behaviors. Second, our hypotheses are tested using self-reports from both parents, in contrast to past studies that relied on children’s perceptions of parenting behaviors (e.g., Pleck & Hofferth, 2008). Whereas measuring parenting behaviors from children’s perspectives is useful in some contexts, it is unsuitable for estimating partner effects. More specifically, relying on children’s perceptions would provide a rather weak test of partner effects because the only possible conclusion would be that children’s perceptions of a parent caused their own perceptions of the other parent. Third, our research encompassed two independent studies using a prospective design with intervals of 1 and 2 years between measurement points, different measures to assess parenting constructs, and sophisticated structural equation modeling (SEM) analyses.

STUDY 1

Method

Participants and Procedure. Data from this study came from a longitudinal project on high school students’ motivation achievement and persistence. Students and their

parents were recruited via a list provided by Quebec's ministry of education, leisure, and sports. Both parents were asked to fill out their questionnaire individually and return it in a separate pre-stamped envelope. Because this research focused on intact families for which both parents participated in the study, we used a subsample of 289 families who had participated in two measurement waves, 1 year apart. Demographic characteristics of the sample at Time 1 are presented in [Table 1](#).

Measures.

Autonomy Support. Maternal and paternal autonomy support were assessed with an adaptation of the Learning Climate Questionnaire (Williams & Deci, 1996), which contains three items. Items were adapted to assess fathers' and mothers' autonomy supportive behaviors toward the children who participated in the study. Mothers and fathers had to rate, on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), the extent to which they agreed with each item (e.g., "My child can freely discuss school matters with me"). Cronbach's alphas were .70 (T1) and .57 (T2) for mothers' self-reports and .77 (T1) and .80 (T2) for fathers' self-reports.

Control. Mothers' and fathers' controlling behaviors were measured with items from the Perceived Interpersonal Style Scale (Pelletier, 1992), adapted to the parenting context. Mothers and fathers rated, on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), the extent to which they agreed with each of the 3 items (e.g., "I punish my child when he/she has bad grades at school"). Cronbach's alphas were .70 (T1) and .64 (T2) for mothers' self-reports and .68 (T1) and .64 (T2) for fathers' self-reports.

Data Analysis.

Analyzing Dyadic Data. The actor-partner interdependence model (APIM; Cook & Kenny, 2005) was used to account for interdependence in partner scores. The APIM was used in the context of longitudinal data where a specific variable was measured twice for both partners. The postulated model is depicted in [Figure 1](#). The APIM is usually tested in regression models and estimates actor and partner effects. In a longitudinal design, actor effects capture the extent to which a person's score is predicted by his/her previous score. In this study, partner effects indicate that a partner's score on autonomy support (or control) predicted his/her partner's autonomy support (or control) score. The partner effect is of central interest in this study. The absence of partner effects would refute a behavior contagion hypothesis. In this study, we estimated four actor effects and four partner effects (see [Figure 1](#)).

The APIM estimates correlations between the independent variables and correlations between residual of dependent variables. The correlation between independent variables allows the estimation of actor effects, whereas controlling for partner effects, as well as of partner effects, whereas controlling for actor effects. Because of the likelihood that independent variables will explain all the variance in the dependent variables, a correlation between residual error term is calculated between dependent variables.

In this study, the APIM was tested using SEM in which variables are measured by multiple indicators. Because partner and actor effects are tested longitudinally and the same items are administered to both mothers and fathers on two occasions, the uniquenesses associated with the same observed variables will likely be correlated (*correlated uniquenesses*). Failing to control for these correlated uniquenesses will positively bias the correlations between corresponding latent constructs, which here could result in a

TABLE 1
Descriptive statistics on demographic variables at time 1 for participants of study 1 and study 2, as well as comparisons by participation status (participation at both times and non-participation at time 2)

Variables	Study 1			Study 2		
	Participation at T1 (<i>n</i> = 289)	Participation at both T1 and T2 (<i>n</i> = 201)	Non-participation at T2 (<i>n</i> = 88)	<i>p</i>	Participation at T1 (<i>n</i> = 202) and T2 (<i>n</i> = 160)	Non-participation at T2 (<i>n</i> = 42)
Percentage of Mothers	50.0	54.6	42.3	.01	50.0	42.6
Percentage of Girls	62.7	62.3	63.8	.82	45.3	45.2
Children's Mean Age	13.7	13.7	13.8	.50	14.1	14.2
Mothers' Mean Age	42.6	42.6	42.6	.94	44.1	43.3
Fathers' Mean Age	44.4	44.6	44.1	.52	46.1	43.7
Mothers' College Diploma (%)	27.4	30.3	20.3	.09	34.0	32.5
Fathers' College Diploma (%)	21.0	24.6	11.3	.03	30.4	28.6
Mothers' University Diploma %	16.4	18.0	12.7	.28	44.0	32.5
Fathers' University Diploma %	22.3	24.6	16.1	.17	37.8	26.2
Mothers-Work Full Time %	58.8	57.4	62.5	.43	71.8	69.1
Fathers-Work Full Time %	90.2	91.2	87.7	.42	92.1	83.3
Family Income Mean (\$)	56 752	57 769	54 240	.24	88 342	86 786

Note. Tests statistics are based on a comparison between participants who have participated at both time points and those who have not participated at Time 2.
n = the number of dyads.

spurious partner effect. Hence, uniqueness for the same items across partners and time were correlated.

Goodness-of-Fit Indices. SEM models were estimated using Mplus (Version 6.1) with standardized coefficients obtained using the maximum likelihood robust (MLR) estimator (Muthén & Muthén, 2008). Adequacy of model fit was ascertained using the comparative fit index (CFI), the non-normed fit index (NNFI), and the root-mean-square error of approximation (RMSEA), as well as the χ^2 test statistic. The NNFI and CFI vary on a 0-to-1 continuum, with values greater than .90 reflecting acceptable fit to the data (Schumacker & Lomax, 1996) and the RMSEAs below .05 are indicative of a "close fit" (Browne & Cudeck, 1992). Model comparison is also facilitated by positing a nested ordering of models in which the parameter estimates for a more restrictive model are a proper subset of those in a more general model. The difference in χ^2 value under MLR was used. When conducting χ^2 difference tests using the MLR estimator in Mplus, the χ^2 must be adjusted using the Satorra-Bentler scaling correction.

Missing Values. Missing data ranged from 5 to 43% (see Table 2). As in most longitudinal studies, there were more missing values at T2. Little's (1988) test yielded a statistically significant result, $\chi^2(457) = 592.94$, $p = .001$, indicating that the data were not missing completely at random (MCAR). In addition, because more data were missing at T2, we tested for differences on all indicators at T1 between families with complete or missing data. A multivariate analysis of variance (MANOVA) yielded statistically non-significant results, $F(12, 200) = 1.26$, $p = .25$, suggesting that there were no differences on the indicators used in the SEM analyses between subjects who participated at both time points and those who participated only at T1. Additional analyses were performed on demographic characteristics as a function of parents and students who have participated at both times and those who have not participated at Time 2 (see Table 1). Two differences reached significance: (1) the percentage of mothers who participated at both times was higher than the percentage of mothers who did not participate at Time 2; and (2) fathers who participated at both times were twice as likely (24.6%) to have a college degree than those who did not participate at Time 2 (11.3%). Missing data were taken into account using full information maximum likelihood (FIML; Davey, Shanahan, & Schafer, 2001; Peugh & Enders, 2004).

RESULTS AND DISCUSSION

Preliminary Analyses

The data were screened to ensure they conformed to basic statistical assumptions (Tabachnick & Fidell, 2013). No serious departure from univariate normality was observed on the indicators used to build latent constructs. Kurtosis and skewness values ranged between -2 and 2, except for one indicator on maternal autonomy support at T2 whose skewness value was -3.50 and kurtosis was 23. Ten multivariate outliers (3%) were identified and, because removing these cases did not change model fit indices and parameter estimates of the tested models, they remained in the sample for the analyses.

TABLE 2
Study 1: Means, standard deviations, missing values, and factor loadings for the sem model

Latent Factors and Indicators	<i>M</i>	<i>SD</i>	% of MV	Factor Loadings
Mother Autonomy Support T1				
The feedback that I provide to my child helps him/her to develop his/her confidence	6.02	1.074	5.2	.64
My child can freely discuss school matters with me	6.63	0.736	5.5	.68
When I ask my child something, I give him/her a sufficient amount of supervision in order for him/her to know what he/she has to do without any feelings of constraint	5.76	1.011	5.2	.64
Father Autonomy Support T1				
The feedback that I provide to my child helps him/her to develop his/her confidence	5.61	1.15	19.0	.80
My child can freely discuss school matters with me	6.22	1.05	18.6	.66
When I ask my child something, I give him/her a sufficient amount of supervision in order for him/her to know what he/she has to do without any feelings of constraint	5.42	1.17	18.6	.74
Mother Autonomy Support T2				
The feedback that I provide to my child helps him/her to develop his/her confidence	6.07	1.04	32.1	.58
My child can freely discuss school matters with me	6.63	0.68	31.7	.63
When I ask my child something, I give him/her a sufficient amount of supervision in order for him/her to know what he/she has to do without any feelings of constraint	5.85	1.08	32.4	.51
Father Autonomy Support T2				
The feedback that I provide to my child helps him/her to develop his/her confidence	5.85	1.05	43.1	.83
My child can freely discuss school matters with me	6.19	0.98	43.4	.69
When I ask my child something, I give him/her a sufficient amount of supervision in order for him/her to know what he/she has to do without any feelings of constraint	5.40	1.11	43.4	.75
Mother Control T1				
I'm angry when my child does not succeed well at school	3.03	1.63	5.2	.83
I punish my child when he/she has bad grades at school	1.95	1.37	4.8	.73
I often speak to my child about his/her mistakes	3.43	1.79	5.5	.38
Father Control T1				
I'm angry when my child does not succeed well at school	2.92	1.65	18.6	.84
I punish my child when he/she has bad grades at school	2.11	1.41	19.3	.70
I often speak to my child about his/her mistakes	3.57	1.63	18.6	.40
Mother Control T2				
I'm angry when my child does not succeed well at school	2.62	1.49	31.7	.82
I punish my child when he/she has bad grades at school	1.72	1.19	32.1	.72
I often speak to my child about his/her mistakes	2.90	1.63	31.7	.36
Father Control T2				
I'm angry when my child does not succeed well at school	2.78	1.70	43.1	.85
I punish my child when he/she has bad grades at school	2.03	1.44	43.1	.73
I often speak to my child about his/her mistakes	2.96	1.45	43.4	.45

Note. MV = missing values; T1 = Time 1, T2 = Time 2.

Possible ranges for autonomy support and control items are 1 to 7.

Confirmatory Factor Analysis (CFA)

We performed CFA to evaluate relations among latent constructs and to ensure that latent constructs were adequately assessed by their respective indicators. It is important to verify that parents have the same interpretation of latent constructs over time and across members of the dyad (Putnick & Bornstein, 2016). Hence, we tested three CFA models: one containing free factor loadings (Model 1), another constraining factor loadings to be invariant over time (Model 2), and a third one constraining factor loadings to be invariant over time and between members of the dyad (Model 3). Because the NNFI, CFI, and the RMSEA were identical among the three models (see Table 3), and the Chi-square difference test statistically nonsignificant, factor loadings were assumed to be invariant across time and partners. The reported parameters estimates are, therefore, those of Model 3. Factor loadings for latent constructs ranged from .36 to .85 (see Table 2). Fit indices for the CFA model (see Table 3) were all acceptable.

Correlations among latent factors are presented in Table 4. Positive and moderate-to-high correlations were obtained between measures of mothers' and fathers' autonomy support ($r_s = .43$ and $.58$ for T1 and T2, respectively) and control ($r_s = .64$ and $.60$ for T1 and T2, respectively). Correlations between T1 and T2 measures of a same latent construct were high (ranging from .65 to .78; see Table 4), suggesting substantial actor effects. Correlations between mothers' and fathers' scores were high (see Table 4), which suggest partner effects. Also, the correlation between T1 mother autonomy support and T2 father autonomy support (.56) was equivalent to the one between T1 father autonomy support and T2 mother autonomy support (.52). Partners' correlations were also both strong for controlling behaviors (.50 and .60).

Although dyad members were distinguishable (being heterosexual couples), they might not be *empirically distinguishable*. For this reason, an omnibus test of distinguishability (Kenny, Kashy, & Cook, 2006) was conducted with a CFA model that constrained item intercepts, variances, and covariances to equability between dyad members. Fit indices for this constrained model were worse, CFI = .88, NNFI = .86, RMSEA = .05, $\chi^2(222) = 398.73$, than those of the initial CFA model (Model 1), suggesting that dyad members were distinguishable.

Model Testing

Based on CFA results, we estimated SEM models with time/gender-invariant constraints. Models were estimated to determine actor and partner effects, in line with the APIM. Three models were tested: In Model 1, partner and actor effects were freely estimated (i.e., no constraints were imposed; see Figure 1). In Model 2, partner effects on autonomy support were constrained to equality. In Model 3, partner effects on both autonomy support and control were constrained to equality. Equality constraints were imposed to determine whether partner effects varied as a function of the partner (mother versus father). Fit indices of these three models were identical (CFI, NNFI, and RMSEA; see Table 3), and the scaled χ^2 difference test did not yield any statistically significant differences, revealing that partner effects were equivalent for autonomy support and control. From these findings, Model 3 was considered a better fit for the data and interpretations were based on it (see Figure 2).

Results of Model 3 supported reciprocal partner effects on control and autonomy support. Mothers' autonomy support at T1 predicted an increase in fathers' autonomy

TABLE 3
Study 1 and 2: Fit indices for CFA and SEM models

Models	Npar*	χ^2	df	p	CFI	NNFI	RMSEA [CI]	Comparison
Study 1								
CFA-Model 1	124	290.16	200	.001	.94	.92	.039 [.029, .049]	
CFA-Model 2 loadings invariant across time	116	297.61	208	.001	.94	.92	.039 [.028, .048]	CFA M2 versus CFA M1 (<i>ns</i>)
CFA-Model 3 loadings invariant across time and gender	112	301.39	212	.001	.94	.92	.038 [.028, .048]	CFA M3 versus CFA M2 (<i>ns</i>)
Model 1: Partner and actor effects freely estimated	104	308.44	220	.001	.94	.93	.037 [.027, .047]	
Model 2: Partner effects on autonomy support constrained to equality	103	311.58	221	.001	.94	.93	.038 [.027, .047]	M2 versus M1 (<i>ns</i>)
Model 3: Partner effects on both autonomy support and control constrained to equality	102	311.52	222	.001	.94	.93	.037 [.027, .047]	M3 versus M2 (<i>ns</i>)
Study 2								
CFA-Model 1	124	358.52	200	.001	.92	.89	.063 [.052, .073]	
CFA-Model 2: Loadings invariant across time	116	365.05	208	.001	.92	.90	.061 [.051, .072]	CFA M2 versus CFA M1 (<i>ns</i>)
CFA-Model 3: Loadings invariant across time and gender	112	365.97	212	.001	.92	.90	.060 [.050, .070]	CFA M3 versus CFA M2 (<i>ns</i>)
Model 1: Partner and actor effects freely estimated	104	380.13	220	.001	.92	.90	.060 [.050, .070]	
Model 2: Partner effects on autonomy support constrained to equality	103	380.52	221	.001	.92	.90	.061 [.051, .071]	M2 versus M1 (<i>ns</i>)
Model 3: Partner effects on both autonomy support and control constrained to equality	102	380.28	222	.001	.92	.90	.060 [.049, .070]	M3 versus M2 (<i>ns</i>)

Note. Npar = number of parameters in model. *ns* = non-significant.
Level of significance used for models comparison = .01.

support at T2 ($\beta = .17$), over and beyond the contribution of fathers' autonomy support at T1 ($\beta = .60$). Fathers' autonomy support at T1 also made a contribution to mothers' autonomy support at T2 ($\beta = .34$), over and beyond the contribution of mothers' autonomy support at T1 ($\beta = .61$). Partner effects were observed on controlling behaviors, but these effects were weak: Mothers' controlling behaviors at T1 predicted a small increase in fathers' controlling behaviors at T2 ($\beta = .15$, $p < .10$), over and beyond the contribution of fathers' controlling behaviors at T1 ($\beta = .55$). Fathers' controlling behaviors at T1 predicted an increase in mothers' controlling behaviors at T2 ($\beta = .18$, $p < .10$), over and beyond the contribution of mothers' controlling behaviors at T1 ($\beta = .66$).

Overall, the results of Study 1 corroborated our hypothesis. Partner effects were obtained for autonomy support for both mothers and fathers as well as for control. Constraints analyses revealed no statistically significant differences between mothers' and fathers' contributions to each other's behaviors. This first study, however, had some weaknesses. First, the number of items used to measure each construct was limited (three items per latent construct). Second, some of these items had low factor loadings

TABLE 4
Study 1 and 2: Correlations among latent factors.

Variables	1	2	3	4	5	6	7	8
1. T1 Mother AS	—	.22	.44*	.11	.56*	.24*	.16	.09
2. T1 Father AS	.43*	—	.13	.51*	.29*	.66*	.14	.19
3. T1 Mother C	-.34*	-.08	—	.31*	.21*	.14	.70*	.45*
4. T1Father C	-.27*	-.26*	.64*	—	.09	.27*	.43*	.72*
5. T2 Mother AS	.78*	.52*	-.24*	-.35	—	.29*	.45*	.18
6. T2 Father AS	.56*	.65*	-.22*	-.36	.58*	—	.18	.41*
7. T2 Mother C	-.41*	-.14	.78*	.60*	-.15	-.30*	—	.56*
8. T2 Father C	-.22	-.11	.50*	.65*	-.07	-.16	.60*	—

Notes. Coefficients below the diagonal are those of Study 1, those of Study 2 are above. AS = autonomy support, C = control, T1 = Time 1, T2 = Time 2. Entries 1 through 8 are latent factors.
* $p < .05$.

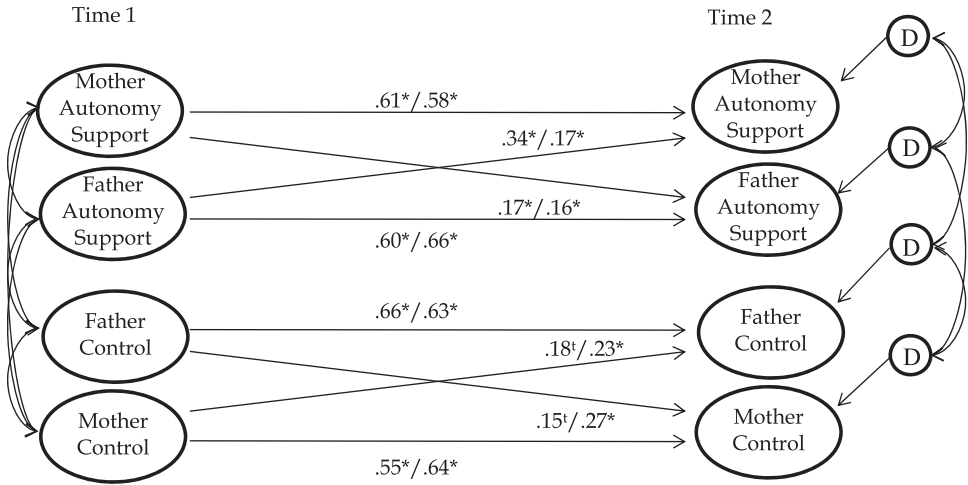


FIGURE 2

Study 1 and 2: Results of model 3 based on latent factors. Correlated uniquenesses are not depicted in the figure for the sake of clarity, nor are correlated uniquenesses for actor and partner effects. * $p < .05$, $t p < .10$. Results of study 1 are before the slash, those of study 2 after it.

(<.40) and some scales had low reliability coefficients. A second study aimed to overcome these shortcomings.

STUDY 2

Method

Participants and Procedure. Data from this study came from a longitudinal project on parents' contribution to their child's academic and vocational trajectories. It began when adolescents were in their third year of high school

(15 years old) and surveyed adolescents, their mothers, and fathers. As in Study 1, it focused on intact families where both parents participated in the study. We thus used a subsample of 202 families who participated in two measurement waves, 2 years apart. Demographic characteristics of the sample are presented in [Table 1](#). Participants came from a random sample, provided by the Quebec ministry of education, leisure, and sports, of students who were in Secondary 3 at a French-speaking high school during the 2011–2013 academic year. The sample was stratified based on gender, geographic location (rural or urban), type of school (public or private), and socioeconomic status. Participants were surveyed each year in the fall.

Autonomy-Supportive and Controlling Behaviors. The Parental Autonomy Support Scale (Mageau et al., 2015) was used to assess mothers' and fathers' self-reported autonomy support and control. Mothers and fathers were asked to indicate the extent to which each item applied to them, using a 7-point Likert scale ranging from 1 (*almost never*) to 7 (*always*). Autonomy support was assessed via components of acknowledging feelings (4 items), providing choices (4 items), and providing a rationale (4 items). Control included components of guilt induction (4 items), ego induction (4 items), and threat (4 items). Cronbach alphas ranged from .59 to .93 with most values being higher than the .70 (see [Table 5](#)).

Data Analysis.

Analyzing Dyadic Data. As in Study 1, we used the APIM and the same statistical parameters were estimated. The scores from the rationale, choices, and acknowledgment subscales used to evaluate autonomy-supportive behaviors were regressed on the latent constructs assessing mothers' and fathers' autonomy support at both time points (see [Table 5](#)). Latent constructs used to assess mothers' and fathers' controlling behaviors at T1 and T2 were also assessed using the scores from the guilt, threat, and ego subscales. All models were tested with standardized coefficients obtained using the MLR method of estimation.

Missing Values. Missing data ranged from 1 to 33% (see [Table 5](#)). Little's (1988) test was computed for all individual indicators and yielded a statistically significant result, $\chi^2(531) = 584.63$, $p = .05$, indicating that the data were not MCAR. In addition, because more data were missing at T2, we tested for differences on all T1 indicators between families with complete or missing data. A MANOVA yielded statistically significant results, $F(1,178) = 2.09$, $p = .02$, $\eta^2 = .01$, suggesting that there were differences on indicators used in the SEM analyses between participants at both time points and those who participated only at T1, although it explained little variance. Additional analyses were performed on demographic characteristics as a function of parents who participated at both times and those who did not participate at Time 2 (see [Table 1](#)). Only one difference reached significance: Fathers who participated at both times were older than those who did not participate at Time 2. To account for missing data in SEM analyses, FIML estimation was used under MLR.

TABLE 5
Study 2: Means, standard deviations, missing values, and factor loadings for the SEM model.

Latent Factors and Indicators	Alpha for subscale scores	<i>M</i>	<i>SD</i>	% of MV*	Factor Loadings
Mother Autonomy Support T1					
Acknowledging	.70	4.98	1.07	.5	.79
Choice	.62	5.31	.98	.5	.80
Rationale	.80	5.61	1.01	1	.80
Father Autonomy Support T1					
Acknowledging	.79	4.58	1.16	1.5	.80
Choice	.59	4.91	.98	1	.81
Rationale	.67	5.13	1.08	2	.78
Mother Autonomy Support T2					
Acknowledging	.72	5.06	1.13	22.8	.85
Choice	.65	5.30	1.03	24.8	.84
Rationale	.74	5.37	1.09	24.8	.80
Father Autonomy Support T2					
Acknowledging	.74	4.68	1.07	31.2	.88
Choice	.65	4.89	1.06	31.7	.84
Rationale	.74	4.96	1.23	33.2	.78
Mother Control T1					
Guilt	.86	3.64	1.54	.5	.79
Threat	.85	3.24	1.51	1.5	.64
Ego	.78	3.55	1.49	2	.59
Father Control T1					
Guilt	.81	3.31	1.39	2	.82
Threat	.86	3.35	1.50	2	.63
Ego	.81	3.83	1.47	2	.55
Mother Control T2					
Guilt	.86	3.62	1.63	24.8	.89
Threat	.91	3.05	1.68	25.2	.73
Ego	.87	3.55	1.63	24.3	.66
Father Control T2					
Guilt	.86	3.42	1.53	33.2	.87
Threat	.92	3.05	1.67	32.2	.70
Ego	.86	3.79	1.58	32.7	.63

Note. MV = missing values; T1 = Time 1, T2 = Time 2. Possible ranges for autonomy support and control items are 1 to 7.

RESULTS AND DISCUSSION

Preliminary Analyses and CFA

Data screening revealed no serious departure from univariate normality. Ten multivariate outliers were identified (5%) and, because removing these cases did not change model fit indices and parameter estimates, they remained in the sample for all analyses. As in Study 1, we tested the same three CFA models. Because the NNFI, CFI, and the RMSEA were identical among models, and the Chi-square difference test was statistically nonsignificant, factor loadings were assumed to be invariant across time and gender. Fit indices for the CFA-Model 3 were all acceptable (see Table 3). Factor loadings for latent constructs were high (ranging from .55 to .88; see Table 5), supporting the adequacy of the measurement model.

Correlations among latent factors are presented in Table 4. As hypothesized, a positive correlation was found between measures of mothers' and fathers' autonomy support ($r_s = .22$ and $.29$ for T1 and T2, respectively) and control ($r_s = .31$ and $.56$ for T1 and T2, respectively). Correlations between T1 and T2 measures of a same latent construct were high (ranging between $.56$ and $.72$; see Table 4), suggesting substantial actor effects (i.e., temporal stability). Correlations between mothers' and fathers' scores were moderate (see Table 4), which support partner effects. The correlation between T1 mother autonomy support and T2 father autonomy support ($.24$) is similar to the one between T1 father autonomy support and T2 mother autonomy support ($.29$). Partners' correlations are also nearly identical for controlling behaviors ($.45$ and $.43$). As in Study 1, an omnibus test of distinguishability was conducted and the constrained model offered a worse fit to the data, CFI = $.91$, NNFI = $.88$, RMSEA = $.07$, $\chi^2(222) = 411.03$, than the initial CFA model (Model 1) supporting the distinguishability of dyad members.

Model Testing

The same three models in Study 1 were tested in this study (see Table 3). Fit indices of these three models were identical (CFI, NNFI, and RMSEA), and the scaled χ^2 difference test did not yield statistically significant differences, revealing that partner effects were equivalent for autonomy support and control. Based on these findings, Model 3 was considered as best fitting the data and interpretations are based on it (see Figure 2).

Results from Model 3 supported reciprocal partner effects on control and autonomy support. Mothers' autonomy support at T1 predicted a small increase in fathers' autonomy support at T2 ($\beta = .16$), over and above the contribution of fathers' autonomy support at T1 ($\beta = .66$). Fathers' autonomy support at T1 also made a small contribution to mothers' autonomy support at T2 ($\beta = .17$), over and beyond the contribution of mothers' autonomy support at T1 ($\beta = .58$). Partner effects were also observed on control. Mothers' controlling behaviors at T1 predicted a moderate increase in fathers' controlling behaviors at T2 ($\beta = .26$), over and beyond the contribution of fathers' controlling behaviors at T1 ($\beta = .64$). Fathers' controlling behaviors at T1 predicted a small-to-moderate increase in mothers' controlling behaviors at T2 ($\beta = .23$), over and beyond the contribution of mothers' controlling behaviors at T1 ($\beta = .63$).

Overall, these findings replicated the reciprocal relations between mothers' and fathers' autonomy support and control obtained in Study 1 using stronger psychometric measures of parental behaviors and having a different time interval between data waves. Moreover, results from constrained analyses suggested that partner effects were equivalent for mothers and fathers, contradicting the assumption that one partner has a greater contribution than the other.

GENERAL DISCUSSION

The goal of this research was to examine interparental contributions between mothers' and fathers' autonomy supportive and controlling behaviors by testing a behavior contagion hypothesis where one partner's self-reported behaviors of autonomy and control would predict those of the other partner. This hypothesis was supported in both studies. In addition, the partner effects on both parenting dimensions were found

to be equivalent for mothers and fathers. These findings have scientific and applied implications.

Behavior Contagion

Correlational findings suggest that mothers and fathers reported similar levels of autonomy supportive and controlling behaviors. These results concur with those from previous studies (e.g., Abad & Sheldon, 2008; Beiswenger & Grolnick, 2010; D'Ailly, 2003). Our findings, based on the APIM, demonstrated that co-parents' behavioral similarity was a result of reciprocal contributions as both mothers and fathers predicted each other's controlling and autonomy supportive behaviors. Mothers' and fathers' self-reported autonomy support and control predicted increases in each other's behaviors over time (partner effects), even when actor effects and various statistical parameters (correlated uniquenesses, correlated disturbances) were controlled. These findings are consistent with a behavior contagion hypothesis and social learning theory (Bandura, 1997), positing that individuals emulate each other's behaviors.

The similarity in parenting behaviors observed in this study may also result from assortative mating (see Rhule-Louie & McMahon, 2007). Assortative mating occurs when individuals choose a life partner based on their similar characteristics, which can stem from a common ecological niche (i.e., social homogamy) or phenotypic preference. Because individuals choose partners with similar characteristics, they may, likewise, adopt parenting behaviors stemming from these characteristics (e.g., Prinzie, Stams, Deković, Reijntjes, & Belsky, 2009). Consequently, assortative mating and behavior contagion may not necessarily be two competing processes, but may rather occur in a complementary fashion over long developmental periods. In early parenting, mothers' and fathers' similarities in autonomy support and control may be explained by assortative mating, due to their similar upbringing and background or in personality characteristics. As children grow and develop, behavioral contagion may become more prevalent between parents. Future research will be needed to test this proposed developmental sequence.

Given that behavior contagion can explain similarities between parents' behaviors, it becomes important to further our understanding of the processes, whereby parenting behaviors may be learned, modeled, or promoted within the context of co-parenting. Observations of partner discussions can provide meaningful information regarding potential underlying mechanisms responsible for partners' mutual influences. For example, it is possible for parents to overtly discuss their parenting strategies and work toward adopting similar strategies with their teenager. If future research supports this mechanism, parenting interventions will benefit from focusing on spousal communication to help mothers and fathers develop uniform parental practices with their teenagers. Specifically, mothers and fathers who participate in such intervention might report improvements in communication, increased frequency of communication, and increases in shared decision-making regarding parenting practices (see Hartman, Gilles, Shattuck, Kerner & Guest, 2012), which may directly contribute to their own autonomy supportive and controlling behaviors.

Similarities between partners might also be explained by emotional processes. Providing autonomy support yields emotional benefits to the provider (Cheon, Reeve, Yu, & Jang, 2014; Deci, La Guardia, Moller, Scheiner, & Ryan, 2006). Thus, when a parent supports her child's autonomy, she/he experiences gains in happiness and

energy, which improves the positive affective atmosphere at home and contributes to the well-being and vitality of the other parent who, in turn, has more energy and creativity available to adopt autonomy supportive behaviors. In contrast, when a parent acts in a controlling fashion, it may increase tension, such that the partner experiences more stress, anxiety, or anger and becomes more inclined to vent his/her emotions by being controlling.

An unexpected finding was that reciprocal effects between mothers' and fathers' controlling behaviors were weak in Study 1 and moderate in Study 2. This difference in magnitude may reflect discrepancies in sample characteristics such as marital negativity, which might be higher in the first sample. More specifically, Schofield et al. (2009) showed that the correlation between mothers' and fathers' harshness was weakest in families characterized by high levels of marital negativity. Differences in partner effects for control may also be explained by adolescents' gender. In Study 1, the sample included more girls, whereas Study 2 had more boys. Because previous studies have shown that emerging adult females perceive their parents as less controlling than emerging adult males (Guay, Senécal, Gauthier, & Fernet, 2003), it is possible that gender moderated the reciprocal relations between partners. Hence, for parents of adolescent boys, the reciprocal relations for controlling behaviors may be stronger than those for parents of adolescent girls. Future studies should, therefore, test for potential moderators of partner effects.

Differential Effects of Mothers and Fathers on Parenting Behaviors

Partner effects were found to be equivalent for mothers and fathers, suggesting that mothers' contribution was no greater than fathers' contribution. Thus, mothers and fathers both learn from each other's behaviors when interacting with their teenager. These findings are consistent with those of Schofield et al. (2009), who showed that mothers and fathers contribute to each other's monitoring, warmth, and harshness to similar extents. However, our findings differ from those of studies on parental involvement, which demonstrated that mothers' scores are stronger predictors than fathers' scores (Pleck & Hofferth, 2008). The nature of parenting constructs may explain these differences. More specifically, involvement is usually assessed by parents' participation in various childcare activities. Generally, less involved in child rearing than mothers, fathers may be more inclined than mothers to emulate their partners' involvement. Fathers may, therefore, view their partner's involvement as a baseline on which to calibrate their own behaviors (Pleck & Hofferth, 2008). With respect to other parenting dimensions, such as autonomy support and control, the amount of time spent on a parenting behavior is more difficult to evaluate. Rather, autonomy support and control focus on relational skills and competencies that could be used by both partners, even if they differ in level of involvement. Fathers and mothers may be willing to emulate each other's behaviors, especially when a given parenting behavior has been successful to modify adolescents' behaviors. In addition, this emulation could be reinforced when both partners perceive themselves as involved in adolescent-care activities. This hypothesis accords with social learning theory, which posits that similar models are more emulated than dissimilar ones (Bandura, 1997). Finally, modeling influences that reinforce their perceived efficacy in dealing with their adolescent child may weaken the

impact of subsequent difficulties with their adolescent and sustain their effort in trying to negotiate those difficulties.

Strengths and Limits

Although this study used a prospective design, relatively large dyadic samples, and sophisticated data analyses, some limitations need to be taken into account when interpreting the findings. First, data on parenting behaviors were obtained via parents' self-reports. Although this procedure has clear advantages over the use of children's perceptions when testing a behavior contagion hypothesis, reports of parenting behaviors may be positively biased due to social desirability concerns. Future research could try to replicate these findings using observed ratings of autonomy support and control. Second, this study covered only part of the adolescence period. It is important to replicate the findings with parents of younger and older children to see their generalizability. Third, the samples were rather homogeneous in terms of family characteristics. It is important to verify whether the observed effects can be replicated in samples including various ethnicities, educational backgrounds, and incomes. Fourth, in both studies, some differences were obtained between those who dropped out at T2 and those who did not. Although, we used a sophisticated procedure to handle missing data, future research should aim to reduce attrition in replicating contagion effects. Fifth, other factors, such as marital satisfaction, may moderate the observed reciprocal relationships and would need to be considered in subsequent studies.

IMPLICATIONS FOR PRACTICE, APPLICATION, THEORY, AND POLICY

Results of this study have important implications for practice. First, parents should be made aware that their own parenting behaviors affect those of their partner. Being autonomy supportive increases the probability that the partner will as be more autonomy supportive, but similarly, being controlling increases the probability that the partner becomes more controlling. Second, these results also suggest that having mothers participate in an intervention program designed to increase autonomy support and reduce control could improve father's parenting behaviors as well, through behavior contagion. Knowing that fathers may be more reluctant to participate in such programs, these findings suggest that therapists can nevertheless, albeit indirectly, shape fathers' behaviors. Finally, understanding determinants of autonomy supportive parenting behaviors in future research may be crucial to ensure synchronicity in spouses' parenting behaviors, which could maintain or even increase marital satisfaction overtime.

ADDRESSES AND AFFILIATIONS

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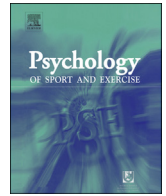
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Do perceived autonomy-supportive and controlling teaching relate to physical education students' motivational experiences through unique pathways? Distinguishing between the bright and dark side of motivation



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ABSTRACT

Objectives: Grounded in Self-Determination Theory (SDT), this study examined the mediating role of students' experiences of need satisfaction and need frustration in associations between perceived teaching style and students' motivation and oppositional defiance in the context of physical education. Specifically, we tested an integrated model including both a 'bright' path from perceived autonomy-supportive teaching through need satisfaction toward autonomous motivation and a 'dark' pathway from perceived controlling teaching through need frustration toward controlled motivation, amotivation, and oppositional defiance.

Design: Cross-sectional study.

Methods: To investigate the proposed paths structural equation modeling was used in a sample of 499 secondary school students (44% boys, $M_{age} = 15.77 \pm 1.16$).

Results: We found that perceived autonomy-supportive and controlling teaching, as well as need satisfaction and need frustration, constitute different constructs relating distinctively to motivational outcomes. Consistent with the notion of a bright and dark path, perceived autonomy support was related primarily to autonomous motivation, with need satisfaction mediating this association, whereas perceived controlling teaching was related primarily to controlled motivation and amotivation, through need frustration. Perceived controlling teaching also displayed a direct and unique relationship with oppositional defiance.

Conclusions: To more accurately capture the detrimental effects of controlling teaching, this teaching dimension along with its consequences in terms of need frustration and motivational outcomes needs to be studied in its own right. It is also discussed that effective teacher training may raise awareness among teachers about the motivational risks associated with controlling practices.

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Teachers can vary substantially in the way they begin a physical education (PE) lesson. Some teachers focus primarily on sparking enthusiasm in their students and begin by explaining the relevance of the lesson or by soliciting students' own experiences with the topic of the lesson. In contrast, other teachers focus on disciplinary matters first, and when students do not meet expectations, they rely on guilt-induction and criticism to correct students. Whereas

the former teachers predominantly rely on autonomy-supportive teaching practices, the latter teachers make use of more controlling teaching practices.

A substantial body of research grounded in Self-Determination Theory (SDT, Deci & Ryan, 2000), a well-investigated macro-theory on human motivation, indicates that an autonomy-supportive teaching style catalyzes a 'bright' pathway toward more optimal functioning because an autonomy-supportive teaching style nurtures students' basic psychological needs for relatedness, competence, and autonomy (e.g., Filak & Sheldon, 2008; Jang, Kim, & Reeve, 2012). Apart from this bright pathway, SDT researchers have increasingly argued for the existence of a separate 'dark'

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pathway activated by controlling socialization (Ryan & Deci, 2000b; Vansteenkiste & Ryan, 2013) and experiences of need frustration (e.g., Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011). If this dark pathway would be elicited, it would have unique predictive validity for suboptimal or even maladaptive motivational outcomes, including controlled motivation, amotivation, and oppositional defiance. Support for the existence of a specific dark pathway was obtained in the domains of sports (Bartholomew, Ntoumanis, Ryan, Bosch, et al., 2011; Stebbings, Taylor, Spray, & Ntoumanis, 2012), work (Gillet, Fouquereau, Forst, Brunault, & Colombat, 2012), and health (Verstuyf, Vansteenkiste, Soenens, Boone, & Mouratidis, 2013). However, few studies in the educational literature have examined the dark pathways involved in students' motivation (De Meyer et al., 2014). The present study aimed to fill this gap by investigating a theoretically driven model involving a bright path from perceived autonomy support via need satisfaction to optimal motivational functioning and a dark pathway from perceived controlling teaching via need frustration to maladaptive motivational dynamics in the context of PE.

Autonomy-supportive and controlling teaching

Autonomy-supportive teachers attempt to identify, develop, and nurture students' interests (Reeve, 2009). They can do so by relying on a variety of strategies, including soliciting the students' interests and points of view, using inviting language (e.g., Ryan, 1982), offering meaningful choices (e.g., Prusak, Treasure, Darst, & Pangrazi, 2004), and creating opportunities for initiative taking (e.g., Reeve & Jang, 2006). In contrast, controlling teaching involves the use of pressuring tactics to make students think, feel, or behave in a teacher-prescribed way, thereby bypassing the students' viewpoints (Reeve, 2009). Controlling teaching can manifest in at least two different ways (Soenens & Vansteenkiste, 2010). First, teachers can rely on externally controlling tactics that typically involve the use of relatively overt and bluntly controlling strategies, such as punishments, yelling, and the use of controlling language including statements such as 'you have to' (e.g., Assor, Kaplan, Kanat-Maymon, & Roth, 2005; Reeve & Jang, 2006). Second, teachers make use of internally controlling tactics that sometimes manifest in relatively subtler and less directly observable ways. For instance, teachers can appeal to students' feelings of guilt, shame, or anxiety and they can display an orientation of contingent regard, where their involvement in the students' activities and display of appreciation covaries with the students' performance and ability to meet the teacher's expectations (e.g., Soenens, Sierens, Vansteenkiste, Dochy, & Goossens, 2012).

Whereas autonomy-supportive teaching has been found to relate to students' need satisfaction, high-quality motivation, and positive course-related outcomes in a number of studies both in education generally (e.g., Jang, Reeve, Ryan, & Kim, 2009) and in PE in particular (e.g., Taylor, Ntoumanis, Standage, & Spray, 2010), the concept of controlling teaching has been studied less frequently in its own right. In most studies in which both teaching dimensions were assessed, they were subtracted from each other to yield an aggregate measure of autonomy-supportive versus controlling teaching (e.g., Jang et al., 2009). Herein we argue that it is important to consider the distinct contribution of both teaching dimensions because an absence of autonomy support would not necessarily imply the presence of controlling teaching. Teachers who do not actively promote volitional functioning (e.g., by providing a rationale for the activity at hand or by building in choices) do not necessarily engage in controlling tactics. Teachers can also be relatively uninvolved or can use a relatively neutral style. Further,

we argue that both teaching dimensions may each have relatively unique and differential associations with adaptive and maladaptive types of student motivation. According to SDT, these differential associations would be accounted for by the differential mediating role of experiences of, respectively, need satisfaction and need frustration.

Need satisfaction and need frustration

The psychological needs for autonomy, competence, and relatedness are at the heart of SDT and are considered essential to understand how teaching behaviors relate to students' type of motivation (Reeve & Jang, 2006; Ryan & Deci, 2000a). The need for autonomy refers to the experience of being the initiator of one's actions and to a sense of psychological freedom when engaging in an activity (Deci & Ryan, 2000). The need for competence refers to the feeling of being effective and to the experience of confidence in achieving desired outcomes (Skinner & Belmont, 1993). The need for relatedness refers to experiences of positive and mutually satisfying relationships, characterized by a sense of closeness and trust (Ryan & Deci, 2000a). Much like an absence of teacher autonomy support does not necessarily entail the presence of a controlling style, it is argued increasingly in SDT that need frustration is distinct from an absence of need satisfaction (Bartholomew, Ntoumanis, Ryan, Bosch, et al., 2011; Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011; Vansteenkiste & Ryan, 2013). When frustrated, the needs would manifest in feelings of pressure (autonomy need frustration), inferiority and failure (competence need frustration), and loneliness and alienation (relatedness need frustration). We note that whereas Bartholomew, Ntoumanis, Ryan, Bosch, et al. (2011) and Bartholomew, Ntoumanis, Ryan, and Thøgersen-Ntoumani (2011) used the term need thwarting to reflect students' personal feelings, we prefer, consistent with other work (e.g., De Meyer et al., 2014; Vansteenkiste & Ryan, 2013), to use the term need frustration. This is because the term need frustration more closely reflects students' personal experiences (in the same way as need satisfaction does), whereas the term need thwarting is used in reference to contextual features that undermine students' needs.

The distinction between need satisfaction and need frustration is said to be important because both processes would have differential antecedents and outcomes (Vansteenkiste & Ryan, 2013). Specifically, teacher autonomy support would be particularly important for fostering experiences of need satisfaction (Ryan & Deci, 2000b). An autonomy-supportive teacher would, for instance, display a sincere interest in the way students dealt with an exercise and asks them whether they need any additional help. In such a situation, students probably feel they have a say in how to proceed (autonomy satisfaction), are perhaps more likely to feel more confident to improve their skills (competence satisfaction), and feel understood by their teacher (relatedness satisfaction). For need frustration to occur, teachers would not simply have to be low on autonomy support but would engage in an actively controlling style. To illustrate, it is not because students experience few opportunities for choice (low autonomy need satisfaction) that they feel pressured to engage in activities against their will (autonomy need frustration). It is especially when teachers engage in controlling behaviors that students may feel pressured to change their behavior (autonomy frustration), may start to doubt their capabilities (competence frustration), and may feel rejected and disliked by the teacher (relatedness frustration). Consistent with this reasoning, Bartholomew, Ntoumanis, Ryan, Bosch, et al. (2011) showed that while autonomy-supportive coaching was related more closely to athletes' experiences of need satisfaction, controlling coaching was related primarily to athletes' experiences of need

frustration. To the best of our knowledge, the differential role of autonomy-supportive and controlling teaching in relation to need satisfaction and need frustration has not yet been examined in the context of PE.

Apart from being associated differentially with separate teaching style dimensions, need satisfaction and need frustration would also have differential relations to students' motivational outcomes. While need satisfaction is considered conducive to individuals' engagement, well-being, and adaptive motivation (e.g., Mouratidis, Vansteenkiste, Lens, & Sideridis, 2011), it is increasingly recognized that need frustration represents a vulnerability factor for maladaptive motivation, ill-being, and even psychopathology (Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011; Vansteenkiste & Ryan, 2013). Consistent with this claim, need satisfaction has been found to relate fairly specifically to positive outcomes (e.g., vitality, positive affect), whereas need frustration has been found to relate more strongly to negative outcomes (e.g., disordered eating, depressive symptoms, burn-out, and stress) in samples of athletes (Bartholomew, Ntoumanis, Ryan, Bosch, et al., 2011; Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011). Similar findings were obtained in samples of sport coaches (Stebbing et al., 2012), trainees in a police officer program (Gillet et al., 2012), and adolescents involved in a diary study (Verstuyf et al., 2013). In the context of PE, the differential role of need satisfaction and need frustration in the prediction of motivational dynamics deserves greater attention.

A differentiated view on motivational outcomes in physical education

SDT employs a differentiated view on motivation, distinguishing between more autonomous and more controlled forms of motivation (Deci & Ryan, 2000). Specifically, intrinsic motivation represents the prototype of autonomous motivation and refers to participating in PE lessons out of interest and enjoyment. For instance, students can be excited for learning a dance because they watched a really engaging video of professional dancers. With identification, a second type of autonomous motivation, students engage in a PE-related activity because they understand why it is personally valuable or important to do so. For instance, students may put effort in the PE lessons because they value being in good shape.

Introjected and external regulations are considered two relatively controlled forms of motivation. Introjected regulation occurs when students pressure themselves to engage in an activity because their self-worth is dependent upon their success or because they would feel ashamed or guilty for not putting effort in the activity. For instance, students who volunteer in a PE lesson to show to their peers how 'sporty' or 'muscular' they are function on the basis of introjected regulation. External regulation represents the most pressuring form of motivation and refers to putting effort into the lesson to comply with coercive demands of others, to avoid punishment, or to obtain contingently offered rewards.

Previous research in the context of school PE (see Ntoumanis & Standage, 2009 for an overview) has shown that autonomous motivation predicts higher activity levels and greater engagement (Aelterman et al., 2012), higher concentration (Ntoumanis, 2005) and more participation in optional physical activities (Haerens, Kirk, Cardon, De Bourdeaudhuij, & Vansteenkiste, 2010; Taylor et al., 2010). In contrast, controlled forms of motivation are usually linked to negative outcomes such as boredom (Ntoumanis, 2001), unhappiness (Standage, Duda, & Pensgaard, 2005), and decreased intention to participate in physical activity (Haerens et al., 2010).

Students differ not only in the type of motivation they display, but also in the intensity of motivation. In SDT, the term amotivation is used to refer to low intensity of motivation. When amotivated,

students lack the intentionality to participate in the learning activity, for instance because they feel helpless and unable to affect their learning process (Ryan, Lynch, Vansteenkiste, & Deci, 2011). Past research has shown that amotivation relates positively to negative outcomes such as unhappiness (Standage et al., 2005) and boredom (Ntoumanis, 2001), and negatively to positive outcomes such as students' engagement (Aelterman et al., 2012). Much like controlled motivation, amotivation is theorized to be rooted in a controlling teaching environment (Assor et al., 2005; De Meyer et al., 2014).

Apart from doing the activity for pressured reasons (controlled motivation) and becoming discouraged and passive (amotivation) when being exposed to controlling environments, students might also actively defy the teacher's request. That is, under pressuring circumstances students can become inclined to straightforwardly defy the pressuring requests and expectations altogether (i.e., oppositional defiance). SDT indeed assumes that the active thwarting of the psychological needs engenders defensive and compensatory attempts to cope with experiences of need frustration (Deci & Ryan, 2000; Vansteenkiste & Ryan, 2013). Although not yet investigated in the context of physical education, recent studies in the parenting domain support this view by showing that children tend to defy parental rules more frequently when they perceive their parents as being controlling and when they experience need frustration in the parent-child relationship (Van Petegem, Soenens, Vansteenkiste, & Beyers, 2014; Vansteenkiste, Soenens, Van Petegem, & Duriez, 2014). As such, it was deemed important to study oppositional defiance as an outcome in the 'dark' pathway in addition to amotivation and controlled motivation.

The present study

In light of the theoretical assertion that need frustration and need satisfaction represent relatively distinct processes, each with their own antecedents and motivational outcomes (Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011; Vansteenkiste & Ryan, 2013), the primary aim of the present study was to test a theory-based model encompassing perceived teaching style, needs, and motivational outcomes. It was hypothesized that students' perceived autonomy support would relate primarily to autonomous motivation via need satisfaction and that perceived controlling teaching would relate primarily to controlled motivation, amotivation, and oppositional defiance via need frustration. Although perceived autonomy-supportive teaching would primarily feed into need satisfaction, we also considered the possibility that it would be a buffer against need frustration and maladaptive motivational outcomes (Vansteenkiste & Ryan, 2013). Indeed, past work provided evidence for a negative relationship between autonomy support and negative outcomes (e.g., Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011). Similarly, although perceived controlling teaching would relate primarily to need frustration, it may also forestall optimal motivation via low need satisfaction. Such a cross-path would be consistent with past work showing that controlling socialization also relates negatively to positive outcomes (e.g., Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011). Overall though, we expected the cross-paths to be less pronounced compared to the hypothesized predominant symmetrical relations (e.g., perceived autonomy support → need satisfaction → optimal motivation).

Method

Participants and procedure

The sample of the present study consisted of 499 students (43.8% boys, mean age 15.76 years $\pm$ 1.16) from 30 classes out 11

secondary schools in Flanders (Belgium) who filled out a set of questionnaires at the end of a PE lesson. The questions dealt with their experiences during the past lesson. Students were in 9th (15.4%), 10th (23.4%), 11th (43.2%) or 12th (18.0%) grade. Class sizes ranged from 7 to 26 students per class. For each of the participating students passive consent was obtained from their parents to participate in the present study.

Each of the 30 classes was taught by a different teacher. Although all teachers gave informed consent for their voluntary participation in the study, two teachers did not return their questionnaires. The remaining 28 teachers were on average 40.68 years old ($SD = 10.35$, range = 25–56) and they had an average of 17.96 years of teaching experience ($SD = 10.80$, range = 2–37). All participating teachers were full-time certified PE teachers, 68% of whom obtained a master degree in movement and sport sciences at the university (including an academic master degree in teacher education), whereas 32% had received a teacher education program at the college level (i.e., professional bachelor in PE teacher education). The topic of the PE lesson was determined by the PE teacher and was categorized as dealing with either interactive games (e.g., basketball, volleyball, soccer, badminton, table tennis; 70%) or individual sports (e.g., athletics, gymnastics, dance; 30%). Similar to the students, teachers were asked to fill out a set of questionnaires at the end of the PE lesson. The Ethical Committee of Ghent University approved the study protocol.

Measures

All questionnaires were administered in Dutch, the participants' mother tongue. Unless mentioned otherwise, participants responded to the items on a 5-point Likert scale ranging from 1 (*not at all true for me*) to 5 (*very true for me*).

Perceived teaching behavior

Similar to previous studies (De Meyer et al., 2014) students' perceptions of autonomy support and perceived controlling teaching were measured by means of items from the Teacher As Social Context Questionnaire (TASCQ; Belmont, Skinner, Wellborn, & Connell, 1988) and the Psychologically Controlling Teaching scale (PCT; Soenens et al., 2012). To measure perceived autonomy support, we used the six positively worded items from the TASCQ autonomy support scale (e.g., "During this class my teacher gave me a lot of choices about how to do the exercise"). Controlling teaching was measured with the seven-item scale for psychologically controlling teaching (e.g., "During this class the teacher made me feel guilty when I dissatisfied him/her") supplemented with the two negatively worded items from the TASCQ autonomy support scale (i.e., "During this class it seemed like my teacher was always telling

me what to do" and "During this class my teacher often criticized me on how I do the things during class").

Confirmatory Factor Analysis (CFA) was performed with Mplus Version 7.0 (Muthén & Muthén, 1998–2012) to test the proposed two-factor model. However, fit indices were not satisfactory, $\chi^2(76) = 237.70$, $p < .001$, RMSEA = .07, CFI = .89, SRMR = .06. Problems mainly involved the loadings of the two negatively worded items of the TASCQ on the latent construct of perceived controlling teaching. Therefore, these two items were removed from the analyses, which yielded a significant improvement in model fit, $\chi^2(53) = 119.72$, $p < .001$, RMSEA = .05, CFI = .95, SRMR = .05. In this final model all item loadings were above .45, $p < .001$. Cronbach's alpha for perceived autonomy-supportive teaching was .79. Cronbach's alpha of the perceived controlling teaching scale based on the seven items of the PCT was .82. Students' perceptions of autonomy-supportive and controlling teaching were slightly negatively correlated ($r = -.15$, $p < .001$, see Table 1).

Experiences of need satisfaction and need frustration

Students' experiences of need satisfaction and frustration were measured with an adapted version of the Basic Psychological Need Scale and Need Frustration Scale (BPNSNF; Chen et al., 2014), a recently developed and validated 24-item scale. Chen et al. (2014) provided evidence for the factorial and predictive validity of this scale in four samples from diverse cultural backgrounds (i.e., China, US, Peru, and Belgium). Each need was assessed with eight items, of which four tapped into need satisfaction and four into need frustration. For the present study, this general need satisfaction scale was slightly adjusted by adding the stem "During the past PE lesson" and by slightly rewording some of the items to better reflect the specific context of a PE lesson. To illustrate, the item "I feel that my decisions reflect what I really want" was changed into "I felt that the exercises reflected what I really wanted to do".

To examine the internal structure of this questionnaire, a higher-order CFA was conducted thereby modeling the items as indicators of 6 first-order factors (autonomy satisfaction, autonomy frustration, competence satisfaction, competence frustration, relatedness satisfaction, and relatedness frustration) that, in turn, served as indicators for 2 higher-order factors, that is, need satisfaction and need frustration. This higher-order model fitted the data well, $\chi^2(243) = 530.49$, $p < .001$, RMSEA = .05, CFI = .91, SRMR = .06. All indicator loadings were above .45, $p < .001$. Internal consistency was good for the second order factors of need satisfaction (Cronbach's $\alpha = .87$) and need frustration (Cronbach's $\alpha = .84$), and for each of the six first-order factors ($.71 < \alpha < .80$). The items of both the original scale (Chen et al., 2014) and the version that was revised for the present study are presented in Appendix 1.

Table 1
Descriptive statistics and correlations between study variables.

	Total sample		F-value	Boys		Girls		2	3	4	5	6	7	8
	M	SD		n = 215		n = 279								
				M	SD	M	SD							
1 Autonomy-support	2.98	.81	10.18**	3.12	.82	2.88	.79	-.15***	.61***	-.26***	.51***	-.01	-.29***	-.15***
2 Controlling teaching	1.79	.68	17.10***	1.94	.74	1.68	.61	—	-.20***	.51***	-.25***	.32***	.35***	.56***
3 Need satisfaction	3.21	.73	5.80*	3.30	.72	3.14	.72		—	-.36***	.70***	-.02	-.36***	-.20***
4 Need frustration	1.96	.63	.00	1.96	.61	1.96	.65			—	-.37***	.48***	.51***	.34***
5 Autonomous motivation	3.43	.90	14.68***	3.61	.90	3.30	.86				—	.01	-.62***	-.20***
6 Controlled motivation	1.67	.64	3.13	1.73	.66	1.63	.62					—	.27***	.15***
7 Amotivation	1.82	.79	.85	1.77	.82	1.85	.76						—	23***
8 Oppositional defiance	1.82	.84	10.05**	1.96	.90	1.72	.78							

Note: * $p \leq .05$; ** $p \leq .01$, *** $p \leq .001$.

Motivational outcomes

Students' motivation toward the past PE lesson (i.e., situational motivation) was assessed by means of the validated Behavioral Regulations in Physical Education Questionnaire (BRPEQ; Aelterman et al., 2012). We used the stem 'I put effort in this past PE lesson because ...'. This stem was followed by items reflecting autonomous motivation (8 items; e.g., 'because I enjoyed this PE class', 'because I found this PE class personally meaningful'), controlled motivation (8 items; 'because I had to prove myself', 'because otherwise I got criticized'), and amotivation (4 items; e.g., 'I didn't see why this PE class is part of the curriculum').

CFA showed that a higher-order model, with intrinsic motivation (4 items) and identified motivation (4 items) loading on the higher-order latent variable autonomous motivation, with introjected motivation (4 items) and external motivation (4 items) loading on the higher-order latent variable controlled motivation (8 items), and with amotivation (4 items) as a separate latent factor, yielded an acceptable fit, $\chi^2(165) = 468.80$, $p < .001$, RMSEA = .06, CFI = .90, SRMR = .09. However, one item from the introjection subscale ("because it is the only way to be pleased with myself") loaded relatively low on its corresponding factor (i.e., .42) and cross-loaded strongly (.40) with the identification subscale. To avoid that the introjection subscale would include only avoidance-oriented items, the current scale contained a combination of two items tapping into the avoidant type (e.g., "because I will feel like a failure if I don't") and two items tapping into the approach type (e.g., "because it is the only way to be pleased with myself") of introjected regulation. Although such introjected approach items could be separated from identified motivation in previous studies (e.g., Assor, Vansteenkiste, & Kaplan, 2009), the item "because it is the only way to be pleased with myself" did display a cross-loading with autonomous motivation in the present study. Theoretically, the cross-loading of an introjection-approach item is not unexpected, as introjection-approach regulation is more volitional in nature when compared to introjection-avoidance regulation. As the same item also had the lowest standardized loading on controlled motivation in the study of Aelterman et al. (2012), it was decided to remove this item from the final analyses. This resulted in a significantly better fit, $\chi^2(147) = 350.04$, $p < .001$, RMSEA = .05, CFI = .93, SRMR = .07. All indicator loadings were above .55. Internal consistencies were good with Cronbach's alphas of .91, .81, and .79 for autonomous motivation, controlled motivation and amotivation, respectively.

Oppositional defiance

Students' oppositional defiance was measured with a recently developed and validated scale (Van Petegem et al., 2014; Vansteenkiste et al., 2014) that was adjusted to the PE context. The scale assesses students' tendencies to reject the PE teacher's authority and contained 4 items that follow the stem "During the past PE lesson": "I had the tendency to do exactly the opposite of what the teacher expected me to do", "I sometimes thought about completely ignoring what the teacher asked me to do", "I had the tendency to rebel against the teacher's requests", and "I didn't care about what the teacher asked me to do: I'd rather done my own thing". A CFA modeling the 4 items as indicators of the latent construct of oppositional defiance showed a good fit ($\chi^2(2) = 5.55$, $p = .06$, RMSEA = .06, CFI = .996, SRMR = .01). All loadings were higher than .74. The scale had good reliability ($\alpha = .87$).

Plan of analyses

Structural Equation Modeling (SEM) based on maximum likelihood estimation with 5000 bootstrap samples in Mplus (Muthén &

Muthén, 1998–2012) was used to test the theory-based model specifying paths from teaching behaviors via experiences of need satisfaction and need frustration toward motivational outcomes. To evaluate the model fit, the Comparative Fit Index (CFI); the Root Mean Squared Error of Approximation (RMSEA) and the Standardized Root Means Square Residual (SRMR) were selected. According to Hu and Bentler (1999), combined cut-off values close to .95 for CFI and close to .06 for RMSEA and .09 for the SRMR indicate good fit.

Latent constructs for need satisfaction and need frustration as well as for autonomous motivation and controlled motivation were estimated based on four two-item parcels. Latent constructs for perceived autonomy support and perceived controlling teaching were represented by three two-item parcels. Parcels were created by combining stronger loading items with weaker loading items from the same scale (Little, Cunningham, Shahar, & Widaman, 2002). The latent constructs for amotivation and oppositional defiance were indicated by the four items representing both scales. As recommended by Hayes and Scharkow (2013) and Cerin and Mac Kinnon (2008), points of estimate as well as the bias-corrected bootstrapped confidence intervals were calculated for each of the proposed pathways. Gender was included as a control variable in the model because a MANOVA analysis showed differences according to gender (see Preliminary Analyses section).

Total effects (τ) were first estimated through a structural model with paths from the teaching dimensions (perceived autonomy-supportive and controlling teaching) directly toward the motivational regulations (autonomous motivation, controlled motivation, amotivation, oppositional defiance). Next, we added need satisfaction and need frustration in the model to investigate the theory-based hypothesis (Ryan & Deci, 2000a; Vansteenkiste & Ryan, 2013) that the direct associations between autonomy-supportive teaching and autonomous motivation would be accounted for need satisfaction, and that the direct associations of controlling teaching with controlled motivation, amotivation, and oppositional defiance would be accounted for by need frustration. In addition to the theoretically expected symmetrical paths (e.g., from autonomy support to autonomous motivation via need satisfaction), we also tested all other possible indirect effects (e.g., from autonomy support toward autonomous motivation via need frustration). For this purpose, we used the product-of coefficient test of mediation through the MODEL INDIRECT procedure in Mplus, as recommended by Cerin and Mac Kinnon (2008). This method tests the statistical significance of the product of two regression coefficients ($\alpha\beta$), where α represents the relationships between the independent variable (i.e., perceived autonomy supportive teaching, perceived controlling teaching) and the potential mediators (i.e., need satisfaction, need frustration), and β represents the relationship between the mediator and motivational outcomes (i.e., autonomous motivation, controlled motivation, amotivation, oppositional defiance), while simultaneously adjusting for the direct relationship (τ') from teaching behavior toward motivational outcomes. Mediation effects represented by $\alpha\beta$ were considered statistically significant when their 95% bootstrap-based confidence interval did not include zero. Both specific indirect effects (' $\alpha\beta$ ' for need satisfaction, and ' $\alpha\beta$ ' for need frustration) as well as total indirect effects through both mediators simultaneously (sum of $\alpha\beta$ for each of the mediators) were estimated. In addition, the structural model also included correlations between autonomy support and controlling teaching, between need satisfaction and need frustration, and between each of the motivational outcomes.

Table 2

Multiple-mediator model from teaching behavior to students' motivation through need satisfaction and need frustration.

	Total effect (τ) 95% CI _{BC}	Direct effect (τ') 95% CI _{BC}	Need satisfaction			Need frustration			Sum of indirect ($\alpha\beta$) 95% CI _{BC}
			α -coefficient	β -coefficient	Specific indirect ($\alpha\beta$) 95% CI _{BC}	α -coefficient	β -coefficient	Specific indirect ($\alpha\beta$) 95% CI _{BC}	
			95% CI _{BC}	95% CI _{BC}		95% CI _{BC}	95% CI _{BC}		
Perceived autonomy support									
Autonomous motivation	.58*** (.46, .71)	.06 (-.09, .21)	.59*** (.48, .70)	.86*** (.67, 1.06)	.46*** (.34, .58)	-.12** (-.19, -.04)	-.07 (-.24, .11)	.01 (-.01, .03)	.47*** (.35, .58)
Controlled motivation	.06 (-.03, .15)	-.01 (-.13, .11)	.59*** (.48, .70)	.25** (.11, .42)	.18*** (.07, .29)	-.12** (-.19, -.04)	.66*** (.50, .87)	-.10** (-.16, -.03)	.08 (-.04, .20)
Amotivation	-.27*** (-.38, -.15)	-.11 (-.27, .05)	.59*** (.48, .70)	-.15 (-.32, .03)	-.09 (-.19, .02)	-.12** (-.19, -.04)	.60*** (.39, .83)	-.07** (-.12, -.02)	-.16** (-.27, .05)
Oppositional defiance	-.05 (-.15, .05)	.00 (-.16, .16)	.59*** (.48, .70)	-.11 (-.30, .07)	-.06 (-.17, .04)	-.12** (-.19, -.04)	-.10 (.31, .07)	.01 (-.01, .04)	-.05 (-.16, .05)
Perceived controlling teaching									
Autonomous motivation	-.30*** (-.44, -.17)	-.13 (-.30, .02)	-.13** (-.23, -.03)	.86*** (.67, 1.06)	-.09* (-.16, .01)	.55*** (.45, .64)	-.07 (-.24, .11)	-.03 (-.10, .05)	-.11* (-.22, -.01)
Controlled motivation	.42*** (.30, .55)	.09 (-.06, .24)	-.13** (-.23, -.03)	.25** (.11, .42)	-.03 (-.07, .00)	.55*** (.45, .64)	.66*** (.50, .87)	.37*** (.26, .48)	.34** (.23, .45)
Amotivation	.49*** (.34, .65)	.14 (-.03, .33)	-.13** (-.23, -.03)	-.15 (-.32, .03)	.02 (-.01, .04)	.55*** (.45, .64)	.60*** (.39, .83)	.27*** (.17, .37)	.29*** (.19, .38)
Oppositional defiance	.80*** (.63, 1.01)	.83*** (.62, 1.07)	-.13** (-.23, -.03)	-.11 (-.30, .07)	.01 (-.01, .03)	.55*** (.45, .64)	-.10 (.31, .07)	-.05 (-.14, .05)	-.03 (-.13, .06)

Note: * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$. Model fit structural model with total effects from perceived controlling teaching directly to motivational outcomes: $\chi^2(210) = 369.85$; RMSEA = .04; CFI = .97; SRMR = .04. Model fit full model with mediators: $\chi^2(399) = 731.25$; RMSEA = .04; CFI = .96; SRMR = .04.

Results

Preliminary analyses

Means, standard deviations, and correlations among the study variables are presented in Table 1. Pearson bivariate correlations between students' age and each of the study variables were non-significant (all r s < .08, all p > .07). To examine whether the main study variables differed according to student gender, we conducted a MANOVA with student gender as an independent variable and with the eight study variables as dependent variables. The multivariate effect of student gender was significant, Wilks' Lambda = .90, $F(7,473) = 6.74$, $p < .001$, $\eta^2 = .10$. Univariate tests were significant for autonomy-supportive teaching ($F(1,481) = 10.18$, $p < .01$, $\eta^2 = .02$), controlling teaching ($F(1,481) = 17.10$, $p < .001$, $\eta^2 = .03$), need satisfaction ($F(1,481) = 5.80$, $p = .02$, $\eta^2 = .01$), autonomous motivation ($F(1,481) = 14.68$, $p < .001$, $\eta^2 = .03$), and oppositional defiance ($F(1,481) = 10.05$, $p < .01$, $\eta^2 = .02$). Boys scored higher than girls on all these variables (see Table 1). In light of these findings we controlled for gender in the primary analyses.

Multilevel SEM has become an established method to analyze data that are hierarchically structured (Preacher, Zhang, & Zyphur, 2011), as is the case in the present study (with 499 students nested within 30 classes and 11 schools). Accordingly, we estimated the variances at the school and class level using the statistical program MLwin version 2.20 (Rasbash, Steele, Browne, & Goldstein, 2009) prior to conducting SEM analyses in Mplus Version 7.0 (Muthén & Muthén, 1998–2012). Three-level models indicated that there was no significant variance at the school level (all $\chi^2(1) < 1.007$, $p = .32$). We proceeded with estimating two-level models with students nested within classes. Class-level variance was significant for perceived autonomy support ($\chi^2(1) = 9.727$, $p < .01$; ICC = .21), perceived controlling teaching ($\chi^2(1) = 8.209$, $p < .01$; ICC = .14), need satisfaction ($\chi^2(1) = 7.309$, $p < .01$; ICC = .13), autonomous motivation ($\chi^2(1) = 8.601$, $p < .01$; ICC = .17), amotivation ($\chi^2(1) = 5.812$, $p = .02$; ICC = .09) and oppositional defiance ($\chi^2(1) = 5.864$, $p = .02$; ICC = .09), but not for need frustration ($\chi^2(1) = 2.912$, $p = .09$; ICC = .05) and controlled motivation ($\chi^2(1) = .049$, $p = .82$; ICC = .01). These analyses showed that the class-level variance was relatively small and in some cases even not

significant. According to Preacher et al. (2011), multilevel SEM is less efficient when ICC's are lower than .10, which was the case for 4 out of 8 variables. Testifying to the fact that problems may arise when using multilevel SEM when Level 2 variance (<.10) and sample size are small ($n < 100$), an attempt to estimate the hypothesized multilevel SEM model did not yield a converging solution. Therefore, we proceeded with single level SEM in the primary analyses.

Primary analyses

In a first model, we estimated the total effects (τ coefficients) from perceived autonomy support and perceived controlling teaching directly toward motivational outcomes, without inclusion of the mediators. This model showed good fit to the data [$\chi^2(210) = 369.85$, $p < .001$; RMSEA = .04; CFI = .97; SRMR = .04]. Table 2 shows that all direct relationships (τ) were significant, except for the relationship between autonomy support and controlled motivation, and the relationship between autonomy support and oppositional defiance. While perceived autonomy-supportive teaching was related positively to autonomous motivation and negatively to amotivation, perceived controlling teaching was related negatively to autonomous motivation and positively to controlled motivation, amotivation, and oppositional defiance. The most pronounced paths were the ones expected on the basis of the distinction between dark and bright pathways (i.e., between autonomy-supportive teaching and autonomous motivation and between controlling teaching and the maladaptive outcomes).

Next, we tested the theory-based model specifying paths from teaching behaviors via experiences of need satisfaction and need frustration toward motivational outcomes. The measurement model of all eight latent constructs and 31 indicators yielded good fit to the data [$\chi^2(407) = 784.03$; RMSEA = .04; CFI = .96; SRMR = .05]. The factor loadings of the indicators ranged between .57 and .86. In the structural model, we added direct paths (τ') from teaching behaviors toward each of the motivational outcomes in addition to the indirect paths (α , β) from teaching behaviors through need satisfaction/frustration toward the motivational outcomes. Both the theoretical expected symmetrical paths (e.g., autonomy support toward need satisfaction, need satisfaction

toward autonomous motivation), as well as the cross-paths were tested (e.g., from autonomy support toward need frustration, from need satisfaction toward defiance). Results of the structural model, which had a good fit [$\chi^2(399) = 731.25, p < .001$; RMSEA = .04; CFI = .96; SRMR = .04], are presented in Table 2. In this full model, direct relationships (τ') between teaching behaviors and motivational outcomes were no longer significant, apart from the direct relationship between perceived controlling teaching and oppositional defiance ($\tau' = .83, p < .001$). Relationships between teaching behaviors and the mediators (i.e., need satisfaction, need frustration), and between the mediator and motivational outcomes (i.e., autonomous motivation, controlled motivation, amotivation, oppositional defiance) are represented by α and β , respectively in Table 2 and are displayed graphically in Fig. 1. Table 2 also presents the point of estimates as well as the bias-corrected bootstrapped for the mediated effects ($\alpha\beta$). The relationship between perceived autonomy support and autonomous motivation was mediated only by need satisfaction ($\alpha\beta = .46, p < .001$) and not by need frustration ($\alpha\beta = .01, p = .47$). Similarly, only need satisfaction ($\alpha\beta = -.09, p = .02$) and not need frustration ($\alpha\beta = -.03, p = .45$) mediated the relationship between perceived controlling teaching and autonomous motivation. The opposite pattern was observed for amotivation, with only need frustration ($\alpha\beta = -.07, p = .007$) and not need satisfaction ($\alpha\beta = -.09, p = .09$) mediating the relationship between perceived autonomy support and amotivation, and between perceived controlling teaching and students' amotivation ($\alpha\beta = .27, p < .001$ for need frustration, $\alpha\beta = .02, p = .21$ for need satisfaction). As for the relationship between perceived autonomy support and controlled motivation, mediation occurred both through need satisfaction ($\alpha\beta = .18, p < .001$) and need frustration ($\alpha\beta = -.10, p < .001$), with both specific indirect effects canceling each other out (sum of $\alpha\beta = .08, p = .18$). Only need frustration ($\alpha\beta = .37, p < .001$) but not need satisfaction ($\alpha\beta = -.03, p = .06$) mediated the relationship between perceived controlling teaching and controlled motivation. Finally, for oppositional defiance, none of the mediated effects were significant in the full model.

In line with the correlational analyses in Table 1 we also found a significant negative relationship between the latent construct for need satisfaction and need frustration ($\beta = -.05, p < .001, 95\% \text{ CI}_{\text{BC}}: -.09, -.03$), and between the latent constructs for perceived autonomy support and perceived controlling style ($\beta = -.11, p < .001, 95\% \text{ CI}_{\text{BC}}: -.17, -.06$).

Discussion

The present study adds to the findings of a large number of SDT-based studies in education more broadly (e.g., Filak & Sheldon, 2008; Jang et al., 2009) and in the context of PE in particular (see Van den Berghe, Vansteenkiste, Cardon, Kirk, & Haerens, 2012 for a recent overview) by revealing a bright pathway in which experienced need satisfaction primarily relates to perceived autonomy-supportive teaching and beneficial motivational outcomes. The novelty of the present study, however, lies in the fact that it attempted to better understand whether and how controlling teaching behaviors relate to unfavorable motivational outcomes in the context of PE. It did so by distinguishing between pathways involved in perceived autonomy-supportive and controlling teaching and by identifying need satisfaction and need frustration as differential mediators in relations between perceived teaching style and diverse motivational outcomes. Several findings were consistent with recent claims that a dark motivational pathway deserves being studied separately from a bright motivational pathway.

First, we found rather modest negative correlations between perceived autonomy-supportive and controlling teaching indicating that both constructs do not necessarily fall along a single continuum, but constitute separate constructs. The same was true for the association between need satisfaction and need frustration. The correlations between autonomy-supportive and controlling style obtained in the present study were even somewhat smaller than correlations obtained in other studies (e.g., Bartholomew, Ntoumanis, Ryan, Bosh, & Thøgersen-Ntoumani, 2011). This finding might have to do with the fact that we assessed perceptions of teachers' behavior with reference to one specific lesson. When evaluating a socialization figure's behavior immediately after an interaction of about an hour, students may be more likely to recall instances of both autonomy-supportive and controlling behaviors. When tapping into more general retrospective accounts of teachers' style, students may be more likely to report on a more general impression of autonomy-supportive or controlling teaching rather than concrete events, possibly resulting in a stronger negative association between both.

Second, on the basis of findings in a small set of studies in contexts such as sport (Bartholomew, Ntoumanis, Ryan, Bosh, & Thøgersen-Ntoumani, 2011; Bartholomew, Ntoumanis, Ryan, &

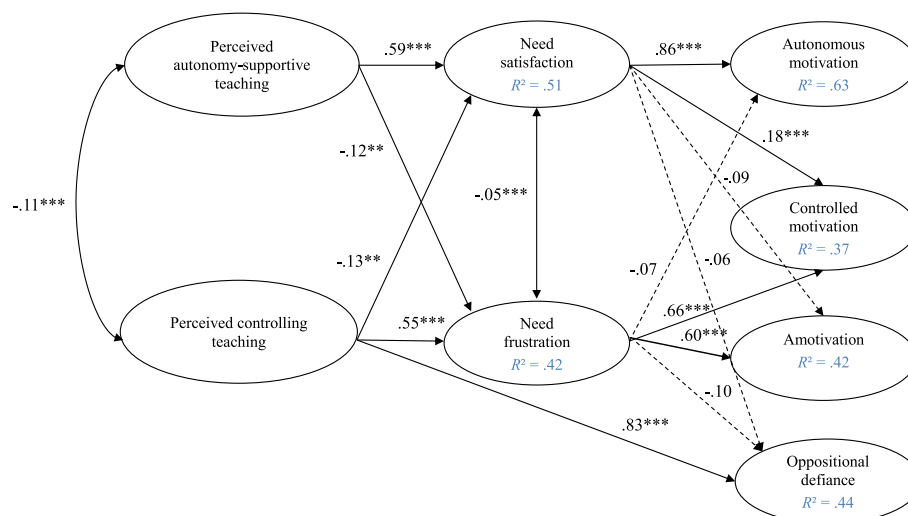


Fig. 1. Graphical representation of the α and β coefficients as estimated in the full model. Note. The direct relationships between teaching behaviors and students' motivation (τ' , see Table 2) were also estimated and were not significant, except for the direct path from perceived controlling teaching to oppositional defiance, which is graphically presented.

Thøgersen-Ntoumani, 2011; Stebbings et al., 2012), work (Gillet et al., 2012), and health (Verstuyf et al., 2013), we had hypothesized that perceived controlling teaching behaviors, rather than the mere lack of perceived autonomy support, would be related most strongly to need frustration, which in turn would be related primarily to less optimal motivational functioning (controlled motivation, amotivation, and oppositional defiance). Indeed, our findings revealed that while perceived autonomy support was related primarily to need satisfaction and autonomous motivation, perceived controlled teaching was related more closely to need frustration and controlled motivation, amotivation, and oppositional defiance. These findings are consistent with those from a recent study, in which it was found that observed controlling teacher behavior was related either directly or indirectly (through students' perceived controlling teaching) to controlled motivation and amotivation (De Meyer et al., 2014).

The current study adds to the De Meyer et al. (2014) study by examining the mediating role of students' experiences of need frustration in the relationship between perceived controlling teaching and students' motivational regulations. Consistent with SDT, associations between perceived controlling teaching and both controlled motivation and amotivation were mediated by students' experienced need frustration. When students reported that their teacher was more controlling, they were also more likely to feel pressured (autonomy frustration), to doubt their capabilities to perform well (competence frustration), and to get the idea that the teacher disliked them (relatedness frustration). In turn, these experiences of need frustration were related to suboptimal motivational outcomes. Specifically, students reporting high levels of need frustration were not only more likely to see the lesson as a waste of time (amotivation), they also reported having put effort into the lesson only to meet externally or internally pressuring demands (controlled motivation).

Based on theorizing and recent studies in the parenting domain (Van Petegem et al., 2014; Vansteenkiste & Ryan, 2013), we expected that need frustration would also account for associations between a controlling teaching style and oppositional defiance. The tendency to rebel against a teacher would then represent a derivative and compensatory way of dealing with the experiences of need frustration following from controlling teaching. Yet, need frustration did not account for the association between controlling teaching and oppositional defiance. Results showed that students' tendency to oppose the teacher's authority had a more direct relationship with controlling teaching, suggesting that students tended to straightforwardly defy the pressuring requests and expectations of controlling teachers in a direct (i.e., unmediated) fashion. There are several possible explanations for this finding. First, perceptions of a teacher as being controlling in a specific context and within a short time frame might elicit a direct and impulsive desire to oppose the teacher's authority. Compared to studies in the parenting domain capturing more general perceptions of parental behavior (Van Petegem et al., 2013), we might have tapped into a more impulsive and context-specific type of oppositional defiance. Perhaps the route via need frustration entails a more deliberate process where students decide relatively consciously to rebel against socialization figures' authority after having been exposed to a long history of controlling interactions, involving an accumulation of need frustrating experiences. Second, as the present study was cross-sectional in nature, it remains unclear whether controlling teaching elicited the tendency to defy the teacher or whether teachers increased their use of controlling strategies when noticing that students rebelled against them. As such, at least part of the direct association between a controlling teaching style and student oppositional defiance might represent a student-teacher rather than teacher-student effect. This issue

certainly deserves greater attention in future studies with longitudinal (e.g., Jang, et al., 2012) and experimental (e.g., Mouratidis et al., 2011) designs.

Although some studies showed that aggregate measures of controlling (versus autonomy-supportive) teaching are related to lower need satisfaction and low-quality motivation (e.g., Jang et al., 2009), few studies have looked at the specific cross-path relationships between controlling teaching and positive motivational outcomes. Although we found that symmetrical relationships (i.e., between autonomy support and need satisfaction) were stronger than cross-paths (i.e., between autonomy support and need frustration), all of the cross-paths between teaching behaviors and students' needs were significant. This suggests that students also experienced less need frustration when they perceived their teachers as more autonomy-supportive, while feelings of need satisfaction were lower when teachers were perceived as more controlling. Such cross-paths are consistent with theorizing (Vansteenkiste & Ryan, 2013) and past work showing that controlling socialization also relates negatively to positive outcomes (e.g., Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011).

Finally, in the structural model we found an unexpected positive relationship between need satisfaction and controlled motivation, although bivariate correlations between manifest variables were not significant. To better understand this unexpected positive relationship, the structural model was further refined by modeling each of the separate needs and by separating controlled motivation into external regulation and introjected regulation. This refined structural model showed that, while external regulation was unrelated to satisfaction of each of the three needs, introjected regulation was related positively to competence satisfaction in particular. Hence, the positive association between need satisfaction and controlled motivation in the structural model was due to a specific association between competence satisfaction and introjected regulation. Although we did not anticipate this association, it is consistent with the notion in SDT that competence need satisfaction is an essential, yet not sufficient, condition to foster internalization and intrinsic motivation. That is, in isolation from the other two needs, and from the need for autonomy in particular, satisfaction of the need for competence may result only in partial internalization, as reflected in introjected regulation. To obtain fuller internalization of behavior and even intrinsic motivation, students ideally need to experience competence in combination with autonomy (Ryan & Deci, 2000a; Vansteenkiste, Niemiec, & Soenens, 2010). Consistent with this reasoning, Silva et al. (2010) found that competence need satisfaction had a unique association with introjected regulation in a sample of overweight women involved in a program to increase physical activity. In contrast, identified regulation and intrinsic motivation were predicted by a combination of competence and autonomy need satisfaction. The findings in this study are strikingly similar with those of Silva et al. (2010) and indeed suggest that competence need satisfaction alone may not always suffice to promote deep internalization and intrinsic motivation.

Limitations and directions for future research

In the present study we examined a structural model, the sequence of which was strongly based upon theory. However, the design of the study was cross-sectional with all measures being assessed at the same moment in time. Hence, possible alternative models for which the same variables are put in a different order fitted the data equally well. Accordingly, the question remains whether the proposed direction of relationships would hold if an experimental or longitudinal design was used. Following this

limitation, future studies can aim at experimentally manipulating teachers' behaviors (e.g., Mouratidis, et al., 2011) or at longitudinally investigating whether changes in teaching behaviors lead to changes in students' motivational experiences (e.g., Jang et al., 2012) to gain insight into the directionality of the proposed relationships.

Secondly, the data in the present study were all based on student self-reports. Although students' perceptions of their teacher's behavior are considered the most proximal indicators of motivational outcomes, in future studies a multi-informant (teacher, observer, student) perspective could be taken to gain more insight into the way teachers actually behave, self-declare to behave and are perceived by the students. Such research is important because one might argue that, rather than representing substantive dimensions, the distinctions between controlling and autonomy-supportive teaching and between need satisfaction and need frustration are caused by response tendencies.

Another possible limitation relates to the use of parcels to estimate latent constructs (Kline, 2010). Parceling requires that items within each set are unidimensional, thus measuring one underlying construct. Therefore, the confirmatory factor analyses on separate scales tapping into teaching style, the needs, and the motivation outcomes were performed with the individual items (rather than parcels) as indicators. However, as described by Little et al. (2002) and as also underscored by Kline (2010), parceling has important advantages when estimating complex structural models. A parcel-based structural model is less biased, more parsimonious and more stable. Therefore, we used parcels when the focus was on the structural relationships between latent constructs.

The relatively modest negative correlations observed between students' perceptions of autonomy-supportive and controlling teaching behaviors are in line with previous research in the sport (Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011) and educational domain (e.g., Reeve et al., 2013). Such findings indicate that perceived autonomy support and control are not always perfectly opposite sides of the same coin and may at times even co-occur (Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011). As such, teachers may rely on a cocktail of both autonomy-supportive and controlling teaching behaviors during the course of the lesson. It might thus be interesting to examine in future studies whether and how teachers, who combine autonomy-supportive and controlling behaviors, affect students' motivation compared to teachers who predominantly rely on either autonomy-supportive or controlling behaviors.

As according to SDT (Deci & Ryan, 2000), need frustration occurs not only in controlling environments, but can also emerge when interactions are cold, unfriendly, indifferent, and/or when teachers engage in a chaotic style, future studies could try to simultaneously incorporate students' perceptions of controlling, cold, and chaotic teaching behaviors. Moreover, as teachers' style represents only one source of influence on students' motivational experiences in PE, it might be interesting to investigate in future studies which other factors influence students' 'dark' experiences in PE. Such factors may include other characteristics of teachers (e.g., years of teaching experience, standing, ...) as well as other socialization figures (e.g., peers and parents) and students' personality.

Practical implications

Although longitudinal, experimental and interventional studies are needed to confirm the direction of the proposed relationships in the present study, one obvious recommendation following from current and previous findings is that, besides training teachers to become more autonomy-supportive toward their students (Su &

Reeve, 2011), raising awareness among teachers about the motivational risks associated with controlling practices and discouraging them from engaging in such practices, might be equally important. By providing teachers with insight into the motivational dynamics demonstrated in this study, they may come to a deeper understanding of what it means to be controlling, which is a starting point to begin avoiding these behaviors.

Moreover, it seems crucial that teachers not only reflect on their interpersonal style, but also think about how their didactical approach might frustrate students' needs. For instance, when composing the teams in a basketball lesson a teacher might pick three students who can in turn pick students for their teams. In such a situation students who were selected last by their classmates will probably doubt their capabilities (competence frustration) and feel excluded or disliked (relatedness frustration). Although the teacher's interpersonal style in this situation is not necessarily controlling, cold, or chaotic, this didactical approach might still have elicited feelings of need frustration among some students.

Encouraging teachers to avoid the use of controlling tactics might not be as easy as it seems at first sight as it represents a change in one's motivating style. Moreover, teachers frequently engaging in controlling teaching might be less open to change and may hesitate to decrease their engagement in controlling behaviors because the use of a controlling style is intertwined with their broader personality functioning (Van den Berghe et al., 2013). Specifically, teachers with a controlled causality orientation, that is, teachers who tend to perceive pressure more easily in their environment and who at the same time are more sensitive for pressuring cues around them, were found to engage in more controlling behaviors, as rated by external observers. Clearly, this issue deserves attention when designing continuous professional development (CPD) programs for teachers.

Conclusion

The present study added to a small body of work (e.g., Bartholomew, Ntoumanis, Ryan, Bosh, & Thøgersen-Ntoumani, 2011; Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011; De Meyer et al., 2014) demonstrating that the well-investigated bright pathway from autonomy support toward need satisfaction and autonomous motivation is relatively distinct from a darker pathway from controlling teaching toward need frustration and less optimal motivational outcomes. Together, the findings of the present study suggest that controlling teaching (and subsequent experiences of need frustration) do not simply reflect an absence of autonomy support (and subsequent experiences of low need satisfaction). To more accurately capture the detrimental effects of controlling teaching, this teaching dimension along with its consequences in terms of need frustration needs to be studied in its own right. Overall, the results suggest that effective teacher training in terms of motivational style may involve more than training teachers to become more autonomy supportive toward their students (Su & Reeve, 2011); it may also involve raising awareness among teachers about the motivational risks associated with controlling practices and discouraging them from engaging in such practices.

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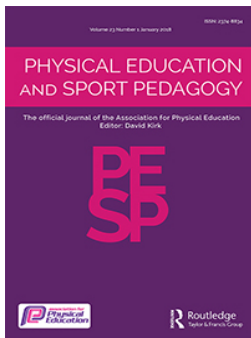
Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.psychsport.2014.08.013>.

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Different combinations of perceived autonomy support and control: identifying the most optimal motivating style

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Different combinations of perceived autonomy support and control: identifying the most optimal motivating style

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ABSTRACT

Background: According to Self-Determination Theory, teachers and sport coaches can differ in the motivating style they rely upon to motivate young people. When endorsing an autonomy-supportive motivating style, instructors try to identify, vitalize, and nurture youngsters' inner motivational resources. In contrast, instructors with a dominant controlling motivating style rather pressure youngsters to think, feel, or behave in prescribed ways. While the dimensions of autonomy support and control can be conceptually differentiated, in reality both dimensions may co-occur to different degrees.

Purpose: The present study investigates to what extent perceived autonomy support and control can be combined and which motivating style then yields the most optimal pattern of outcomes.

Research design: Multi-Study with Cross-Sectional Design.

Findings: In two studies, conducted among elite athletes ($N = 202$; $M_{\text{age}} = 15.63$; $SD = 1.70$) and students in physical education ($N = 647$; $M_{\text{age}} = 13.27$; $SD = 0.68$) reporting on their instructor's motivating style, cluster analyses systematically pointed towards the extraction of four motivating profiles. Two of these groups were characterized by the dominant presence of either autonomy support (i.e. high-autonomy support) or control (i.e. high control), while the two dimensions were found to be equally present in the two remaining groups (i.e. high-high or low-low). Results revealed that the high-autonomy support group showed to the most optimal pattern of outcomes (e.g. need satisfaction, autonomous motivation), while the high-control group yielded the least optimal pattern of outcomes. Results further showed that perceiving one's instructor as high on control is detrimental (e.g. higher need frustration, amotivation) even when the instructor is additionally perceived to be autonomy-supportive. Finally, it appeared better to be relatively uninvolved than to be perceived as exclusively high on control.

Conclusions: When coaches or teachers are perceived to be high on autonomy support and low on control, this is likely to benefit youngsters' motivation and well-being. Also, while some instructors, particularly those who are functioning in a more competitive context where pressure is considered more normative, may endorse the belief that the combination of autonomy support and control yields the most effective cocktail to motivate young people (e.g. using competitive and game-based activities to make it fun, while treating 'the losers' with

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punishments such as push-ups or humiliating comments), this perspective is not supported by the findings of the current study. Apart, from its theoretical relevance, the findings of the present study are valuable for future intervention development.

Introduction

According to Self-Determination Theory (Deci and Ryan 2000; Vansteenkiste and Ryan 2013), instructors (e.g. teachers, sport coaches) can differ in the motivating style they rely upon to motivate young people (e.g. Reeve 2009). Instructors with a predominantly autonomy-supportive motivating style share the assumption that youngsters have the capabilities to get self-motivated and thus acknowledge youngsters' natural tendency to grow and develop (Vansteenkiste and Soenens 2015). These held assumptions lead them to display a sincere respect for youngsters' individuality and to adopt an open and curious attitude, which is essential to identify, vitalize, and nurture youngsters' inner motivational resources (Reeve 2009; Soenens and Vansteenkiste 2010). In contrast, instructors with a dominant controlling motivating style rather take their personal standards and ambitions as a starting point, thereby bypassing, neglecting, or even thwarting youngsters' inner motivational resources (Haerens et al. 2015; Reeve 2009; Soenens and Vansteenkiste 2010). As such, they take a more pressuring stance so that youngsters feel obliged to think, feel, or behave in prescribed ways (Assor et al. 2005; Reeve, Deci, and Ryan 2004).

While the dimensions of autonomy support and control can be conceptually differentiated, in reality both dimensions may co-occur to different degrees, thereby constituting different motivating styles. However, the question which configuration of autonomy support and control yields the most desirable outcomes has received little, if any, prior attention (but see Amoura et al. 2015; Matosic and Cox 2014). Therefore, the first aim of the present study was to investigate which configurations of autonomy support and control naturally emerge among athletes' reporting on their sport coaches (Study 1), and secondary school students' reporting on their Physical Education (PE) teachers (Study 2) as to identify different perceived motivating styles. A second aim was then to examine whether the identified motivating styles help to explain differences in athletes' and students' motivational experiences.

Autonomy support and control in PE and sport

Autonomy support refers to actively soliciting and nurturing youngsters' interests, providing choices and asking for input, allowing the expression of deviant points of view, making use of inviting language, providing meaningful rationales for requests, and respecting youngsters' pace of progress (e.g. Mitchell, Gray, and Inchley 2015; Reeve 2009; 2015; Vansteenkiste and Soenens 2015). Controlling instructions involve the use of punishments, commanding, yelling and shouting (e.g. Assor et al. 2005; Reeve and Jang 2006), or appealing to feelings of guilt and shame and triggering contingent self-worth (e.g. Soenens et al. 2012).

SDT suggests that an autonomy-supportive motivating style fosters individuals' development because it nurtures youngsters' psychological needs for autonomy (i.e. experience a sense of volition), competence (i.e. feeling effective), and relatedness (i.e. experience a warm relationship; Ryan and Deci 2000; Vansteenkiste and Ryan 2013). A controlling motivating style, on the other hand, may not only undermine need satisfaction, but may also engender need frustration (Vansteenkiste and Ryan 2013), as indexed by feelings of pressure and internal conflict (i.e. autonomy frustration), failure and inadequacy (i.e. competence frustration), or rejection and disrespect (i.e. relatedness frustration).

An increasing number of studies, both in the domain of sports (e.g. Bartholomew et al. 2011) and PE (e.g. Cheon, Reeve, and Moon 2012; De Meyer et al. 2014; Haerens et al. 2015; Perlman 2015)

confirmed that perceived autonomy support relates to desirable outcomes, such as need satisfaction, autonomous motivation, and well-being, while perceived control relates to maladjustment, as indexed by need frustration, controlled motivation, and even amotivation, and ill-being (see Vansteenkiste and Ryan 2013; Van den Berghe et al. 2014 for an overview).

These empirical studies also pointed to moderate ($-.50 < r < -.30$; Bartholomew et al. 2011; Cheon, Reeve, and Moon 2012) or small ($-.30 < r < -.10$; De Meyer et al. 2014; Haerens et al. 2015) negative correlations between perceived autonomy support and control. Such findings suggest that instructors' non-reliance on autonomy support does not automatically imply that they act in a controlling way (and vice-versa). To illustrate, while some instructors may fail to build in choice or to provide a meaningful rationale (i.e. autonomy support), that does not imply nor does it exclude that they rely on threats and sanctions to enforce youngsters' compliance (i.e. control). Similarly, it is not because instructors display curiosity in youngsters' viewpoints, or work from their perspective (i.e. autonomy support) that they necessarily refrain from using punishments or guilt-trips (i.e. control). As such different motivating styles are possible, depending on the degree to which autonomy support and control are configured.

Combinations of autonomy support and control in PE and sport

Extant SDT-based research on perceived autonomy support and control has predominantly relied on a variable-centered approach. In the current study, we extend this large body of work by adopting a person-centered approach (Magnusson 1988). Whereas a variable-centred approach describes the associations between variables and thus provides an overall picture of the average relationship between perceived autonomy support, control, and the various outcomes (e.g. Haerens et al. 2015); a person-centred approach identifies groups of individuals who share particular attributes or relations among attributes (i.e. perceptions of autonomy support and control) and thus allows to examine how perceptions of autonomy support and control can be combined within individuals (Magnusson 1988). In our view, such a person-centered approach has the potential to produce several new theoretical and practical insights.

First, from a theoretical viewpoint, a person-centered approach helps to shed light on the question whether autonomy support and control represent perfect opposites or may instead be conceived as relatively distinct dimensions. If the two dimensions would stand in direct opposition, the number of identified motivating profiles should be rather limited because youngsters would not perceive their instructors as being simultaneously high or low on both.

Second, the identification of different profiles with some characterized by a mix of both autonomy support and control helps to shed light on the question whether the presence of perceived control may possibly yield some benefits. Indeed, coaches and PE teachers often express the idea that pressure may be better than being uninvolved and that such pressure, when used in combination with autonomy support, will do no harm. Yet, from a theoretical perspective, the perceived use of control – even in combination with autonomy support – is suggested to come with a cost, as manifested through elicited need frustration, oppositional defiance, or anger (e.g. Assor et al. 2005; Haerens et al. 2015).

Third, assessing an instructor's motivating style based on both dimensions is highly practically relevant as it might reveal that it is more useful for some instructors to learn to become less controlling (high on both), while others will gain more from learning how to become more autonomy-supportive (low on both).

We are aware of only two studies that have adopted a person-centered approach to investigate motivational styles based on configurations of autonomy support and control, the first among athletes reporting on their swimming coach (Matosic and Cox 2014) and the second among psychology students reporting on their university teacher (Amoura et al. 2015; Study 1). Both studies identified a predominantly autonomy-supportive group, characterized by high levels of perceived autonomy support and relatively low levels of control; and a pronounced controlling group, characterized by

relatively high levels of control and low levels of autonomy support. The two studies also identified a group that was perceived to combine relatively high levels of both autonomy support and control. The studies revealed that the predominantly autonomy-supportive group showed the most optimal pattern of outcomes, that is, they reported the most need satisfaction (Matosic and Cox 2014) and autonomous motivation (Amoura et al. 2015; Matosic and Cox 2014), while the opposite was true for the highly controlling group. Noteworthy, in both studies, the combined autonomy-supportive-controlling motivating style (high–high) did equally well as the purely autonomy-supportive motivating style (high–low) in terms of positive outcomes.

The present study

The present research consists of two cross-sectional studies, the first among athletes reporting on their sport coaches and the second involving secondary school students reporting on their PE teachers. Across both studies, a variety of adaptive (e.g. need satisfaction, autonomous motivation) and maladaptive (e.g. amotivation, controlled motivation) outcomes were assessed. The following two aims were examined across both studies. First, we aimed at investigating whether a similar set of naturally occurring motivating styles, each characterized by different levels of the dimensions of autonomy support and control, can be identified. Given the presumed relative distinctiveness of both dimensions, we hypothesized to find four different groups, with two of them being characterized by the differential presence of autonomy support and control (i.e. high–low and low–high groups) and two being characterized by simultaneously high or simultaneously low levels of autonomy support and control (i.e. high–high and low–low).

Our second aim was to examine whether different configurations would differentially be associated with motivational outcomes. In light of previous studies (e.g. Haerens et al. 2015) and based on theoretical grounds, we formulated the general expectation that instructional profiles characterized by the stronger presence of autonomy support and the lowered presence of control would yield the most optimal outcomes, while profiles that involve higher levels of control and relatively lower levels of autonomy support would yield the most maladaptive outcomes. In addition to this general hypothesis, we were also interested in directly contrasting the identified motivating styles on a pairwise fashion. For instance, we aimed to examine whether the hypothesized drawbacks of a perceived controlling instructor may also surface when the instructor is additionally perceived to be autonomy-supportive (i.e. when both dimensions are combined), or whether it is better to perceive one's instructor as controlling as opposed to relatively uninvolved (i.e. low on both).

Study 1¹

Study 1 comprised young athletes who were engaging in an exclusive and selective school program involving a large proportion of sport-specific training sessions, and who reported on their school-coaches' motivating style. We deemed this highly competitive sport context to be ideal to begin examining the presence and correlates of different motivating profiles as many sport coaches argue that pressure is a normative or even inherent aspect of competitive sports (Cheon et al. 2015). Indeed, some sport coaches even argue that imposing pressure on athletes is critical, as it would increase athletes' resilience to handle future pressures. Apart from including measures of need satisfaction and motivation, Study 1 also incorporated more distal outcomes, such as athletes' self-reported well-being (i.e. positive affect; vitality) and ill-being (i.e. negative affect; depressive feelings), as well as coach-rated performance.

Participants and procedure

Athletes (69% boys, $M_{\text{age}} = 15.63 \pm 1.70$ years) out of four selective and elite sport schools in Flanders (Belgium) participated in this study. Athletes in these schools consist a highly selective, highly

talented group as they must meet very high and competitive standards outlined by the national sport federation. In total, approximately 400 athletes received a questionnaire, of whom 202 (51%) returned the questionnaire. Of all the participants 28.2% was specialized in soccer, 16.8% in handball, 12.5% in athletics, 10.4% in basketball, 4% in volleyball, 5.9% in cycling, 5.9% in swimming, 5% in golf, 3.5% in judo, 2.5% taekwondo, 2% triathlon, 1.5% in gymnastics, 1% skiing, and 0.5% table tennis. Athletes were engaging in competitive activities for on average 7.21 (SD = 2.71) years and they trained on average 18.11 (SD = 5.32) hours per week. Almost 16% (15.9%) competed at international level, while the majority of the sample competed at the national level (72.6%), and 11.5% competed regionally. Permission to conduct the study was granted from the respective school boards of four elite sport schools, and participation in the study was voluntary.

Measures

Unless mentioned otherwise, participants recorded their agreement with the items on a 5-point Likert scale ranging from 1 (completely *disagree*) and 5 (completely *agree*).

Perceived autonomy support and control

Athletes' perceptions of coaches' autonomy support was measured by means of 12 items, of which 5 items were derived from the Work Climate Survey (Deci, Connell, and Ryan 1989) and 7 additional items were adapted from the Perceptions of Parents Scale (Grolnick, Ryan, and Deci 1991) that was further validated by Soenens et al. (2007). An example of such an item was: 'Whenever possible, my coaches at school allow me to choose what to do'. Perceptions of psychologically controlling coaching were assessed by means of 5 items. These items were taken from an existing scale used in developmental psychology (Children's Report of Parental Behavior Inventory; Schaefer 1965), but the content was adapted to the sport context. An example of such an item is the following: 'My coaches at school make me feel guilty if I disappoint them'.

Confirmatory Factor Analysis (CFA) was performed with MPlus Version 7.0 (Muthén and Muthén 1998–2010) to test the proposed two-factor model of perceived autonomy support and control. The model showed moderate fit to the data ($\chi^2(118) = 252.34, p < .001$, RMSEA = .08, CFI = .83, SRMR = .09). After inspection of the modification indices it became clear that cross-loadings were found for the two negatively worded items of the autonomy support scale (i.e. 'My coaches were not really sensitive to the things that are important to me'; 'My coaches insisted on doing things their way'); while one item of the perceived control scale ('My coaches were less friendly with me when I did not see things in their way') also loaded on the autonomy-supportive scale. Removing the items with cross-loadings resulted in a better fit to the data ($\chi^2(76) = 136.60, p < .001$, RMSEA = .06, CFI = .91, SRMR = .06). Loadings ranged between .41 and .78 for the autonomy-supportive items, and between .45 and .89 for the perceived controlling items. Cronbach's alphas were .82 and .73 for perceived autonomy support and control, respectively. Latent constructs of perceived autonomy support and control were negatively correlated ($r = -.27, p = .009$).

Experienced need satisfaction

Experienced satisfaction of the need for autonomy, competence, and relatedness was assessed by means of 18 items from the Psychological Need Satisfaction in Exercise Questionnaire (Wilson et al. 2006), which were adjusted to the sport context. Because the autonomy items of this scale primarily tap into athletes' perception of decisional autonomy (e.g. 'I feel I can co-decide on the exercises I do'), we based our selves on previous research (Houlfort et al. 2002) to add three additional items assessing more their affective experiences (e.g. 'I have a feeling that my training plan is made like I want it to be'). As such, the need for autonomy was measured by means of 9 items ($\alpha = .88$). The need for competence was measured with 6 items (e.g. 'I feel competent to execute exercises that are challenging for me', $\alpha = .87$), and the need for relatedness was questioned by means of 6 items (e.g. 'I

feel closely connected to the people with whom I train and sport', $\alpha = .88$). Because all three needs were highly correlated, we used a single measure of need satisfaction ($\alpha = .90$).

Motivation

To assess athletes' motivation, we used a modified version of the Behavioral Regulation in Sport Questionnaire (Lonsdale, Hodge, and Rose 2008) as described by Assor, Vansteenkiste, and Kaplan (2009). After reading the stem 'I take part in my sport', athletes reported on their autonomous motivation (e.g. 8 items; 'because I enjoy it'; 'because I personally value it', $\alpha = .82$), controlled motivation (e.g. 11 items; 'because I can only be satisfied with myself if I continue'; 'because others force me to', $\alpha = .83$), and amotivation (e.g. 4 items; 'but I often ask myself why', $\alpha = .87$).

Well-being

Two different well-being indicators were assessed. First, vitality denotes the extent to which athletes feel alive and energetic, and was measured by means of 7 items from the General Vitality Scale (Ryan and Frederick 1997, for example, 'The last couple of days I felt very energetic during sports'). Ratings were made on a scale ranging from (0) *rarely or none of the times (less than one day)*, over (1) *a couple of times (1–2 days)*, and (2) *sometimes or regularly (3–4 days)*, to (3) *most or all of the time (5–7 days)*. The reliability coefficient of this scale was .85. Second, positive affect (e.g. 'The last six weeks at the elite sport school I felt: 'enthusiastic') was measured with 10 items from the Positive Affect Schedule (PANAS; Watson, Tellegen, and Clark 1988). Items were adjusted so that they focused on experienced affect at the elite sport school over the past six weeks. The answering categories varied from 1 (*completely not experienced*) to 5 (*very strongly experienced*). Similar to previous studies (Mouratidis et al. 2008) scores were combined to form a composite score of well-being after z-scoring both variables.

Ill-being

Two ill-being indicators were included. First, depressive feelings were measured with 6 items from the Center for Epidemiological Studies-Depression (CES-D) scale (Radloff 1977). Items were adapted to the sport context, so that they all focused on athletes' experiences of depressive feelings over the past week at the elite sport school (e.g. 'During the last week I felt sad at the elite sport school'). The internal consistency was good with $\alpha = .76$. Second, negative affect was measured with 10 items from the Negative Affect Schedule (e.g. 'The last six weeks at the elite sport school I felt: anxious') (PANAS; Watson, Tellegen, and Clark 1988). Ratings were similar to the corresponding well-being subscale, and both subscales were z-scored and combined to form a composite score of ill-being.

Rated performance

Similar to previous studies (Mouratidis et al. 2008), performance was assessed based on ratings of inter-individual performance and intra-individual progress by the sport coaches. Because Flemish top sport students are all closely followed and trained by their coaches at the top sport school, these coaches are considered to have good insight in the progress and performance of the athletes. Inter-individual performance reflected the performance level of the athlete over the past school year in comparison with other athletes in the same sport and age category based on a 7-point scale ranging from much weaker than others (1), at the same level as others (4), to much better than others (7). Intra-individual progress referred to the progress made during the past year, thus in comparison to the beginning of the school year. Four different performance aspects (tactical, technical, physical, and psychological) were rated on a 7-point scale from very strong regression (1), stagnation (4) to very strong progress (7) and were aggregated into one total score for intra-individual progress ($\alpha = .86$).

Plan of analyses

To meet Aim 1 (i.e. the identification of motivating styles), cluster analyses were conducted on the dimensions of perceived coach autonomy support and control. The analysis required two steps, thereby using a combination of hierarchical and non-hierarchical clustering methods (Gore 2000). In the first step, a hierarchical cluster analysis was carried out using Ward's method based on squared Euclidean distances. To reduce the impact of univariate (values of more than 3SD above or below the mean) and multivariate (individuals with high Mahalanobis values) outliers, these were removed. In the second step, the extracted initial cluster centers based on Ward's hierarchical method were used as non-random starting points in an iterative, non-hierarchical k -means clustering procedure.

To examine stability of cluster solutions, the sample was randomly split into halves and the full two-step procedure (Ward, followed by k -means) was then applied to each half. The participants in each half of the sample were assigned to new clusters on the basis of their Euclidean distances to the cluster centers of the other half of the sample. These new clusters were then compared for agreement with the originals by means of Cohen's Kappa (K). The two resulting Kappas were averaged and an agreement of at least .50 was considered acceptable (Asendorpf et al. 2001). Finally, MANOVAs with follow-up pairwise comparisons (with the Least Significant Difference Test) were used to investigate differences in outcomes according to cluster membership. All analyses were conducted in IBM SPSS Statistics 22.0

Results

Aim 1: identification of motivating styles

Prior to conducting cluster analyses, we removed 2 univariate and 2 multivariate outliers. Four clusters were identified, explaining, respectively, 57.2% and 72.0% of the variance in perceived autonomy support and control, thereby surpassing the critical threshold of 50% (Milligan and Cooper 1985). A three-cluster solution explained less variance in the clustering dimensions, whereas the five and six cluster solutions were more difficult to interpret and some of the clusters became very small. Figure 1 (left half) presents the final four-cluster solution based on, the z -scores (Y -axis). As hypothesized, we identified two groups with a contrasting motivating style: that is, the high-autonomy support group ($n = 44$, 22.6%) who perceived their coaches as relatively high on autonomy support, but low on controlling coaching, whereas the high-control group ($n = 32$, 16.5%) displayed the opposite pattern. In addition, the two remaining groups of athletes perceived their coaches on both dimensions as either relatively high ($n = 70$, 36.1%; that is, high-high group) or low ($n = 48$, 24.7%; that is, low-low group). Figure 1 (right half) presents the clusters based on the absolute scores for both dimensions. Notably, the high-control group also experienced their coaches as significantly higher on control than autonomy support ($t = -7.80$, $p < .001$) in an absolute sense, indicating that the label 'high control' is justified. In contrast, in the three other clusters, absolute scores of perceived autonomy support were significantly higher than absolute scores of perceived control (all $t > 9.10$, $p < .001$). Finally,

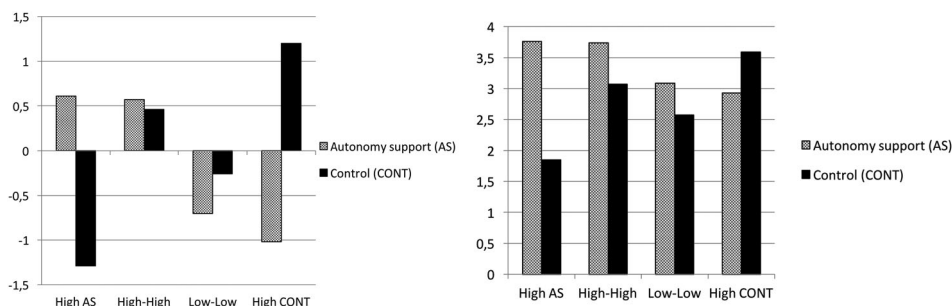


Figure 1. Z-scores (left half) and absolute scores (right half) of perceived autonomy support and controlling coaching.

the double-split cross-validation procedure provided significant evidence for the stability of the four-cluster solution resulted (average kappa value of 0.87) Z-scores (left half) and absolute scores (right half) of perceived autonomy support and controlling coaching (Study 1; top half) and teaching (Study 2; bottom half).

Aim 2: outcomes associated with the identified motivating profiles

Preliminary analyses. Age related significantly positively to perceived control and negatively to well-being, coach-rated progress, and performance (see Table 1). Further, weekly number of training hours correlated positively with perceived control and ill-being, while it yielded a negative relation with perceived autonomy support, need satisfaction, and rated performance by the coach. Next, MANOVAs showed that girls ($M = 0.20$; $SD = 0.85$) displayed higher ill-being ($F(1, 197) = 4.71$, $p = .03$) and were rated as performing better ($M = 5.97$; $SD = 0.83$; $F(1, 139) = 4.12$, $p = .04$) compared to boys ($M_{\text{ill-being}} = -.08$; $SD = 0.82$; $M_{\text{performance}} = 5.59$; $SD = 0.99$). In contrast, boys reported higher autonomous motivation ($M = 4.15$; $SD = 0.55$) compared to girls ($M = 4.33$; $SD = 0.48$; $F(1, 197) = 5.52$, $p = .02$). Given these findings, we controlled for athletes' sex, age, and hours of training in all subsequent analyses by entering these variables as covariates in the MANOVAs.

Main analyses. MANOVAs were run separately for the athlete and coach-reported outcomes. MANOVAs revealed a significant multivariate effect of cluster membership for the athlete reported ($F(24, 523) = 25.33$, $p < .001$), but not for the coach-rated outcomes ($F(6, 206) = 1.19$, $p = .31$). For the athlete-reported outcomes, all univariate between subject effects were significant, whereas univariate effects were not significant for the coach-rated outcomes (see Table 2). Follow-up pairwise comparisons with the least significant difference test revealed that athletes in the high-autonomy support group clearly showed the highest levels of need satisfaction and autonomous motivation when compared to all other groups. The low-low group and the high-control group displayed the lowest levels of need satisfaction and autonomous motivation, followed by the high-high group. As for controlled motivation and amotivation, an opposite pattern of results was found, with especially the high-control group (both outcomes), but also the low-low group (especially amotivation) displaying high levels in these outcomes. Athletes in the high-control group reported the highest levels of controlled motivation, suggesting that of all athletes they felt most pressured. In terms of well-being, the highest levels were found in the high-autonomy support and the high-high group, while the high-control group displayed the lowest levels of well-being, followed by the low-low group. As for ill-being, the high-autonomy support and the high-high group reported the lowest levels, while the high-control group and the low-low group reported higher levels of ill-being.

Brief discussion

This first study generally confirmed our hypotheses. First, consistent with the idea that perceived control and autonomy support are not necessarily two poles of the same dimension, we found that (a) both were modestly negatively correlated and (b) four groups could be identified, each characterized by an unique motivating style. In two of these groups, the two dimensions were found to be equally present (either high or low), while two remaining groups were characterized by the dominant presence of either perceived autonomy support or control. Second, the results showed that profiles characterized by a stronger presence of perceived autonomy support displayed more optimal outcomes, whereas the high-control and the low-low group displayed a less optimal pattern of outcomes. Furthermore, the drawbacks of perceiving one's coach as high on control also surface when the coach is additionally perceived to be autonomy-supportive, with athletes reporting lower need satisfaction and less preferable outcomes in the high-high group when compared to the high-autonomy support group.

Table 1. Descriptive statistics and correlations between study variables – Study 1.

Athlete report (N = 199)	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Autonomy-supportive coaching	3.45	0.51	–										
2. Controlling coaching	2.75	0.70	–.25***	–									
3. Need satisfaction	3.60	0.50	.60***	–.24***	–								
4. Autonomous motivation	4.27	0.51	.22**	–.12	.39***	–							
5. Controlled motivation	2.39	0.77	–.016*	.35***	–.16*	–.04	–						
6. Amotivation	1.84	0.88	–.26***	.21**	–.36***	–.52***	.51***	–					
7. Well-being	–0.00	0.91	.47***	–.26***	.56***	.43***	–.19**	–.45***	–				
8. Ill-being	0.00	0.84	–.34***	.25***	–.38***	–.17*	.29***	.45***	–.35***	–			
9. Rated performance	5.69	0.97	.25**	–.14	.21*	.10	–.13	–.24**	.15	–.14	–		
10. Rated progress	5.07	0.83	.26**	–.04	.27***	.14	–.19*	–.29***	.24**	–.25**	.45***	–	
11. Age	15.63	1.71	–.12	.17*	–.06	–.07	.13	.11	–.20**	–.02	–.39***	–.24**	–
12. Hours of training	17.93	5.57	–.26***	.16*	–.16*	–.04	–.03	.05	–.10	.16*	–.35***	–.12	.39***

Note: N varied from 201 for the student outcomes to 140 for the coach-rated outcomes.

* $p \leq .05$.

** $p \leq .01$.

*** $p \leq .001$.

Table 2. Differences in study variables according to cluster membership – Study 1.

<i>N</i> (%)	High-autonomy support 44 (22.6%)	High-autonomy support and control 70 (36.1%)	Low-autonomy support and control 48 (24.7%)	High control 32 (16.5%)	<i>F</i> -value	Effect size (η^2)
Cluster dimensions (raw scores)						
Perceived autonomy support	3.76 (0.36) ^a	3.74 (0.26) ^a	3.09 (0.29) ^b	2.93 (0.35) ^c	81.61***	.57
Perceived controlling teaching	1.85 (0.36) ^a	3.07 (0.33) ^b	2.57 (0.37) ^c	3.59 (0.36) ^d	171.10***	.73
Cluster dimensions (z-scores)						
Perceived autonomy support	0.61 (0.70) ^a	0.57 (0.52) ^a	−0.70 (0.57) ^b	−1.02 (0.69) ^c	81.61***	.57
Perceived controlling teaching	−1.29 (0.51) ^a	0.46 (0.48) ^b	−0.26 (0.53) ^c	1.20 (0.51) ^d	171.10***	.73
Athlete outcomes						
Need satisfaction	3.89 (0.42) ^a	3.70 (0.40) ^b	3.41 (0.37) ^c	3.24 (0.46) ^c	18.18***	.23
Autonomous motivation	4.49 (0.35) ^a	4.28 (0.46) ^b	4.07 (0.56) ^c	4.24 (0.61) ^b	6.78***	.10
Controlled motivation	2.06 (0.67) ^a	2.45 (0.75) ^b	2.33 (0.76) ^b	2.86 (0.71) ^c	7.93***	.11
Amotivation	1.42 (0.53) ^a	1.78 (0.81) ^b	2.14 (1.02) ^c	2.13 (0.97) ^{b,c}	7.01***	.10
Well-being	.44 (0.71) ^a	0.16 (0.70) ^a	−0.23 (1.00) ^b	−0.66 (0.91) ^c	12.21***	.16
Ill-being	−0.32 (0.61) ^a	−0.18 (0.63) ^a	0.23 (0.90) ^b	0.57 (1.09) ^b	9.44***	.13
Rated performance*	5.93 (0.54)	5.75 (0.81)	5.49 (1.25)	5.44 (1.16)	0.96	.02
Rated progress*	5.12 (0.80)	5.15 (0.69)	4.94 (1.00)	4.92 (0.89)	2.19	.05

*These analyses were performed on a truncated sample ($N = 138$).

^{a,b,c}These values are significantly different from each other.

Note: All analyses controlled for sex, age and hours of weekly training.

Study 2²

Study 2 extended Study 1 in two significant ways. First, whereas, Study 1 tapped into athletes' perceived coach autonomy support at the domain level, Study 2 focuses on students' perceived autonomy support and control at the situational level (i.e. after a specific lesson with a specific teacher; Vallerand 1997). Second, different from Study 1, a broader range of maladaptive outcomes was included as we reasoned that such outcomes might especially surface in groups characterized by elevated perceived control. Specifically, apart from tapping into need satisfaction, we also assessed need frustration (e.g. Bartholomew et al. 2011; Haerens et al. 2015; Hein, Koka, and Hagger 2015). Next, apart from tapping into students' controlled reasons to be cooperative during a PE class, we also included a measure of controlled non-participation (Aelterman et al. 2016), which refers to the tendency to refrain from putting effort in PE for either externally (e.g. 'because my classmates would look up to me if I would do so') and internally ('because I had enough of continuously doing my best') pressuring reasons.

Methods

Participants and procedure

Participants were 647 8th grade secondary school students (69% boys, $M_{\text{age}} = 13.27 \pm .68$ years) from 41 classes out of 13 different secondary schools throughout Flanders (Belgium). In terms of education, 431 students (69.9%) were enrolled in an academic track, 137 students (22.1%) in a technical track, and 51 students (8.2%) in a vocational track. In total, 14 PE teachers (92.9% men) were involved, each teaching 1–5 of the classes included. Teachers were on average 35.50 years old ($SD = 13.82$, range = 25–56), and had an average of 14.50 years of teaching experience ($SD = 10.21$, range = 2–37). All participating teachers were full-time certified PE teachers, who had received a teacher education program at college level. Class sizes ranged from 5 to 28 students per class. To

obtain standardization regarding the topic of the PE lesson across the different classes, all measures took place during a lesson on interactive games (e.g. basketball, badminton). Teachers and students' parents gave informed consent for their participation in the study. Participation was voluntary and confidentiality was guaranteed. Both students and PE teachers were asked to fill out a set of questionnaires at the end of the PE lesson about their experiences during the past PE class. The study protocol was approved by the Ethical Committee of The Ghent University.

Measures

Unless mentioned otherwise, participants responded to the items on a 5-point Likert scale ranging from 1 (*not at all true for me*) to 5 (*very true for me*).

Perceived autonomy-supportive and controlling teaching behaviors

Similar to previous studies (e.g. Haerens et al. 2015) with secondary school students, perceptions of autonomy support and controlling teaching were measured by means of items from the Teacher As Social Context Questionnaire (TASCQ; Belmont et al. 1988) and the Psychologically Controlling Teaching scale (PCT; Soenens et al. 2012). To measure perceived autonomy support, we used the six positively worded items from the TASCQ autonomy support scale (e.g. 'During this class my teacher gave me a lot of choices about how to do the exercise'). Controlling teaching was measured with the 7-item scale for psychologically controlling teaching (e.g. 'During this class the teacher made me feel guilty when I dissatisfied him/her') supplemented with the two negatively worded items from the TASCQ autonomy support scale (i.e. 'During this class it seemed like my teacher was always telling me what to do' and 'During this class my teacher often criticized me on how I do things during class').

CFA was performed with MPlus Version 7.0 (Muthén and Muthén, 1998–2010) to test the proposed two-factor model. The model showed good fit to the data ($\chi^2(89) = 290.35$, $p < .001$, RMSEA = .06, CFI = .91, SRMR = .06). Loadings for perceived autonomy support and perceived controlling teaching ranged between .37 and .78, and .55 and .75, respectively. Internal consistencies were good with Cronbach's alpha of .77 and .86 for perceived autonomy-supportive and controlling teaching, respectively. Latent constructs of perceived autonomy-supportive and controlling teaching were unrelated ($r = -.05$, $p = .43$).

Experiences of need satisfaction and need frustration

Students' experiences of need satisfaction and frustration were measured with an adapted version of the Basic Need Satisfaction and Frustration Scale (BNSNF; Chen et al. 2015), a recently developed and validated 24-item scale. Each need was assessed with eight items, of which four tapped into need satisfaction and four into need frustration. Similar to previous studies (Haerens et al. 2015), this general need satisfaction scale was slightly adjusted by adding the stem 'During the past PE lesson' and by slightly rewording some of the items to better reflect the specific context of a PE lesson. To illustrate, the item 'I feel that my decisions reflect what I really want' was changed into 'I felt that the exercises reflected what I really wanted to do'. Internal consistency was good for both need satisfaction (Cronbach's $\alpha = .79$) and need frustration (Cronbach's $\alpha = .84$).

Motivation

Students' motivation towards the past PE lesson (i.e. situational motivation) was assessed by means of the validated Behavioral Regulations in Physical Education Questionnaire (BRPEQ; Aelterman et al. 2012). We used the stem 'I put effort in this past PE lesson ...' followed by items reflecting autonomous motivation (8 items; e.g. 'because I enjoyed this PE class', 'because I found this PE class personally meaningful'), controlled motivation (7 items; e.g. 'because I had to prove myself', 'because otherwise I got criticized'), and amotivation (4 items; e.g. 'I didn't see why this PE class

is part of the curriculum'). Internal consistencies were good with Cronbach's alphas of .85, .82, and .74 for autonomous and controlled motivation and amotivation, respectively.

Controlled non-participation

Controlled motivated non-participation was measured relying on a newly developed 8-item scale, thereby using the stem 'During the past PE lesson I sometimes did not do what the teacher requested', followed by items representing externally pressuring reasons (4 items; for example, 'because my classmates would look up to me if I would do so') and internally pressuring reasons (4 items; for example, 'because in my opinion only the teacher's pets always cooperate') (Aelterman et al. 2016). The scale had good reliability ($\alpha = .93$).

Plan of analyses

Similar to Study 1, cluster analyses relying on a two-step procedure were used to generate motivating profiles (i.e. Aim 1). Further, associations of student (i.e. sex and age) and class (i.e. educational track) characteristics with the study outcomes were explored in IBM SPSS Statistics 22.0 (see Table 3). Given that students ($n = 647$) were nested within classes ($n = 41$) being nested within teachers ($n = 14$), we relied on multilevel regression modelling in MLWin (Rasbash et al. 2009) to investigate differences between groups.

Results

Aim 1: identification of motivating styles

Prior to conducting cluster analyses, we removed five univariate outliers for perceived controlling teaching and one multivariate outlier. Four clusters were retained, explaining 68.0% and 58.0% of the variance in perceived autonomy support and control, respectively (all values > threshold of 50%) (Milligan and Cooper 1985). A three-cluster solution explained less variance, particularly in perceived autonomy support (53.4%), and a five-cluster solution appeared less interpretable and less parsimonious.

Figure 2 (left half) presents the final four-cluster solution, based on respectively the z-scores (Y-axis), and the absolute scores for both dimensions. As hypothesized, we identified two groups with a contrasting configuration: that is the high-autonomy support group who perceived their teachers as predominantly autonomy-supportive but low on controlling teaching ($n = 167$; 26.1%), and a high-control group who perceived their teacher as largely controlling but low on autonomy support ($n = 101$; 15.8%). In addition, there were two groups of students who perceived their teachers as either relatively high ($n = 172$; 26.9%) or low ($n = 200$; 31.3%) on both dimensions. Notably, as can be seen in Figure 2 (right half), the high-control group also perceived their teachers as significantly higher on perceived control than on autonomy support ($t = -6.73$, $p < .001$), indicating that the label 'high control' is justified. In each of three other groups absolute scores for perceived autonomy

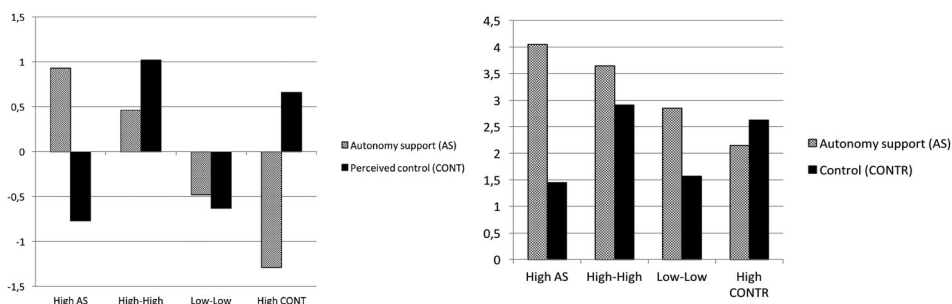


Figure 2. Z-scores (left half) and absolute scores (right half) of perceived autonomy support and controlling teaching.

Table 3. Descriptive statistics and correlations between study variables Study 2.

	Total sample <i>N</i> = 623	Boys <i>N</i> = 425	Girls <i>N</i> = 198											
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>F</i>	1	2	3	4	5	6	7
1. Autonomy-supportive teaching	3.26	0.85	3.24	0.88	3.33	0.78	1.62	–						
2. Controlling teaching	2.05	0.80	2.15	0.80	1.83	0.75	22.57***	–.02	–					
3. Need satisfaction	3.30	0.66	3.30	0.65	3.31	0.67	0.05	.38***	–.08*	–				
4. Autonomous motivation	3.24	0.84	3.27	0.83	3.17	0.84	2.18	.39***	–.12**	.54***	–			
5. Need frustration	2.17	0.73	2.17	0.07	2.17	0.77	0.01	–.01	.50***	–.17***	–.17***	–		
6. Controlled motivation	2.34	0.84	2.39	0.82	2.24	0.85	4.22*	.14***	.46***	.08*	.23***	.55***	–	
7. Amotivation	1.97	0.92	2.02	0.93	1.87	0.90	3.86*	–.13***	.41***	–.20***	–.30***	.51***	.40***	–
8. Controlled non-participation	1.64	0.82	1.73	0.85	1.44	0.77	16.93***	–.04	.36***	–.07	–.09*	.44***	.40***	.48***

Note: Considering missings were random, analyses were conducted on the largest sample as possible as such *N* varied from 645 to 600 depending on the outcome variable or type of analyses.

* $p \leq .05$.

** $p \leq .01$.

*** $p \leq .001$.

Table 4. Differences in study variables according to cluster membership for Study 2.

	High-autonomy support N = 157 (25.6%)	High-autonomy support and control N = 155 (25.2%)	Low-autonomy support and control N = 197 (32.1%)	High control N = 99 (16.1%)
N = 608	β (SE)	β (SE)	β (SE)	β (SE)
Cluster dimensions (raw scores)				
Perceived autonomy support	4.05 (.05) ^a	3.65 (.05) ^b	2.85 (.05) ^c	2.15 (.06) ^d
Perceived controlling teaching	1.45 (.04) ^a	2.91 (.04) ^b	1.57 (.04) ^c	2.62 (.05) ^d
Cluster dimensions (z-scores)				
Perceived autonomy support	0.93 (.06) ^a	0.46 (.06) ^b	-0.48 (.05) ^c	-1.29 (.07) ^d
Perceived controlling teaching	-0.77 (.05) ^a	1.02 (.05) ^b	-0.63 (.04) ^c	0.66 (.06) ^d
Student outcomes				
Need satisfaction	3.65 (.06) ^a	3.40 (.06) ^b	3.35 (.06) ^b	3.05 (.07) ^c
Autonomous motivation	3.71 (.08) ^a	3.37 (.08) ^b	3.32 (.07) ^b	2.86 (.09) ^c
Need frustration	1.73 (.08) ^a	2.37 (.08) ^c	1.88 (.07) ^b	2.30 (.09) ^c
Controlled motivation	2.03 (.09) ^a	2.83 (.08) ^b	2.09 (.08) ^a	2.45 (.10) ^c
Amotivation	1.46 (.08) ^a	2.18 (.08) ^b	1.77 (.07) ^c	2.40 (.09) ^d
Controlled non-participation	1.41 (.08) ^a	1.85 (.08) ^b	1.51 (.08) ^a	1.94 (.10) ^b

^{a,b,c,d}These values are significantly different from each other.

Note: All analyses were controlled for age, sex and educational track.

support were significantly higher than perceived control (all $t > 13.82$, $p < .001$) (see Table 4 and Figure 2). Finally, the double-split cross-validation procedure resulted in an average Kappa value of 0.85, providing significant evidence for the stability of the four-cluster solution.

Aim 2: outcomes associated with the identified motivating styles

Preliminary analyses. Need frustration, autonomous motivation, and controlled motivation were found to increase with increasing age (see Table 3). Next, MANOVAs revealed that boys experienced more control by their teacher ($F(1, 621) = 22.57$, $p = .04$) and also displayed significantly higher levels of controlled motivation ($F(1, 621) = 4.22$, $p = .04$), amotivation ($F(1, 621) = 3.86$, $p = .05$) and controlled non-participation ($F(1, 621) = 19.93$, $p < .001$) when compared to girls. We also found differences in perceived autonomy support ($F(2, 600) = 5.91$, $p = .003$) and amotivation ($F(2, 600) = 5.19$, $p = .006$) according to educational track, with students of vocational education reporting higher levels of perceived autonomy support ($M = 3.59$; $SD = 0.91$) when compared to students from technical ($M = 3.11$; $SD = 0.90$) and academic track ($M = 3.25$; $SD = 0.81$), and students from academic track ($M = 1.88$; $SD = 0.86$) reporting lower levels of amotivation when compared to students from technical ($M = 2.11$; $SD = 1.00$) and vocational track ($M = 2.20$; $SD = 1.04$). Based on these findings, we controlled for sex, educational track, and age in all subsequent analyses by adding these variables to the null model prior to investigating differences between.

Main analyses. Differences in outcomes according to cluster membership were investigated by means of multilevel regression analyses. First, in a fully unconditional three-level null model (students being nested within classes being nested within teachers), intraclass correlation coefficients (ICCs) were estimated for each of the outcomes. These analyses indicated that there was significant between-teacher and between-class level variance in perceived autonomy support ($\chi^2_{\text{teacher}} = 4.37$, $df = 1$, $p < .05$, $ICC = 19.7\%$; $\chi^2_{\text{class}} = 5.37$, $df = 1$, $p < .05$, $ICC = 8.3\%$), but not in perceived controlling teaching ($\chi^2_{\text{teacher}} = 3.55$, $df = 1$, ns , $ICC = 9.8\%$; $\chi^2_{\text{class}} = 2.20$, $df = 1$, ns , $ICC = 3.9\%$). As for the motivational outcomes, most of the variance was significantly situated at the student level, but not at the teacher or class level, except for the outcomes of autonomous motivation ($\chi^2_{\text{class}} = 6.39$,

df = 1, $p < .05$, ICC = 7.8%) and need satisfaction ($\chi^2_{\text{class}} = 4.95$, df = 1, $p < .01$, ICC = 9.0%) that displayed significant between-class variance. In a next step, we controlled for sex, age, and educational track. Because some students had missing data on one of these covariates, the final sample consisted of 608 students nested within 41 classes and 14 teachers. Pairwise comparisons are presented in Table 4 and were conducted by changing the reference category of the predictor (i.e. cluster). Students in the high-autonomy support group clearly reported the highest levels of need satisfaction and autonomous motivation, while the opposite was true for the high-control group. The high-high group reported higher levels of need satisfaction and autonomous motivation than the high-control group, but did not differ from the low-low group.

In terms of negative outcomes, it appeared that students in the high-autonomy support group reported the lowest levels of need frustration, controlled motivation, amotivation, and controlled non-participation, when compared to the high-control group, but also when compared to the high-high group. The high-high group resembled the high-control group on several negative outcomes (i.e. need frustration, controlled non-participation), and even displayed the highest levels of controlled motivation, suggesting that the downsides of a controlling approach also surfaced when combined with autonomy support. The low-low group displayed lower levels of need frustration, controlled motivation, amotivation, and oppositional defiance than the high-high group or the high-control group, but higher levels than the high-autonomy group (except for controlled motivation and controlled non-participation).

Brief discussion

Similar to the findings of Study 1 and in line with our hypothesis that perceived autonomy support and control are not necessarily bipolar, we found that (a) both were unrelated and (b) that four groups could be identified each characterized by a unique motivating profile, that is a high-autonomy support group, a high-control group, a high-high and a low-low group. As for Aim 2, it was shown that profiles characterized by a stronger presence of perceived autonomy support showed a more optimal pattern of results, while the high-control group displayed the worst pattern of outcomes. Furthermore, results indicated that the drawbacks of a perceived controlling approach also occur when the PE teacher is additionally perceived to be autonomy-supportive.

General discussion

A first aim of the current study was to investigate whether we could identify a set of naturally occurring motivating profiles, characterized by different configurations of autonomy support and control in two different samples of athletes and students reporting on their coaches' and PE teachers' motivating style, respectively. Profile analyses systematically pointed towards the extraction of four markedly different groups. Consistent with two studies that have previously adopted a person-centered approach in the context of coaching (Matosic and Cox 2014) and teaching (Amoura et al. 2015), we identified a group high on autonomy support, a group high on control, and also a group that combines both (i.e. high-high). Further, similar to Amoura et al. (2015), we also identified a fourth group characterized by low levels of both (i.e. low-low). The high-high and low-low group would not have emerged if the dimensions of perceived autonomy support and control would fall along a single continuum (i.e. two sides of the same coin). Yet, it seems that – at least in the eyes of youngsters – some instructors tend to combine both dimensions to similar degrees. In support of this argument, we found that correlations between perceived autonomy support and control were modest, being slightly negative in the sample of athletes ($r = -.25$) and non-significant among students ($r = -.02$), which is in line with previous work in PE (De Meyer et al. 2014; Haerens et al. 2015; Van den Berghe et al. 2013) and sport (Bartholomew et al. 2011).

Next to the inspection of the relative presence of autonomy support and control, we also considered the absolute values within each profile. Consistent with our labeling, it was only in the

high-control group that absolute scores for perceived control exceeded absolute scores for perceived autonomy support. Noteworthy, in the high-autonomy support group youngsters consistently perceived their coaches' (Study 1) or teachers' (Study 2) reliance on control to be generally absent (i.e. absolute score lower than 2 indicating strong disagreement with the statements), while in the high-high group absolute scores for perceived control were consistently higher than average, further confirming our labeling. Only the low-low group slightly differed in absolute values across both studies representing perceptions of a more neutral style among athletes when compared to a more uninvolvement style among students. These differences in absolute values are important to keep in mind, in light of the second aim of the current study, which was to examine whether the motivating profiles would relate differently to the outcomes.

The perceived presence of autonomy support yields important benefits

Previous studies making use of a variable-centered approach found perceived autonomy support to relate particularly to need satisfaction and autonomous motivation, and perceived control to need frustration and amotivation (e.g. Bartholomew et al. 2011; Haerens et al. 2015). Consistent with such findings, the profile characterized by high-autonomy support and low control displayed the highest levels of need satisfaction and autonomous motivation in both studies, while the profile characterized by low-autonomy support and high control yielded the highest level of need frustration (Study 2) and amotivation (Study 1 and Study 2).

The advantage of perceived autonomy support was also visible when the high-high group was compared with the high-control group. Across both studies, the high-high group was found to report more need satisfaction than the high-control group, and Study 1 additionally revealed that athletes in the high-high group also experienced more well- and less ill-being. Nonetheless, the perceived presence of autonomy support in the high-high group could not buffer the presence of perceived control in terms of need frustration and controlled non-participation that reached similar levels as in the high-control group. These findings possibly suggest that in the high-high group two pathways are activated, that is a positive pathway towards more positive outcomes such as need satisfaction due to the presence of autonomy support, and a negative pathway towards more negative outcomes due to the reliance on control (Haerens et al. 2015). Yet, this dual pathway was clearer among students when compared to athletes.

The presence of control does not yield any benefits, on the contrary

Results consistently showed that youngsters who perceived their instructors to be high on control on top of high on autonomy support (i.e. high-high) compared to those perceiving their instructor to be high in autonomy support only reported less need satisfaction, lower autonomous motivation, as well as more-controlled motivation and amotivation. Study 2 further added to these findings by showing that students in the high-high group experienced more need frustration and reported more-controlled non-participation relative to those in the high-autonomy support group. In earlier studies of Matosic and Cox (2014) and Amoura et al. (2015) no significant differences between the high-autonomy support group and the high-high group were found, and based on these results Matosic and Cox (2014) suggested that control is adaptive when paired with high-autonomy support. Yet, when further inspecting their results a tendency towards more favorable outcomes in the high-autonomy support group was notified as well. Because both studies had small samples sizes, and Amoura et al. (2015) did not include maladaptive motivational outcomes, differences between both groups might have remained uncovered.

The high-control group also did not display a more desirable pattern of outcomes compared to the low-low group. Students (Study 2) in the low-low group experienced more need satisfaction and autonomous motivation when compared to the high-control group. In athletes (Study 1) in the high-

control group more-controlled motivation and lower well-being was found, but they also reported being more autonomously motivated.

Overall, the drawbacks of a controlling approach were clearer among secondary school students than among athletes, which might have several, yet at this point speculative, explanations. First, the student study included more advanced and proximal maladaptive outcomes such as need frustration and controlled non-participation. As such, it is recommended for future studies to include a broader range of maladaptive outcomes to get a fuller picture of the possible drawbacks of a controlling approach in high-performance contexts. Secondly, the sample of athletes – when compared to the sample of students – reported higher absolute levels of perceived autonomy support and control overall. Thirdly, it might be more normative in a highly competitive sport environment (also see Cheon et al. 2015), when compared to a PE lesson, to engage in controlling practices, which could reduce the negative impact of a controlling approach. A study on parenting, Gershoff et al. (2010) indeed demonstrated that some discipline techniques (e.g. corporal punishment, yelling) are less strongly associated with maladaptive outcomes when these are perceived as normative. As such, some athletes may think it is justified for their coach to engage in some of the controlling practices because they understand the coaches' underlying intention is to enhance their performances. Developing this reasoning, it would be interesting to investigate whether there are certain circumstances (e.g. a player is disrupting the training, thereby preventing team members to stay focused) under which athletes (or students) believe it is justified for their coach (or teacher) to enact in a controlling way because they fully understand the reason for doing so is 'for the best of the group', and whether this would affect the effects of a controlling approach.

Finally, some interesting correlational findings warrant further discussion. Although sport performance is a crucial outcome for elite sport athletes, only few studies (e.g. Gillet et al. 2010) investigated how coaches' motivating style relates to athletes' performance. It was interesting to note that athletes' self-reported perceptions of autonomy support directly positively related to coach-rated performance. Moreover, also experienced need satisfaction positively related to coach-rated performance, while negative relationships between amotivation and performance were notified. As such, it is also well possible that the relationships between performance and motivating styles are more indirect. Future studies could investigate the intervening role of need satisfaction and motivation in the relation between coaches' motivating style and athletes' performance (e.g. Gillet et al. 2010).

Practical recommendations

In addition to its theoretical relevance, the identification of different groups has clear practical implications. When coaches or teachers are perceived to rely on an autonomy-supportive non-controlling motivating style, because they, for instance, acknowledge youngsters' concerns, provide opportunities for initiative taking and input, or afford youngsters with choices while simultaneously refraining from pressuring them, this is likely to benefit youngsters' motivation and well-being. Also, while some instructors, particularly those who are functioning in a more competitive context where pressure is considered more acceptable (Cheon et al. 2015), may endorse the belief that the combination of autonomy support and control yields the most effective cocktail to motivate young people (e.g. using competitive and game-based activities to make it fun, while treating 'the losers' with punishments such as push-ups or humiliating comments), this perspective is not supported by the findings of the current study. Finally, profile analyses, as presented in the current study, might inform future interventions (Aelterman et al. 2014; Cheon et al. 2015; Reeve et al. 2004) as diagnosing an instructor's motivating style based on both dimensions might reveal that it might be more useful for some instructors to learn to become less controlling (high on both), while others will gain more from learning how to become more autonomy-supportive (low on both). For others, a two-step procedure might be more helpful, with instructors first learning how to be less controlling, prior to learning how to become more autonomy-supportive (Reeve 2015). Profile analyses might

also lead towards new and more refined understandings of the antecedents of an instructors' motivating style. Studies, for instance, showed that the degree to which teachers or coaches felt more accountable for the performances of their students (Deci et al. 1982; Reeve 2009; Soenens et al. 2012) or athletes (Cheon et al. 2015; Pelletier, Seguin-Levesque, and Legault 2002), explained whether they interacted in a less autonomy-supportive and more controlling way. It is also well possible that some circumstances elicit a more controlling reaction of the instructor, for instance, when disruptive or unsafe behavior of one student (or athlete) prevents the group from engaging in the exercises.

Future directions

In the current study, we measured rather stringent person-oriented forms of control (e.g. the instructor made me feel guilty, criticized me, ...). Yet, the impact of controlling instructions that are more closely directed towards players' or students' actions (e.g. the coach is pressuring athletes to persist in hard and exhausting exercises) or attitudes (e.g. a teacher is reprimanding a student who is disturbing the lesson) has not been investigated up to now. The latter forms of control might be considered as more acceptable or normative, as the athletes or students might more fully understand why the instructor is enacting in a controlling way for their own good.

Secondly, future studies could rely on observations of instructors' motivating style (e.g. De Meyer et al. 2014; Haerens et al. 2013) to investigate whether a motivating style not only exists in the eye of the beholder (i.e. youngsters' perception), but instead, can be traced back to real observable behaviors. In that respect, it would also be interesting to simultaneously observe various need-supportive (i.e. autonomy support, structure, relatedness support) and need-thwarting (i.e. control, chaos, cold) dimensions to allow determining a more complete picture of teachers' or coaches' motivating style (e.g. Van den Berghe et al. 2013). Finally, it becomes exciting to investigate whether it is possible to boost the effectiveness of existing intervention programs (e.g. Aelterman et al. 2014), by determining teachers' or coaches' motivating style, and tailoring the intervention to their teaching profile.

Limitations

The cross-sectional design, as well as the dominant reliance on self-reported data from athletes or students, forms a limitation of the current study. In the first study we did not have descriptive information on the involved sport coaches, although they provided anonymous information on the athletes' performances. Also, the athletes' questionnaires used a very general stem, that is: 'my coaches at the top sport school ... e.g. insist on doing everything in their way'. As such, it was not possible to detect which coach was the athletes' point of reference when responding to the items about their experiences at the top sport school. It would have been interesting to be able to aggregate scores of athletes who were trained by the same coach, to see whether there were between coach differences that could have explained the motivational outcomes. Unfortunately, this was not possible with the present data set.

Conclusion

Four comparable motivating styles were identified across two studies conducted among elite sport athletes and secondary school students in PE who reported on their coaches' and teachers' reliance on autonomy support and control, respectively. Comparison of the motivating styles in terms of outcomes led to the conclusion that the presence of autonomy support, particularly in the absence of control, yields the most optimal pattern of outcomes. In contrast, motivating profiles characterized by high control displayed less desirable outcomes. The latter conclusion also holds true when control is combined with autonomy support since more maladaptive outcomes (i.e. controlled motivation, amotivation, need frustration) were observed when youngsters perceived high-autonomy support combined with high control, rather than high-autonomy support only.

Notes

1. Part of the data of Study 1 were previously published to answer research questions on the motivating role of positive feedback in Mouratidis et al. (2008, Study 2), and to investigate the conceptual distinction between identified regulation and introjected approach and avoidance motivations in Assor, Vansteenkiste, and Kaplan (2009, Study 2). However, none of these two previously published studies investigated perceived autonomy support and perceived control, and how these relate to outcomes.
2. Part of the data of Study 2 were previously published to investigate students' controlled reasons for non-participation in Aelterman et al. (2016). However, the latter study did not investigate how perceived autonomy support and perceived control relate to motivational outcomes in PE.

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Relationships between perceived teachers' controlling behaviour, psychological need thwarting, anger and bullying behaviour in high-school students



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ABSTRACT

We tested a model of the associations between students' perceptions of their physical education teacher's controlling behaviour, perceptions of basic psychological need thwarting, anger and bullying behaviour. School students ($N = 602$; M age = 12.88, $SD = 1.37$) from 10 schools completed measures of perceived teachers' controlling behaviour and perceived thwarting of the psychological needs for autonomy, competence, and relatedness in physical education context and self-reported bullying and anger. A well-fitting structural equation model demonstrated that students' perceptions of the negative conditional regard and intimidation exhibited by the teacher had significant indirect effect on students' feelings of anger and bullying behaviour through the perceived psychological need thwarting in physical education. Findings suggest that physical education teachers who avoid the use of negative conditional regard and intimidation in their classes have students who perceive less need thwarting and report less bullying behaviour.

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Bullying is defined as intentional verbal or physical aggressive behaviour with intent to harm and typically involves an imbalance of power between the victim and perpetrator (Rigby, 2002). Monks and Smith (2006) have classified bullying as a subset of aggression and several authors have viewed a state anger as potential precursor to aggressive behaviour (Dodge, 1991; Price & Dodge, 1989). Bullying among school children is a major social problem globally (Nansel, Craig, Overpeck, Saluja, & Ruan, 2004). A study by Ziegler, Rosenstein-Manner, and Toronto Board of Education (1991), based on self-report data from children in Canada, showed that 8% of children reported are bullied weekly and 20% of the respondents reported being bullied at least once per school term. Furthermore, 74% of those bullied reported being hit or kicked, 23% reported being teased, and 9% were threatened, intimidated, confined or suffered other types of bullying. According to the results of the cross-national Health Behaviour of School-aged Children (HBSC) study, 41% of school children aged 11–15 years in Estonia reported being a victim of bullying. Furthermore, 46% of students of this age reported engaging in bullying behaviour. Most important, however, the HBSC study reported more frequent incidents of bullying among younger school children aged 11–13 years in Estonia compared to other countries (Aasvee et al., 2012).

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There are several reasons for bullying. Besides demographic risk factors related to socioeconomic background like parental educational level and family income (Jansen et al., 2012), the school environment in which the students spend a substantial part of their day may have also impact on students' aggressive behaviour. Salmivalli and Peets (2009) have noted that the classroom context plays an important role in the occurrence of school bullying. Teachers' behaviour in the classroom context may play a central role in creating a positive or negative class climate that may have concomitant consequences on pupils' behaviour. In this article we investigate the different dimensions of perceived teacher's controlling behaviour and perceived thwarting of basic psychological needs from self-determination theory (SDT, Deci & Ryan, 2000) as potential contributors to aggressive and bullying behaviour and negative affect in Estonian school children.

Controlling teacher behaviour¹

SDT is one of the most widely used approaches to explaining human behaviour (Deci & Ryan, 2000) and it has been applied intensively in educational contexts (Hagger & Chatzisarantis, 2007; Niemiec, Ryan, & Deci, 2009). SDT posits that individuals strive to satisfy three basic and universal psychological needs for autonomy (to feel self-determined in one's actions rather than feeling controlled), competence (to feel competent in interactions with the environment and experience opportunities in which to express one's capabilities), and relatedness (to feel a secure sense of belongingness and connectedness to others) (Deci & Ryan, 1985, 2000; Sheldon, Elliot, Kim, & Kasser, 2001). According to SDT, the satisfaction of these needs is related with social factors like school environment and teacher behaviour. A number of studies in educational settings (Barkoukis, Hagger, Lambropoulos, & Torbatzoudis, 2010; Hagger, Chatzisarantis, & Harris, 2006; Ntoumanis & Standage, 2009; Reeve & Jang, 2006; Ryan & Deci, 2000), including physical education among Estonian students (Hagger et al., 2009; Pihu, Hein, Koka, & Hagger, 2008), have demonstrated that autonomy-supportive teacher behaviour is related directly or indirectly via need satisfaction with positive affective and behavioural outcomes.

Although a large number of studies have examined the correlates of autonomy supportive teaching styles, the correlates of controlling teaching styles has only recently received attention. Moreover, according to Vansteenkiste and Ryan (2013), controlling teaching behaviours should be considered independent of autonomy-supportive behaviours and deserve separate attention in the scientific literature. Recent studies in educational settings have demonstrated that teacher controlling behaviours were related to lower levels of perceived psychological need satisfaction, less engagement during the lessons (Cheon & Reeve, 2015), increased levels of students' controlled motivation and amotivation (Cheon & Reeve, 2015; De Meyer et al., 2014), and increased cortisol levels, a physiological marker of stress, among students (Reeve & Tseng, 2011). Controlling teacher behaviours have also been shown to predict negative affect in students during learning like anger and anxiety (e.g., Assor, Kaplan, Kanat-Maymon, & Roth, 2005; Flink, Boggiano, & Barrett, 1990) and negatively related to overall academic achievement (Soenens, Sierens, Vansteenkiste, Dochy, & Goossens, 2012). It is noteworthy that studies have consistently shown relatively modest correlations between subordinates' perceptions of their supervisor's provision of autonomy support and controlling behaviours (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010; Pelletier, Fortier, Vallerand, & Briere, 2001; Silk, Morris, Kanaya, & Steinberg, 2003; Tessier, Sarrazin, & Ntoumanis, 2008), indicating that controlling behaviours are not the conceptual opposite of autonomy supportive behaviours. According to Bartholomew, Ntoumanis, Ryan, Bosch, et al. (2011), individuals in a position of authority thus may simultaneously use a variety of autonomy supportive and controlling behaviours and to varying extents. For example, a teacher may use conditional regard as a discipline strategy, a controlling behaviour, but may also provide a clear rationale for requested behaviours, and autonomy-supportive behaviour.

Controlling behaviour in teachers has been usually measured on a uni-dimensional scale (Assor et al., 2005; Reeve & Halusic, 2009; Soenens et al., 2012). In their review of parental and educational literature concerning the controlling strategies of significant others, Bartholomew, Ntoumanis, and Thøgersen-Ntoumani (2009) identified several dimensions of controlling behaviour (e.g., controlling use of praise and extrinsic rewards, negative conditional regard, intimidation, excessive controlling behaviour, judging/devaluing, and promoting ego-involvement). In their development and initial validation of the Controlling Coach Behaviours Scale (CCBS), Bartholomew et al. (2010) proposed a conceptual model of controlling behaviours comprising four controlling strategies by coaches: controlling use of praise and extrinsic rewards, negative conditional regard, intimidation, and excessive controlling behaviour. In the present study we focus on these four controlling strategies and adapt these to the physical education context.

According to Bartholomew et al. (2009, 2010), controlling use of praise and extrinsic rewards refers to the use of encouraging statements and extrinsic rewards by significant others to reinforce desired behaviours by their subordinates. An example of the controlling use of praise is a teacher who uses his or her positive feedback solely to direct the future behaviour of the students, as opposed to providing information regarding present performance. An example of the controlling use of extrinsic

¹ It is important to note that our conceptualization and definition of "controlling behaviours" is confined to the definition from self-determination theory i.e. the interpersonal style and actions of significant others (e.g., teachers) that reflect or communicate that the behaviour and outcomes of individuals in a particular context (e.g., students) are determined by others and external forces. It should be considered distinct from other conceptualizations of the construct of control, which generally reflects beliefs about capacity to engage in actions and agency (for a review see Skinner, 1996). From Skinner's perspective, our definition of "controlling behaviours" is most closely aligned with constructs that reflect coercion. We have taken care to ensure that we refer specifically to "controlling behaviours" rather than "control" in order to avoid terminological confusion and "jingle" fallacies i.e. referring to different constructs using the same term (Block, 1995; Hagger, 2014).

rewards is a teacher who promises to reward students if they engage in tasks he or she sets them or perform to a specified standard (Deci, Koestner, & Ryan, 1999). A leader or social agent shouting at his or her subordinates to intimidate them into doing the things he or she wants is a prime example of the use of intimidating behaviour. An example of intimidating behaviour is a teacher who uses the threat of punishment (e.g., push-ups) to motivate students to work harder or keep them in line during lessons or embarrasses students in front of their peers if they do not do certain things. Negative conditional regard refers to the withdrawal of attention, affection, and support from the significant other when specified behaviours by their subordinates are not displayed. An example of the negative conditional regard is a teacher who says things to make a student feel guilty (e.g., 'you have really let me down') when he or she does not perform well or behave as the teacher was expecting. Finally, excessive controlling behaviour refers to behaviours adopted by significant others that can be characterised as intrusive monitoring. An example of an excessive controlling behaviour is a teacher who attempts to interfere in aspects of the students' lives that are not directly associated with their schooling (e.g., teacher's duty to recruit students for extracurricular activities such as competition between schools) and pressure them to prioritise his or her lesson over other lessons.

The role of controlling teacher behaviours on basic psychological need thwarting and bullying behaviour

According to SDT, when psychological needs are satisfied people will develop and function effectively, but if these needs are thwarted, people report lower levels of well-being and experience non-optimal functioning (Bartholomew, Ntoumanis, Cuevas-Campos, & Lonsdale, 2014; Deci & Ryan, 2000). SDT also posits that the darker sides of human behaviour and experience, such as certain types of psychopathology, prejudice, and aggression are understood in terms of reactions to basic needs having been thwarted, either developmentally or proximally (Deci & Ryan, 2000). Researchers have noted that examining whether need thwarting has meaningful and empirical consequences can provide more robust tests of SDT's account of the darker sides of human behaviour (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2011). Studies have shown that whereas the satisfaction of psychological needs is directly or indirectly related to multiple adaptive behavioural and affective outcomes such as vitality and positive affect (Baard, Deci, & Ryan, 2004; Bartholomew, Ntoumanis, Ryan, Bosch, et al., 2011; Reeve & Jang, 2006; Ryan, Patrick, Deci, & Williams, 2008), the thwarting of these needs can lead to defensive or self-protective responses (e.g., compensatory motives or need substitutes, and rigid behaviour patterns) that have significant negative affective or behavioural consequences such as burnout, depression, and negative affect (Bartholomew, Ntoumanis, Ryan, Bosch, et al., 2011; Demaray & Malecki, 2002; Niemiec et al., 2009; Ryan, Deci, Grolnick, & La Guardia, 2006).

Research conducted in multiple contexts including education has demonstrated the detrimental effect of controlling strategies of significant others on their subordinates' basic psychological needs for autonomy, competence, and relatedness. Paying particular attention to the controlling behaviours most relevant to the current study, praise from supervisors given non-contingently, and perceived as inappropriate and insincere by subordinates, undermined their feelings of competence and autonomy (Henderlong & Lepper, 2002; Hollebeak & Amorose, 2005; Horn, 1985; Kohn, 1993). Mageau and Vallerand (2003) suggested that if athletes perceive their coaches to use conditional caring, either positive or negative, they were more likely to relinquish their autonomy to maintain a satisfactory relationship with their coach. Barber (2001) argued that the use of excessive controlling behaviour by parents can undermine children's needs for autonomy and relatedness. Similarly, research by D'Arripe-Longueville, Fournier, and Dubois (1998) revealed that sport coaches engaging in intimidating behaviours had a detrimental effect on the overall psychological experiences of their athletes, indicating that intimidating behaviours may impact negatively on all three psychological needs. Finally, as was pointed out by Skinner and Wellborn (1994), a social environment in classes can also block the development of the needs for competence, autonomy, and relatedness by providing inconsistency or chaos, coercion, and neglect, respectively.

Consequently, we contend that if students' basic needs for autonomy, competence, and relatedness are thwarted, they may experience feelings of anger and anxiety and turn to aggressive behaviour themselves. For example, if a student's genuine preferences are devalued and his or her sense of autonomy has been diminished, it may lead to the use of direct and hostile strategies to control his or her peers (Hawley, Little, & Pasupathi, 2002). One may also argue that if the student's need for competence is thwarted, he or she may have a desire to demonstrate physical superiority or power over other students. Finally, we argue that if a student perceives his or her belonging to a social group to be restricted, or feels isolated from others, thereby thwarting the need for relatedness, he or she may turn to aggressive behaviour.

The present study

Although the positive role of teachers' autonomy supportive behaviour and need satisfaction on students' different adaptive affective and behavioural outcomes are well documented, there is a lack of research on the effect of teacher's controlling behaviours on maladaptive outcomes related to anger and subsets of aggressive behaviour like school bullying. A recently proposed model based on SDT suggests that the thwarting of basic psychological needs may serve to mediate the link between these perceived controlling teacher behaviours and maladaptive outcomes (Bartholomew et al., 2010), but there is no direct evidence for this process model in the context of anger and bullying outcomes in a physical education context. The current study aims to fill this gap in the literature.

The main aim of the present study, therefore, is to develop and validate a model to understand the effect of students' perceptions of their teacher's controlling behaviours (e.g., controlling use of praise and extrinsic rewards, negative conditional regard, intimidation and excessive controlling behaviour) on their feelings of anger and bullying via the mediation of

perceived psychological need thwarting (see Fig. 1). To address this aim, we administered adapted versions of Bartholomew et al.'s (2010) multidimensional measure of teachers' controlling behaviours, Bartholomew, Ntoumanis, Ryan, and Thøgersen-Ntoumani's (2011) measure of perceived thwarting of the needs for autonomy, competence, and relatedness, and a measure of anger and bullying behaviour to a sample of Estonian school students. Consistent with the proposed model, we hypothesise that students' perceptions of physical education teachers' controlling behaviours will be related to the development of feelings of anger and bullying behaviour. We also expect perceived psychological need thwarting will mediate the effect of the perceived teacher controlling behaviours on feelings of anger and bullying behaviour. Finally, a feeling of anger was expected to act as a precursor to bullying behaviour (Dodge, 1991; Price & Dodge, 1989).

Methods

Participants and procedure

Participants were school children ($N = 602$; 309 boys, 293 girls) aged 12–16 years (M age = 12.88, $SD = 1.37$) from 10 schools in Estonia. Students were enrolled in physical education as a compulsory lesson twice per week. Permission to carry out the study in each school was obtained from the headteacher and ethical approval was granted from the university ethics committee. The questionnaire was uploaded to the internet and information about the website address was forwarded to each school's headteacher who, in turn, forwarded the information to students. Next, consent from class teachers was obtained in lieu of parental consent. Students completed the online questionnaire at their convenience. The purpose of the study was explained and the guidelines for completing the questionnaire were provided. It was also emphasised that the questionnaire was designed to measure students' general feelings about their PE teacher's behaviour and their self-reported frequency of aggressive behaviour. The questionnaire took approximately 10–12 min to complete. The students were assured that their responses would remain confidential.

Measures

Teachers' controlling behaviour

The multidimensional Controlling Coach Behaviours Scale (CCBS) developed by Bartholomew et al. (2010) was adapted to measure students' perceptions of the PE teachers' controlling behaviour. Participants were initially presented with a common

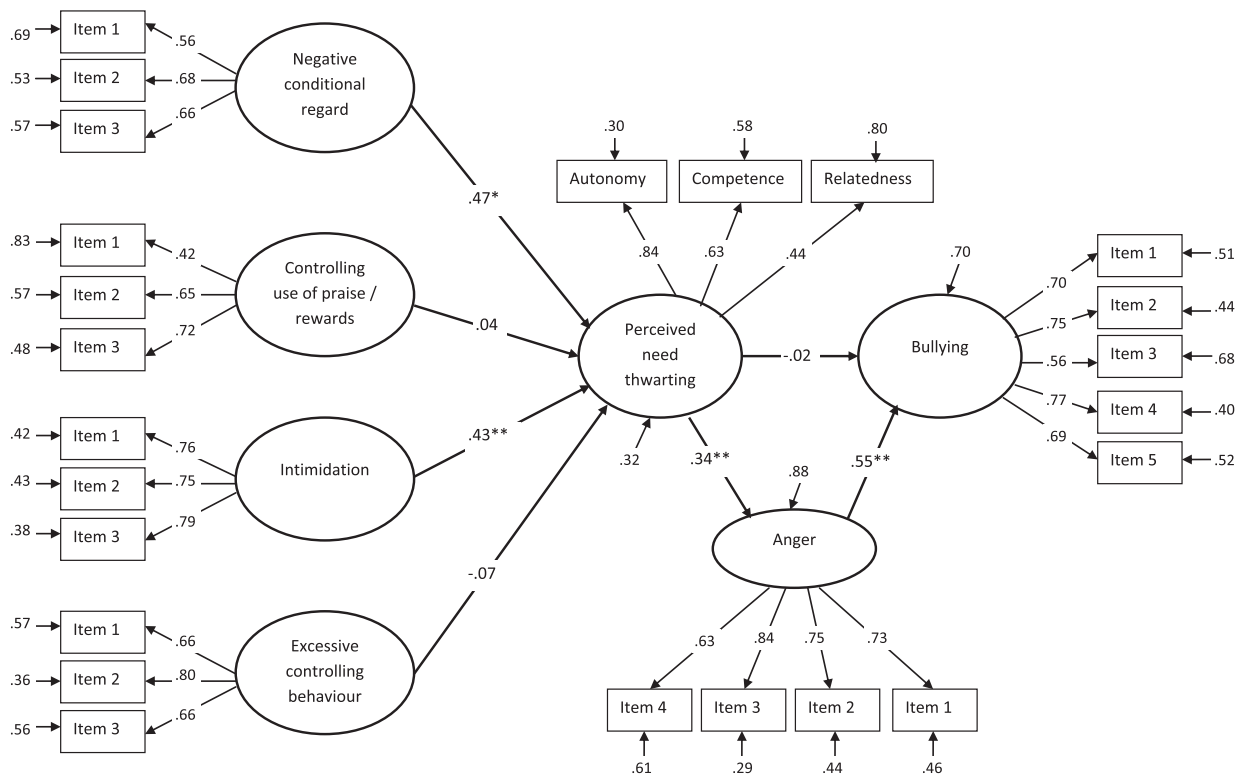


Fig. 1. Structural equation model measuring the associations between the students' perceptions of the teacher's controlling dimensions, perceptions of the need thwarting, anger and bullying behaviour. Note. * $p < .05$, ** $p < .01$.

stem (“My PE teacher”) followed by the items tapping the four subscales: controlling use of praise and rewards (e.g., “... uses rewards/praise so that I stay focused on tasks during lesson”), negative conditional regard (e.g., “... is less supportive of me when I am not exercise and perform well”), intimidation (e.g., “... uses the threat of punishment to keep me in line during lesson”), and excessive controlling behaviour (e.g., “... tries to control what I do during my free time out of school”). Each of the four subscales comprised three items. Previous research have supported the reliability and factor structure of the subscales of the CCBS using confirmatory factor analysis (CFA) (Bartholomew et al., 2010).

The need thwarting scale

Students’ perceptions of the thwarting of the psychological needs of autonomy, competence, and relatedness in physical education were assessed using an adapted and translated version of the 12-item Psychological Need Thwarting Scale (PNTS; Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011). Example items were: “I feel pushed to behave in certain ways” (autonomy thwarting), “There are times when I am told things that make me feel incompetent” (competence thwarting), and “I feel I am rejected by those around me” (relatedness thwarting). Bartholomew, Ntoumanis, Ryan, and Thøgersen-Ntoumani (2011) have reported adequate reliability statistics for the PNTS and supported its three-factor structure using CFA. In line with a work of Baard et al. (2004), and recent work in physical education context (e.g., Taylor, Ntoumanis, & Standage, 2008), scores for each subscale were combined into a single latent variable and used as indicators of an overall need thwarting factor in our hypothesized structural model. Participants responses to the CCBS and PNTS were made on seven-point scales ranging from 1 (strongly disagree) to 7 (strongly agree).

Bullying behaviour and anger

Bullying behaviour and anger were measured using the Modified Aggression Scale (MAS) developed by Bosworth, Espelage, and Simon (1999). Five items of this instrument measure bullying behaviour and four items anger. For bullying behaviour, participants were asked how many times they did the following in the past 30 days: “I called other students names”, “I teased students”; “I said things about students to make other students laugh”; “I threatened to hit or hurt another student”; and “I pushed, shoved, slapped, or kicked other students”. For anger, participants asked how often they did the following in the past 30 days: “I was angry most of the day”; “I took my anger out on an innocent person”; “I frequently got angry”; and “I was grouchy or irritable, or in a bad mood, so that even little things would make me mad”. Responses were made on four-point scales with scale points: 0 = *never*, 1 = *1 or 2 times*, 2 = *3 or 4 times*, and 3 = *5 or more times*. Previous research has confirmed the reliability (Bosworth et al., 1999; Espelage, Bosworth, & Simon, 2000) and the two-factor structure of this scale (Bosworth et al., 1999).

Translation procedures

Estonian versions of the questionnaires for the present study were developed using standardised back-translation procedures by two independent bi-lingual translators (Brislin, 1986). The back-translation procedure was repeated iteratively until the original and back-translated English versions of the questionnaires were virtually identical.

Data analyses

Study hypotheses were tested using confirmatory factor analysis (CFA) and structural equation modeling (SEM) with the LISREL 8.8 statistical package.² Corrected maximum likelihood estimation method was used. Model adequacy was evaluated by using multiple goodness-of-fit indexes: comparative fit index (CFI), normed fit index (NFI), the non-normed fit index (NNFI), and the root mean square error of approximation (RMSEA). A cut-off value greater than .95 for the CFI, NFI, and NNFI, and a cut-off value less than or equal to .08 for the RMSEA indicated adequate model fit (Hu & Bentler, 1999). Indirect

² Due to the hierarchical nature of the data (i.e., student data nested in classes and schools), we explored the use of multilevel analysis to analyse the data. The data available, however, only enabled us to analyse the two-level model (i.e., students at level 1 and schools at level 2). To determine how much of the total variance in each study variable could be attributed to between-school variability we conducted a series of separate null or no-predictor models. These models are considered the first step in developing multilevel models according to the recommendations of Heck, Thomas, and Tabata (2010). In each model, each study variable was specified as the dependent variable and school as grouping variable. Results indicated that the intercepts did not vary significantly across schools (Wald Zs = .28–1.72; ps > .05) for all of the study variables. The intraclass correlations (ICC) for most of the study variables suggested that only between 0.5 and 5.4% of the total variability between schools could be attributed to between-school variability. The only exception was the model for the teacher’s controlling behaviour such as intimidation variable which suggested that 10.5% of the total variability was attributable to between-school variability. On the other hand, results of the null models indicated that significant proportions of the total variance could be explained from within student variability for all study variables without exception (Wald Zs = 17.02–17.20; ps < .001). Since the results of null models indicated that the total variability in study variables attributable to between-school variability was minimal for all but one of the factors, we deemed that conducting a multilevel analysis would add a little advantage as the higher level grouping had an unsubstantive effect in explaining variability in the study variables. Thus, an analysis conducted at the individual level (i.e., student-level) would be optimal. We also fit a multilevel SEM using LISREL 8.8 that included both between group (i.e., school-level) and within group (i.e., student-level) effects to our two-level dataset ($\chi^2(509) = 1092.56$, RMSEA = .061, C₁₀₀ for RMSEA range = .056–.066). Results of the multilevel SEM indicated that school level effects were not statistically significant, but student-level effects remained statistically significant with identical pattern to the single level model depicted in Fig. 1. Therefore the SEM with student-level effects only seems to be the most appropriate. With regard to the teacher’s controlling behaviour such as intimidation, however, we caution the reader about the fact that in addition to the significant variance explained between students, a substantial amount of variability was also found between schools for this particular variable.

effects were computed using LISREL's indirect effects matrix with correction for multiple mediation effects. In order to examine the hypothesized model, we followed the three of Mulaik and Millsap's (2000) four steps for confirming the factor structure of multi-item scales of recommendations. First, separate CFA models that assumed discriminant validity between items representing four modified CCBS factors, three modified PNTS factors and two Modified Aggression Scale factors, respectively, were compared to corresponding congeneric CFA models that assumed lack of discriminant validity for the observed scales. Specifically, each CFA model that assumed discriminant validity between factors was specified by setting items of the respective latent constructs to load on their expected factors. Also, in each CFA model that assumed discriminant validity between factors, the latent constructs were set to correlate. Further, each corresponding congeneric CFA model that assumed lack of discriminant validity was specified in which a single factor would explain relationships between the items of different latent constructs. Discriminant validity of the components is supported if the CFA model that hypothesizes discriminant validity satisfies published cut-off criteria for indices of good fit and is superior in fit to the congeneric model in which all items are specified to indicate a single latent construct. Second, the CFA was performed to verify the measurement model. Third, pending a satisfactory fit was obtained for the measurement model, we tested the proposed model relations using SEM. The fourth and final step of the procedure in which pre-specified paths that were freed in the model from its inception are tested against unspecified paths was not relevant in the current model given the theory-based nature of our specified model.

Results

Preliminary analysis

Descriptive statistics, correlations among study variables and composite reliability coefficients for all measures are presented in Table 1. Analyses of the skewness and kurtosis values for the individual items revealed that not all data were normally distributed and therefore the polychoric correlations and the asymptotic covariance matrices were used in subsequent CFA and SEM analyses. The factor loadings and residuals for the CFA models for the modified CCBS, modified PNTS, and MAS are presented in Tables 2–4, respectively.

First, the discriminant validity CFA model for the modified CCBS with four latent factors and 12 items (Table 5, Model 1) met the criteria for good fit and was superior in fit to the congeneric model (Table 5, Model 2). The CFA model for modified PNTS with three factors and 12 items exhibited inadequate fit ($\chi^2 = 318.75$, $df = 51$, $RMSEA = .098$ with $CI_{90} = .088-.110$, $NNFI = .094$, $NFI = .95$, $CFI = .095$). Results revealed low factor loading (.25) for one item from the perceived need thwarting for autonomy subscale: "I feel under the pressure to agree with the exercises designed for me". Also, the standardized residual for this item and the item "I feel obliged to follow exercise decision made for" was very high (20.43). After removing the item with low factor loading, the composite reliability coefficient of this scale increased from .731 to .780. The exclusion of this item also resulted in improved psychometric parameters that reached an acceptable level. The discriminant validity CFA model for the modified PNTS with three latent factors and 11 items (Table 5, Model 3) met the criteria for good fit and was superior in fit to the congeneric model (Table 5, Model 4). The discriminant validity CFA model for the Modified Aggression Scale with two latent factors and 9 items (Table 5, Model 5) met the criteria for good fit and was superior in fit to the congeneric model (Table 5, Model 6). All factor correlations between the latent variables in each instruments were significantly different from unity according to the criteria specified by Bagozzi and Kimmel (1995), supporting the discriminant validity of the constructs.

Second, we tested our hypothesized measurement model based on 24 observed measures and seven latent constructs, representing the four factors of modified CCBS (comprising 12 items), one factor of PNTS (comprising 3 composite scores of needs) and two factors of Modified Aggression Scale (comprising 9 items). The latent factors were allowed to correlate freely during assessment of the measurement model (Anderson & Gerbing, 1988). The results from the CFA revealed that the measurement model was appropriate (Table 5, Model 7), where each factor was adequately explained by its respective set of indicator items. In addition, factor correlations among the constructs were significantly

Table 1
Descriptive statistics and factor correlations among study variables.

	pc	Mean	SD	1	2	3	4	5	6
1. Negative conditional regard	.703	3.59	1.27	—					
2. Controlling use of praise and extrinsic rewards	.655	3.78	1.16	.80*	—				
3. Intimidation	.845	2.67	1.48	.91*	.76*	—			
4. Excessive controlling behaviour	.800	3.01	1.51	.70*	.54*	.77*	—		
5. Need thwarting	.726	3.57	1.07	.79*	.67*	.77*	.56*	—	
6. Anger	.892	2.34	2.56	.30*	.24*	.38*	.30*	.36*	—
7. Bullying	.889	2.83	3.04	.18*	.19*	.25*	.19*	.14*	.56*

Note. Scores for the need thwarting construct represents the mean values of items from three subscales.

* $p < .05$.

Table 2

Factor loadings and residuals following confirmatory factor analyses for the teachers' controlling behaviour subscales.

Subscale and items	Factor loading	Residual
Negative conditional regard		
My teacher is less friendly with me if I don't make the effort to see things his/her way	.60	.64
My teacher is less supportive of me when I do not exercise and perform well	.72	.49
My teacher pays me less attention if I have displeased him/her	.67	.55
Controlling use of praise and extrinsic rewards		
My teacher promises to reward/praise me if I do well	.43	.81
The only way my teacher rewards/praises me is to make me exercise harder	.69	.52
My teacher only uses rewards/praise so that I stay focused on tasks during lesson	.73	.47
Intimidation		
My teacher shouts at me in front of others to make me comply	.80	.36
My teacher uses the threat of punishment to keep me in line during lesson	.80	.35
My teacher intimidates me into doing the things that he/she wants me to do	.81	.34
Excessive controlling behaviour		
My teacher tries to control what I do during my free time out of school	.73	.47
My teacher tries to interfere in aspects of my activities outside physical education lessons	.86	.26
My teacher expects me to appreciate physical education more than other lessons	.67	.55

Note. All factor loadings are statistically significant ($p < .05$).

different from unity according to the criteria specified by Bagozzi and Kimmel (1995), supporting the discriminant validity of the constructs.

Main analysis

The main purpose of the SEM was to examine how students' perceptions of the different dimensions of their teacher's controlling behaviour (controlling use of rewards, negative conditional regard, intimidation and excessive controlling behaviour) were related to anger and bullying via the mediation of the perceived thwarting of their basic psychological needs (see Fig. 1). A SEM was used to test a model with direct paths from the dimensions of the perceived teachers' controlling behaviour to perceived need thwarting and from perceived need thwarting to anger and bullying. The subscale scores of each perceived need thwarting (i.e., thwarting of the need for autonomy, competence and relatedness) were used as indicators of an overall perceived need thwarting latent variable. Also, the indirect effects from the dimensions of perceived teachers' controlling behaviour on students' aggressive behaviour were calculated.

The structural model demonstrated a good fit with the data.³ The fit indices are presented in Table 5 (Model 8) and standardized coefficients are presented in Fig. 1. Overall, the model explained 68%, 30%, and 12% of the variance in perceived psychological need thwarting, bullying, and anger latent factors, respectively. Focusing first on the effects of the four controlling behaviour dimensions, students' perceptions of the negative conditional regard and intimidation exhibited by the teacher were uniquely significantly related to students' perceived psychological need thwarting. There were no unique significant effects for the controlling use of praise and rewards, and excessive controlling behaviour on need thwarting. Focusing on the effects of psychological need thwarting on outcomes, there was a statistically significant direct path from perceived need thwarting to anger, but no statistically significant direct path from perceived need thwarting to bullying. However, anger was strongly related to bullying and there was also a significant indirect effect of perceived need thwarting on bullying via anger (see Table 6). It was also hypothesized that perceived controlling teacher's behaviours would be indirectly related to anger and bullying via perceived need thwarting. An examination of the indirect effects indicated that the perceived negative conditional regard and intimidation were statistically significantly related to students' anger and bullying, supporting our hypothesis for these variables, but rejecting the hypotheses for the effects of the controlling use of praise and rewards, and excessive controlling behaviour on the outcomes mediated by psychological need thwarting (see Table 6). Although the observed indirect effects of the dimensions of perceived negative conditional regard and intimidation on students' anger were stronger than the indirect effects of these constructs on students' bullying behaviour, there were no statistically significant differences across the two predicted variables as indicated by the overlap in the 95% confidence intervals (see Table 6).

³ We also tested two alternative models and compared those against the hypothesized model depicted in Fig. 1. In both alternative models, the direct paths from all of the dimensions of perceived teachers' controlling behaviour to perceived need thwarting were specified. In the first alternative model, only direct paths from perceived need thwarting to anger and from anger to bullying were specified, whereas in the second alternative model only direct paths from perceived need thwarting to bullying and from bullying to anger were specified. Results of the both alternative models exhibited acceptable fit to the data [$\chi^2(239) = 705.12$, CFI = .96, NFI = .95, NNFI = .96, RMSEA = .057, CI₉₀ for RMSEA range = .052–.062 and $\chi^2(239) = 745.93$, CFI = .96, NFI = .94, NNFI = .96, RMSEA = .060, CI₉₀ for RMSEA range = .055–.064 for the first and second alternative model, respectively]. The model AIC was 828.33, 827.12, and 867.93 for the hypothesized model, first alternative model, and second alternative model, respectively. According to the Rigdon (1999), lower model AIC values indicate a better fit. Although the model AIC values for hypothesized model and first alternative model were almost identical, the hypothesized model was deemed to be the best fitted model as it included also a direct path from perceived need thwarting to bullying representing thus better the real life situation.

Table 3

Factor loadings and residuals following confirmatory factor analyses for the need thwarting subscales.

Subscale and items	Factor loading	Residual
Need thwarting for autonomy		
I feel prevented from making choices as to how I exercise	.84	.29
I feel pushed to behave in certain ways	.90	.19
I feel obliged to follow exercise decisions made for me	.40	.84
<i>I feel under the pressure to agree with the exercises designed for me</i>		
Need thwarting for competence		
There are occasions where I feel incompetent because others impose unrealistic expectations upon me	.79	.37
There are times when I am told things that make me feel incompetent	.83	.32
There are situations where I am made to feel inadequate	.67	.55
I feel inadequate because I am not given opportunities to fulfil my potential	.69	.52
Need thwarting for relatedness		
I feel I am rejected by those around me	.87	.25
I feel others can be dismissive of me	.88	.22
I feel other students dislike me	.85	.27
I feel some of the students around me are envious when I achieve success	.38	.85

Note. All factor loadings are statistically significant ($p < .05$). Item in italics were removed due to low factor loading.

Discussion

The purpose of this study was to investigate whether the perceptions of physical education teachers' controlling behaviours by students were related to students' perceived psychological need thwarting, feelings of anger, and bullying behaviour. Based on self-determination theory, we hypothesised that the different dimensions of perceived controlling behaviours of teachers would be related to maladaptive outcomes of anger and bullying mediated by perceived thwarting of psychological needs.

Prior to testing hypotheses, we needed to confirm the validity of the psychological measures constructs adapted for use with the current Estonian sample and in a physical education context. Three scales measuring the multidimensional aspects of controlling behaviours (CCBS; Bartholomew et al., 2010), psychological needs thwarting (PNTS; Bartholomew, Ntoumanis, Ryan, Bosch, et al., 2011; Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011; Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2011), and the feelings of anger and bullying behaviour (MAS; Bosworth et al., 1999) were subjected to CFA to confirm their construct and discriminant validity. In each case, the analyses revealed acceptable psychometric properties and each factor was adequately explained by its respective set of indicator items. The only exception was the CFA of the adapted version of the PNTS (Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011) which led to a deletion of one item from the perceived need thwarting for autonomy subscale ("I feel under the pressure to agree with the exercises designed for me") that was removed due to low factor loading. In Estonia, individual design for exercise is not a common practice among PE teachers given the curriculum requirements so future studies may consider rewording the item to refer to designing activities for the class (e.g., "... exercises designed for the class"). This item aside, the analysis supported the construct validity of the scale.

Focusing on the main hypotheses of the study, our structural equation model revealed that different dimensions of perceived controlling behaviours of the physical education teacher were positively related to students' perceived need thwarting. This was in keeping with our original hypothesis. However, the proposed relations were confirmed for only two of the dimensions (intimidation and negative conditional regard) with no unique effects for the others (controlling use of praise and extrinsic reward and excessive controlling behaviour). These findings suggest that the more students reported that their teachers used intimidation (e.g., verbal abuse, shouting, physical punishment, humiliating and belittling behaviour, and personal attacks) when communicating with the class, the more they felt that their basic psychological needs were thwarted.

Table 4

Factor loadings and residuals following confirmatory factor analyses for the modified aggression scale.

Subscale and items	Factor loading	Residual
Bullying		
I pushed, shoved, slapped, or kicked other students	.79	.38
I called other students names	.81	.34
I said things about other students to make other students laugh	.66	.57
I teased other students	.86	.26
I threatened to hit or hurt another student	.82	.33
Anger		
I was angry most of the day	.78	.39
I was grouchy or irritable, or in a bad mood, so even little things made me mad	.80	.36
I frequently got angry	.91	.17
I took my anger out on an innocent person	.77	.40

Note. All factor loadings are statistically significant ($p < .05$).

Table 5

Fit indices for confirmatory factor analyses and structural equation models.

Models	S-B χ^2	d.f.	CFI	NNFI	NFI	RMSEA	CI ₉₅ RMSEA
Model 1	174.52	48	0.98	0.98	0.99	0.066	0.056–0.077
Model 2	318.75	54	0.96	0.95	0.95	0.091	0.081–0.160
Model 3	143.08	41	0.98	0.98	0.98	0.064	0.053–0.076
Model 4	882.36	44	0.85	0.82	0.85	0.178	0.180–0.190
Model 5	91.51	26	0.99	0.98	0.98	0.065	0.051–0.079
Model 6	452.52	27	0.92	0.90	0.92	0.160	0.150–0.180
Model 7	477.49	231	0.99	0.98	0.97	0.042	0.037–0.047
Model 8	704.33	238	0.96	0.96	0.95	0.057	0.052–0.062

Note. Model 1 = discriminant validity of modified CCBS with four factors and 12 items; Model 2 = congeneric model with 12 items; Model 3 = discriminant validity of modified PNTS with three factors and 11 items; Model 4 = congeneric model with 11 items; Model 5 = discriminant validity of Modified Aggression Scales with two factors and 9 items; Model 6 = congeneric model with 9 items; Model 7 = Measurement model with all study variable; Model 8 = Hypothesised structural equation model.

Further, if the students were more likely to report that their teachers used negative conditional regard (e.g., focusing less on student when he or she is struggling or offering no attention, affection, and support when the student is not behaving as asked), their perceptions of basic psychological needs were also more likely to be more thwarted. This is, to some extent, consistent with findings of [Blanchard, Amiot, Perreault, Vallerand, and Provencher \(2009\)](#) who demonstrated that coaches' controlling behaviour measured by unidimensional scale were negatively related to the satisfaction of the need for autonomy.

In addition, [Bartholomew et al. \(2009\)](#) argued that some of the controlling motivational strategies could be more damaging to young athletes' psychological well-being than others. They suggested that controlling motivational strategies such as intimidation, negative conditional regard and guilt-induction will have stronger negative relationships with athlete well-being, compared to strategies such as the use of extrinsic rewards. Our findings are consistent with these proposals. That perceived intimidation and negative conditional regard in the present study are the most damaging behaviours to well-being is not surprising as previous research on parents has demonstrated these types of behaviours are associated with severe negative effects on the well-being of those subjected to them as well as serious forms of psychological ill-being (e.g., Hewitt & Flett, 1991). To the best of our knowledge, however, this is the first study that has examined these effects in physical education teachers.

The student perceptions that their physical education teachers' used excessive controlling behaviour and controlling use of praise and extrinsic rewards did not have a uniquely significant relationship with students' perceived basic psychological need thwarting. There are several possible reasons for these non-significant effects. First, the nature of the teacher–student interaction in the latter types of controlling behaviours is less blatantly negative relative to the effects of the intimidation and negative conditional regard behaviours ([Bartholomew et al., 2009](#)). Second, physical education as a subject is consistently rated by students as one of the most popular subjects in school, while its perceived importance relative to other 'academic' subjects (e.g., mathematics, science, languages) is rated much lower ([Ormerod, 1975; Stables & Wikeley, 1997](#)). One may argue, therefore, when the physical education teachers pressure students to prioritise physical education over other 'academic' subjects, the pressure is not taken particularly seriously. The same might be true with physical education teachers' attempts to control students' behaviour by promising to reward them if they engage in the tasks he or she has set them. Consequently, although perceived incidence of these behaviours was relatively high (e.g., the mean score of the controlling use of praise and extrinsic rewards was above the midpoint of the scale; see [Table 1](#)), it is fairly understandable why the controlling use of praise and extrinsic rewards, as well as the use of excessive controlling behaviour, were not substantially related to students' perceived psychological need thwarting in physical education compared with teachers' intimidation and negative conditional regard.

Significant indirect effects from perceived negative conditional regard and intimidation on students' anger and bullying behaviour were found via the mediation of perceived need thwarting. It is noteworthy that the indirect effects of perceived negative conditional regard and intimidation on anger were stronger than for the indirect effects on bullying. In general,

Table 6

Indirect effects of teachers' controlling behaviour on students' aggression behaviour.

Independent variables	Mediating variables	Predicted variables	Indirect effects (95% CI)
Negative conditional regard	Need thwarting	Anger	.16* (.02; .29)
	Need thwarting; Anger	Bullying	.08* (.00; .16)
Controlling use of praise and extrinsic rewards	Need thwarting	Anger	NS
	Need thwarting; Anger	Bullying	NS
Intimidation	Need thwarting	Anger	.15* (.01; .29)
	Need thwarting; Anger	Bullying	.07* (.01; .13)
Excessive controlling behaviour	Need thwarting	Anger	NS
	Need thwarting; Anger	Bullying	NS
Need thwarting	Anger	Bullying	.19** (.13; .25)

Note. * $p < .05$. ** $p < .01$.

results confirmed our second hypothesis that students' perceptions of controlling behaviours used by their teacher were indirectly related with anger and bullying via perceived need thwarting. This finding also supports one of the main tenets of [Deci and Ryan's \(2000\)](#) SDT that the relationship between social factors such as perceived teacher's controlling behaviour and students' affective and behavioural outcomes such as feelings of anger and aggressive behaviour will be mediated by the satisfaction or dissatisfaction of the basic psychological needs for autonomy, competence, and relatedness. This finding is also consistent with previous results that indicated the role of the need thwarting as the mediator between the relationship of job pressure and burnout among physical education teachers ([Bartholomew et al., 2014](#)).

The proposed model showed that the anger was strongly related to bullying behaviour. This finding supports hypotheses proposed by [Dodge \(1991\)](#) and [Price and Dodge \(1989\)](#) who view anger as precursor of aggressive behaviour. Our specified alternative models further supported the view that feelings of anger is a precursor of students' bullying behaviour.

We contend that the statistically significant relationship between perceived need thwarting and bullying behaviour that was completely mediated by anger (i.e., a significant indirect effect with no direct effect) suggests that disaffection in terms of one's basic need satisfaction in physical education may be related to the feelings of anger, which in turn, are linked to aggressive behaviour toward other students. This indicates that negative emotional responses are implicated in the process by which perceived need thwarting impacts on aggression. This is consistent with hypotheses from a number of theories relevant to the current research. According to SDT, need thwarting is not only related to changes in motivational orientations toward particular behaviours but also maladaptive outcomes including emotional responses, such as frustration and, at times, anger. Whether or not perceived basic need thwarting in physical education will result in feelings of anger may depend on the importance students attach to physical education, as discussed earlier. Similarly, in frustration-aggression theory (Dollard), frustration and anger evoked by frustration of goal may lead to aggression, including aggression directed at targets that were not the original source of the aggression. Together, these hypotheses indicate that the interplay between perceived need thwarting and aggression may reflect a key process by which organismic needs explain the subsequent behaviour.

Limitations

Although the present study provided some unique findings for the relationship between students' perceptions of their physical education teachers' use of controlling behaviour and students' aggressive behaviour, there are also some limitations that must be acknowledged. First, the sample used in this study should be considered as the convenience sample that may not be representative of the student population in Estonia. Future studies should focus on randomly selected, stratified samples to permit better inference of findings to the population. The second limitation was that the data only permitted us to determine individual- and school-level variance, but not class-level variance in behaviour. Researchers should, therefore, consider collecting full data at the individual, class, and school levels in order to test all possible sources of variance in the prediction of the psychological variables in the model tested in the current study. Third, the data from the present study were based entirely on students' self-reports. Although, the cautious should be exercised when interpreting self-reports of students, researchers (e.g., [Anderson & Walberg, 1974](#); [Fraser, 1989](#); [Scriven, 1988](#)) have claimed that students' subjective ratings about learning environment as well as teacher's behaviours and about themselves are comparatively valid. Fourth, the data are correlational in nature, which precludes the inference of causality. The possibility still remains that students' who engage in bullying behaviour themselves may feel anger and consequently perceive their teacher to exhibit higher degrees of controlling behaviours. It is also possible that angry, aggressive adolescents are more sensitive to basic psychological needs not being met. Future research would do well to explore the role that feelings of anger play in the motivational sequence proposed in SDT. It is also possible that examining the relations between other psychological variables such as global or physical self-esteem and bullying behaviour may give more useful information. These possible alternatives could be tested in future research by adopting a cross-lagged panel design measuring the psychological antecedents of bullying behaviour and self-reported bullying behaviour and anger at two points in time and analysing for reciprocal relations between the variables over time. Another direction of future research would be to examine the role of observed actual controlling teaching behaviours in physical education on corresponding perceived controlling teaching behaviours and maladaptive affective and behavioural outcomes such as feelings of anger and bullying behaviour ([De Meyer et al., 2014](#)).

Overall, findings of the present study are unique because they provide additional empirical support for the role of perceived psychological need thwarting in SDT's theoretical account of the darker sides of human existence and enable a better understanding of the processes related to aggressive behaviour in school students. In terms of implications for school practice the model will help the physical education teachers to better understand how perceptions of their controlling behaviour are related with students' perceived need thwarting and how this is related with negative affective and behavioural outcomes. Based on the findings of the present study, physical education teachers should be encouraged to avoid intimidating and guilt-inducing behaviours in their lessons as these kinds of behaviours are related to the students' experience that their basic psychological needs are thwarted. The controlling types of behaviours are also related to feelings of anger and bullying behaviour toward others, both of which are aversive and maladaptive outcomes for the students. Although the results of the present study did not demonstrate the unique, statistically significant effects of over-intrusive behaviour (i.e., excessive controlling behaviour) and controlling use of praise and extrinsic rewards on students' basic psychological need satisfaction, the positive, statistically significant correlations between these dimensions and students' perceived need thwarting suggest that physical education teachers should also avoid these types of behaviours when communicating with their students.

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Health behaviours in emerging adulthood: Their relationship with perceived maternal and paternal parental attitudes and the mediating role of self-efficacy

BACKGROUND

The present research examined the mediating role of self-efficacy in the association between perceived maternal and paternal parental attitudes and health behaviours of males and females in emerging adulthood. Parental attitudes shape children's self-esteem, positive self-image, and self-competence. This may affect their physical health and health behaviours throughout their lives.

PARTICIPANTS AND PROCEDURE

A total of 147 (mean age: 19.70, $SD = 0.85$, 68.7% females) participants took part in the study. They completed several questionnaires measuring health behaviours, perceived parental attitudes, and self-efficacy: the *Inventory of Health Behaviours*, the *Retrospective Assessment of Parental Attitude*, and the *General Self-Efficacy Scale*.

RESULTS

We found that that female participants exhibited healthier eating habits but lower self-efficacy than male partic-

ipants did. Accepting and autonomy granting maternal and paternal parental attitudes predicted a positive health attitude (of both male and female participants), preventive behaviours (of male participants), and healthy eating habits (of male participants). As predicted, emerging adults' self-efficacy mediated the relationship between their health behaviours and perceived parental attitudes. However, the mediation patterns were different for female and male participants.

CONCLUSIONS

The quality of perceived parental attitudes and self-efficacy are important for health-related lifestyle choices among emerging adults. Mothers and fathers may play different roles in the formation of health behaviours.

KEY WORDS

parental attitudes; health behaviours; self-efficacy; emerging adulthood

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AUTHORS' CONTRIBUTIONS – A: Study design · B: Data collection · C: Statistical analysis · D: Data interpretation · E: Manuscript preparation · F: Literature search · G: Funds collection

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BACKGROUND

Research on emerging adulthood, though still scarce, suggests that this period in life involves many health risk factors due to a modern, Western culture lifestyle (Janssen, Katzmarzyk, Boyce, King, & Pickett, 2004) and age-typical tendencies to engage in risk behaviours (Furstenberg, 2006; Kessler, Mickelson, Waltes, Zhao, & Hamilton, 2004; National Survey on Drug Use and Health, 2011). Preliminary studies indicate family and cognition as predictors of health outcomes in emerging adults (Donnelly, Renk, & McKinney, 2013).

In the last decades, new trends in the behaviour of young people aged 18-25 years have emerged in highly developed societies. The time in which young adults undertake tasks typical of adulthood, such as marriage, parenthood, or permanent employment, has been delayed (Crogetti, Scignaro, Sica, & Magrin, 2012). This specific time of transition between adolescence and full adulthood is called emerging adulthood (Arnett, 2000), an age of possibilities, self-focus, and active testing of alternatives, especially concerning professional and romantic life (Arnett, 2004). Focused on their own development, emerging adults better understand who they are and what they want in life, and formulate their own plans for adulthood, which they constantly revise. This intense exploration and the accompanying instability are also connected with the process of identity exploration, which started in adolescence. Therefore, emerging adults experience a feeling of in-between adolescence and adulthood. Their lack of a sense of full adulthood results from not performing fully its three main challenges: independent decisions, accepting responsibility for them, and financial independence. The responsibility for these challenges is often co-shared by parents, though paradoxically, emerging adults usually already function beyond their direct control (Piotrowski, Brzezińska, & Pietrzak, 2013). Freed from duties typical for adults, yet before making final commitments, they intensively test various possibilities, which can be a quite stressful and demanding process (Arnett, 2013). Diminished parental control and busy lifestyle typical of this period could, therefore, have implications for the health behaviours of emerging adults.

Health behaviours are personal, conscious actions that directly or indirectly affect the state of one's health. They are purposeful, related to one's lifestyle and daily habits (e.g. amount of sleep, eating habits, physical activity, amount of consumed alcohol, and using psychoactive substances). These behaviours may be either positive or negative (Woynarowska, 2010). Decisions regarding health behaviours are based on both objective knowledge about the factors that determine health or disease and on subjective beliefs about them (Sek, 2000). For instance, attitudes

towards health behaviours may depend on gender and different gender socialisation processes among boys and girls, e.g. eating healthy food and dieting are considered by some men as feminine, not masculine behaviours, and are therefore rejected (El Ansari, Suominen, & Samara, 2015; Wardle et al., 2004).

Undoubtedly, parents are important agents in the process of acquiring and shaping health behaviours. They apply different health practices while caring for a child (e.g. regarding quality and frequency of meals, sleep duration and sleep habits, amount of time spent watching TV), and when a child's cognitive and motor development progress, they provide instruction and training on health practices (Ray, Kalland, Lehto, & Roos, 2013). Subsequently, adolescence is a critical moment to consolidate the habits and attitudes towards health activities (Woynarowska, 2010; Wojtczak, 2009). In the period of emerging adulthood, when young people achieve considerable autonomy (Arnett, 2004; Shanahan, 2000), they gradually assume full responsibility for their life, including their own health and the health of others, e.g. of aging parents (Weiner, Roloff, & Pusateri, 2014). They start to use diverse health practices on their own, including possibly those demonstrated and/or promoted by their parents. Therefore, the behaviour and attitudes of parents can be of great importance for the quality of health of emerging adults (Kanter-Agliata & Renk, 2009; Niemeier, Duan, Shang, & Yang, 2017).

The impact of positive parental health practices on favourable health behaviours of the child is strengthened by parental attitudes of warmth and responsiveness (Ray et al., 2013). Parental attitudes determine the way in which parents build relationships with their children, and how they react in certain parenting situations (Lipowska, Lipowski, & Pawlicka, 2016). Studies indicate that parental attitudes influence the psychological development of children and adolescents and their ability to adapt and function properly. Parents are the first and most important source of emotional support, but also of self-knowledge and self-acceptance. Positive parental attitudes shape children's self-esteem, positive self-image, and self-competence (Lord, Eccles, & McCarthy, 1994; Wissink, Dekovic, & Meijer, 2006), which affect their mental and physical health (Donnelly et al., 2013; Trzesniewski et al., 2006). For instance, children of warm, accepting, and sensitive parents eat more fruit and vegetables (Kremers, Bridge, de Vries, & Engels, 2003; Lytle et al., 2003) and are less likely to use alcohol during adolescence (Kuendig & Kuntsche, 2006; van der Vorst, Engels, Meeus, & Dekovic, 2006). However, children of parents not involved in parenting, emotionally cold, and/or too controlling, regardless of their age, struggle with multiple health issues. For example, a controlling attitude adversely affects the adaptation of children with diabetes to their disease and lowers their treatment effectiveness (Butler, Skin-

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ner, Gelfand, Berg, & Wiebe, 2007), and increases the likelihood of adolescents engaging in activities which worsen their health (Helgeson et al., 2013). An over-protective attitude contributes to female weight control difficulties (Turner, Rose, & Cooper, 2005). Uninvolved parenting impacts greater weight fluctuations in a short-term period, higher body weight (Goldschmidt, Wall, & Zhang 2016; Thomas, Hypponen, & Power, 2008), and higher level of risk behaviours in adolescents (Nelson, Padilla-Walker, & Nielson, 2015), as well as many serious health conditions (e.g. cardiovascular disease, hypertension, duodenal ulcer, and alcoholism) (Russek & Schwartz, 1997), anxieties (Wolfradt, Hempel, & Miles, 2003), and a tendency to abuse alcohol and drugs (Joyce et al., 1994) in adults.

The above examples demonstrate that parental attitudes may influence health behaviours of emerging adults (Bradley-Geist & Olson-Buchanan, 2014). The literature also indicates the role of the sense of self-efficacy in the health aspects of emerging adulthood.

The sense of self-efficacy refers to one's beliefs about one's effectiveness in dealing with task completion. In other words, it is a personal belief in one's ability to plan, organise, control, and implement a purposeful action (Bandura, 1997). The conviction of how well you can cope with the task determines the amount of effort that you invest in starting and continuing an action and persistence in overcoming potential difficulties on the way to your goal (Luszczynska & Schwarzer, 2005; Schwarzer, 2008). Beliefs about one's self-efficacy are formed in childhood and adolescence under the influence of one's own experiences (mastery experiences), observing the actions of important persons (vicarious experiences/modelling) or feedback given about us (verbal persuasion) (Bandura, 1993, 1997). Therefore, parents play a key role in the emergence of self-efficacy. The parental attitude that guarantees acceptance, encouragement to become independent, and open communication (Bong, 2008; Pomerantz & Eaton, 2001) is of great importance for positive development of self-efficacy. Adolescents who perceive their parents as warm, dedicated, and allowing for an age-appropriate level of autonomy and independence manifest higher levels of self-efficacy than their peers who evaluate their parents less favourably (Ingoldsby, Schvaneveldt, Supple, & Bush, 2004). Nidith and Varela (2012) reported that a rejecting maternal (but not paternal) attitude predicted low self-efficacy, which mediated the relationship between maternal rejecting attitude and an increased level of anxiety in teenagers. Many other studies also point to the negative impact of a maternal overprotective attitude on children's self-efficacy (Bradley-Geist et al., 2014), excessive dependence on others, and higher levels of neuroticism (Odenweller, Booth-Butterfield, & Weber, 2014). As self-efficacy is essential to achieve the objectives (Frydenberg & Lewis, 2009), it also affects the persistence and effective coping with

situations involving health. Self-efficacy, therefore, affects the quality of self-care and healthy lifestyle behaviours (Binay & Yiğit, 2016; Zhou, Sun, Knoll, Hamilton, & Schwarzer, 2015), including, for example, regular exercise (Dishman et al., 2004; Dwyer et al., 2012; Wienert, Kuhlmann, & Lippke, 2015), preventive behaviours (Schwarzer & Renner, 2000), or perseverance in coping with the effects of chronic diseases (Berg et al., 2011; Helgeson, Honcharuk, Becker, Escobar, & Siminerio, 2011).

PARTICIPANTS AND PROCEDURE

THE AIM OF THE RESEARCH

In our study, we were interested in investigating health behaviours of emerging adults because this population is (a) still in the process of embracing their independent self-care and health practices, while yet not fully accepting all responsibilities for their actions and well-being, and (b) they become more vulnerable to the modern lifestyle health-related risks than earlier in their childhood and adolescence (Janssen et al., 2004). Primarily, we were wondering if there are any gender differences in health behaviour of emerging adults because previous research indicates that gender stereotypes may contribute to health-related behaviours (Wardle et al., 2004). Furthermore, as preliminary studies indicate family and cognition as predictors of health outcomes (Donnelly et al., 2013), we examined if they are associated with how female and male emerging adults perceive their parents' parental attitudes, and if this relationship is mediated by emerging adults' self-efficacy.

We assumed that females might be more concerned about maintaining health behaviours (H1). Moreover, we hypothesised that parental attitudes influence health behaviours and self-efficacy of male and female emerging adults (H2). Specifically, we assumed that accepting and autonomy granting parental attitudes predict positive health behaviours, whereas demanding and overprotecting attitudes predict negative ones (H3); self-efficacy is positively and significantly associated with positive health behaviours (H4); and self-efficacy mediates the relationship between parental attitudes and health behaviours (H5). To our knowledge, this is the first study that directly measures the mediating role of self-efficacy between health behaviours and perceived parental attitudes of parents of the same and opposite gender in female and male emerging adults.

METHODS

In total, 101 (68.7%) female and 46 (31.3%) male social sciences university students in emerging adulthood

(between 19 and 24 years old, matched between genders; *mean age for females* = 19.65 years, *SD* = 0.82, *mean age for males* = 19.8 years, *SD* = 0.91, ($t(145) = 1.00$, $p = .318$) participated. A general health survey that we developed for the study indicated that 36 (78.3%) males and 86 (85.1%) females regarded themselves as being a generally healthy person. However, 17 (37.0%) males and 33 (32.7%) females declared suffering from a chronic illness, 10 (21.7%) males and six (5.9%) females reported having a disability, and 15 (32.6%) males and 36 (35.6%) females took over-the-counter and/or prescription drugs regularly. Moreover, 33 (71.1%) males and 61 (60.4%) females reported that a close relative/best friend suffered from a serious illness, and 23 (50.0%) males and 52 (51.5%) females lost a close relative/best friend to illness, or their close relatives/best friends became disabled as a result of health negligence. After providing verbal consent, each respondent completed a set of self-reporting questionnaires designed to evaluate health behaviours, perceived parental attitudes, and self-efficacy.

The *Inventory of Health Behaviours* (Juczynski, 2009) consists of 24 statements describing health-related behaviours: correct eating habits (e.g. eating fruit, vegetables, and wholegrain products), preventive behaviours (following health recommendations and seeking information about maintaining good health), a positive mental attitude (maintaining psychological well-being by avoiding stress, difficult emotions, or woeful situations), and health practices (daily basis activities that impact overall health outcomes like sleeping habits, leisure, and physical activity). The overall intensity and the intensity of each category of health-related behaviours is evaluated on the basis of their self-reported frequency, rated on a five-point scale, where 1 means almost never, and 5 means almost always. The higher the value for the general index and for the four factors, the higher the level of the declared health behaviour (*min* = 24, *max* = 120 points). Test reliability is: .85 for the total score and from .6 to .65 for the four subscales.

Retrospective Assessment of Parental Attitudes (Plopa, 2008) consists of two separate, 50-statement questionnaires to assess parental attitudes of a father and a mother. The respondent rates the statements using a five-point scale ranging from “she (he) was definitely like that and behaved this way” to “she (he) was definitely not like that and did not behave this way”. The tool allows for a retrospective evaluation of five parental attitudes: accepting, demanding, autonomy granting, inconsequential, and overprotective. A higher score indicates higher intensity of a specific parental attitude. High score in (a), the accepting attitude, represents a close emotional relationship between a parent and a child, the parent likes the child as he or she is, supports and cares for him/her, allows for open, two-way communication with the child. High score

in (b), the demanding attitude, represents a parent who is cold, aloof, and controlling. The parent expects a lot from the child, while ignoring his or her capabilities, preferences, and developmental needs. The parent does not allow for two-way communication with the child and requires total obedience. High score in (c), the autonomy granting attitude, represents a parent who respects and supports the child’s emerging need for independence and separation from a parent who behaves flexibly and takes into account the developmental needs of the child. High score in (d), the inconsequential attitude, represents a parent whose behaviours are changeable, often unpredictable and extreme, which often leads to the child’s withdrawal from the relationship with the parent. High score in (e), the overprotecting attitude, represents a parent who sees their child as helpless, feels a constant urge to care excessively for the child, and engage in all his or her spheres of life, ignoring the child’s need for autonomy and independence. Test reliability is from .93 to .86 for the maternal scale, and from .90 to .84 for the paternal scale.

The *General Self-Efficacy Scale* (Schwarzer & Jerusalem, 1995) consists of 10 statements constituting a single factor – self-efficacy. The higher the score, the greater the belief in one’s effectiveness to cope with difficult situations and obstacles. The internal reliability for the scale (Cronbach’s α) is between .76 and .90.

RESULTS

DIFFERENCES IN HEALTH BEHAVIOURS, PERCEIVED PARENTAL ATTITUDES, AND SELF-EFFICACY BETWEEN MALE AND FEMALE EMERGING ADULTS

The Mann-Whitney *U* test for independent samples (Table 1) showed that females (*Mdn* = 20) exhibited more healthy eating habits as compared to males (*Mdn* = 18; $U = 1589.5$, $Z = 3.07$, $p = .002$, $r = .25$), but lower self-efficacy (*Mdn* = 30 for females, *Mdn* = 32 for males; $U = 1375.5$, $Z = 2.45$, $p = .014$, $r = .20$). Male and female participants did not differ in other aspects of health behaviours (preventive behaviours, positive mental attitude, and health practices) or how they retrospectively assessed their mothers’ and fathers’ parental attitudes.

CORRELATIONS BETWEEN VARIABLES

In order to examine the relationship between health behaviours, the retrospective assessment of parental attitudes (mother’s and father’s accepting, demanding, autonomy granting, inconsequential, and overprotective attitudes), and self-efficacy in male and

Table 1

Descriptive characteristic of the compared groups: health behaviours, retrospective assessment of parental attitudes, and self-efficacy

	Inventory of Health Behaviours		
	Males	Females	
Anna Maria Jankowska, Marta Łockiewicz, Dorota Dykalska-Bieck, Ariadna Łada, Weronika Owoc, Dawid Stańczykowski	Healthy eating habits	<i>Mdn</i> = 18	<i>Mdn</i> = 20 $U = 1589.5, Z = 3.07, p = .002, r = .25$
	Preventive behaviours	<i>Mdn</i> = 17	<i>Mdn</i> = 18 $U = 1954, Z = 1.55, p = .122, r = .13$
	Positive mental attitude	<i>Mdn</i> = 20	<i>Mdn</i> = 19 $U = 2240.5, Z = 0.35, p = .730, r = .03$
	Health practices	<i>Mdn</i> = 20	<i>Mdn</i> = 19 $U = 2102, Z = 0.93, p = .354, r = .08$
	Total score	<i>Mdn</i> = 74.5	<i>Mdn</i> = 77 $U = 2102, Z = 0.93, p = .354, r = .08$
Retrospective Assessment of Parental Attitudes			
Mother's attitude			
	Accepting	<i>Mdn</i> = 39.5	<i>Mdn</i> = 40 $U = 2212, Z = 0.464, p = .642, r = .04$
	Demanding	<i>Mdn</i> = 28	<i>Mdn</i> = 25 $U = 2007, Z = 1.321, p = .186, r = .11$
	Autonomy granting	<i>Mdn</i> = 40	<i>Mdn</i> = 39 $U = 2167.5, Z = 0.650, p = .515, r = .05$
	Inconsequent	<i>Mdn</i> = 26	<i>Mdn</i> = 23 $U = 2096, Z = 0.949, p = .343, r = .08$
	Overprotective	<i>Mdn</i> = 36.5	<i>Mdn</i> = 36 $U = 2172.5, Z = 0.630, p = .592, r = .05$
Father's attitude			
	Accepting	<i>Mdn</i> = 34	<i>Mdn</i> = 36 $U = 1968, Z = 0.190, p = .850, r = .02$
	Demanding	<i>Mdn</i> = 29	<i>Mdn</i> = 27 $U = 1810, Z = 0.920, p = .358, r = .08$
	Autonomy granting	<i>Mdn</i> = 37	<i>Mdn</i> = 37 $U = 1988.5, Z = 0.095, p = .924, r = .01$
	Inconsequent	<i>Mdn</i> = 29	<i>Mdn</i> = 26 $U = 1804, Z = 0.947, p = .343, r = .08$
	Overprotective	<i>Mdn</i> = 25.5	<i>Mdn</i> = 25 $U = 1991, Z = 0.081, p = .936, r = .01$
General Self-Efficacy Scale			
	Self-efficacy	<i>Mdn</i> = 32	<i>Mdn</i> = 30 $U = 1737.5, Z = 2.45, p = .014, r = .20$

Table 2

Correlations between health behaviours, the retrospective assessment of parental attitudes and self-efficacy in emerging adults

	Healthy eating habits		Preventive behaviours		Positive mental attitude		Health practices		Self-efficacy	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Mother's attitude										
Accepting						.22			.32*	
Autonomy granting						.22			.30	.28*
Inconsequent						-.20	-.36		-.24	
Father's attitude										
Accepting	.37		.37		.53*	.32*				
Demanding			-.37							
Autonomy granting			.48*		.44*	.28*				
Inconsequent			-.32			-.29*				
Self-efficacy	.46*	.26*		.27*	.48*	.42*				

Note. All marked correlations are significant at $p \leq .01$ level. All unmarked correlations are significant at $p \leq .05$ level. Only significant correlations are included.

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female emerging adults, we calculated Spearman's rho correlations (Table 2).

HEALTH BEHAVIOURS AND THE RETROSPECTIVE ASSESSMENT OF MATERNAL PARENTAL ATTITUDES

We found that in female participants, positive mental attitude was weakly correlated with accepting, autonomy granting (positively), and inconsequent attitudes (negatively). In male participants, maternal inconsequence was moderately negatively correlated with health practices.

HEALTH BEHAVIOURS AND THE RETROSPECTIVE ASSESSMENT OF PATERNAL PARENTAL ATTITUDES

We found that in female participants, positive mental attitude was moderately correlated with accepting, and weakly with autonomy granting (positively), and inconsequent (negatively) attitude. In male participants, preventive behaviours were moderately correlated with accepting, autonomy granting (positively), and demanding and inconsequent (negatively) attitude. Positive mental attitude was strongly correlated with accepting (positively) and moderately with autonomy granting (positively) attitude, and healthy eating habits moderately with accepting attitude.

HEALTH BEHAVIOURS AND SELF-EFFICACY

We found that in female students, self-efficacy was correlated positively with healthy eating habits, preventive behaviours (weakly), and positive mental attitude (moderately). In male students, self-efficacy was correlated positively with healthy eating habits and positive mental attitude (moderately).

SELF-EFFICACY AND THE RETROSPECTIVE ASSESSMENT OF PARENTAL ATTITUDES

We found that in female students, self-efficacy was moderately correlated with the mother's accepting (positively) attitude, and weakly with the mother's autonomy granting (positively) and inconsequence (negatively). In male students, self-efficacy was moderately correlated with the mother's autonomy granting (positively) attitude. No correlation was found between self-efficacy and the retrospective assessment of paternal attitudes.

REGRESSION

In female participants positive mental attitude was influenced by maternal accepting [$B = .08$ (.04), $p = .040$, $R^2 = .04$, $F(1, 96) = 4.33$] and autonomy granting [$B = .10$ (.05), $p = .037$, $R^2 = .04$, $F(1, 99) = 4.49$], but not inconsequent attitude [$B = -.07$ (.04), $p = .073$, $R^2 = .03$, $F(1, 99) = 3.27$], and by paternal accepting

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[$B = .10$ (.03), $p = .002$, $R^2 = .09$, $F(1, 96) = 9.65$], autonomy granting [$B = .11$ (.04), $p = .008$, $R^2 = .07$, $F(1, 96) = 7.40$], and inconsequent attitude [$B = -.12$ (.04), $p = .001$, $R^2 = .10$, $F(1, 96) = 10.99$].

In male participants, health practices were predicted by maternal inconsequent attitude [$B = -.13$ (.06), $p = .032$, $R^2 = .10$, $F(1, 44) = 4.91$]. Preventive behaviours were influenced positively by paternal accepting attitude [$B = .16$ (.07), $p = .027$, $R^2 = .12$, $F(1, 39) = 5.30$] and paternal autonomy granting attitude [$B = .18$ (.07), $p = .019$, $R^2 = .13$, $F(1, 39) = 6.00$], and negatively by paternal demanding attitude [$B = -.14$ (.07), $p = .048$, $R^2 = .10$, $F(1, 39) = 4.19$], but not inconsequent attitude [$B = -.11$ (.07), $p = .089$, $R^2 = .07$, $F(1, 39) = 3.04$]. Positive mental attitude was predicted by paternal accepting [$B = .29$ (.08), $p = .001$, $R^2 = .23$, $F(1, 39) = 11.88$] and autonomy granting attitude [$B = .18$ (.09), $p = .055$, $R^2 = .09$, $F(1, 39) = 3.93$]. Healthy eating habits were influenced by paternal accepting attitude [$B = .19$ (.09), $p = .036$, $R^2 = .11$, $F(1, 39) = 4.71$].

MEDIATION

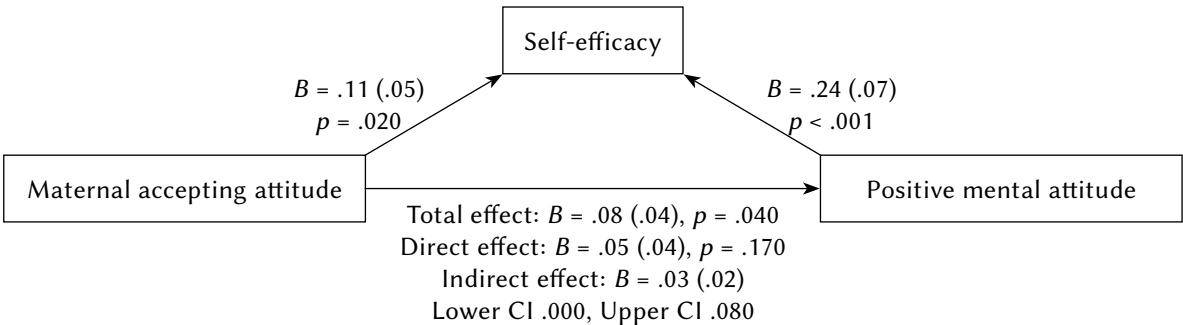
To test the hypothesis that the relationship between the retrospective assessment of parental attitudes (mother's and father's accepting, demanding, autonomy granting, inconsequent, and overprotective atti-

tude) and health behaviours is mediated by self-efficacy, we calculated a PROCESS (model 4; by Hayes, 2013) mediation analysis with bootstrap resamples.

In female participants, maternal accepting attitude was indirectly linked to a positive mental attitude. The participants who felt that their mother's attitude was more accepting reported higher self-efficacy ($a = .11$), which was linked to a higher positive mental attitude ($b = .24$). Adjusted confidence intervals for an indirect effect ($ab = .03$) based on 5000 bootstrap resamples were above zero (from .000 to .080). However, there was no direct effect of the impact of maternal accepting attitude on a positive mental attitude of the female emerging adults ($c' = .05$, $p = .170$).

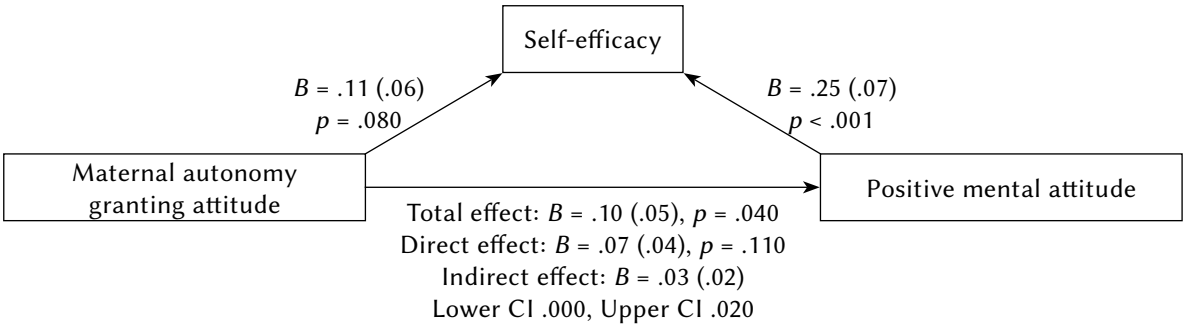
In female participants, maternal autonomy granting attitude was indirectly linked to a positive mental attitude. The participants who felt that their mothers supported and accepted their autonomy reported higher self-efficacy ($a = .11$), which was linked to a higher positive mental attitude ($b = .25$). Adjusted confidence intervals for an indirect effect ($ab = .03$) based on 5000 bootstrap resamples were above zero (from .000 to .020). However, there was no direct effect of the impact of maternal acceptance/rejection on a positive mental attitude of the female emerging adults ($c' = .07$, $p = .110$).

In male participants, paternal accepting attitude was indirectly linked to a positive mental attitude. The participants who felt their fathers' acceptance



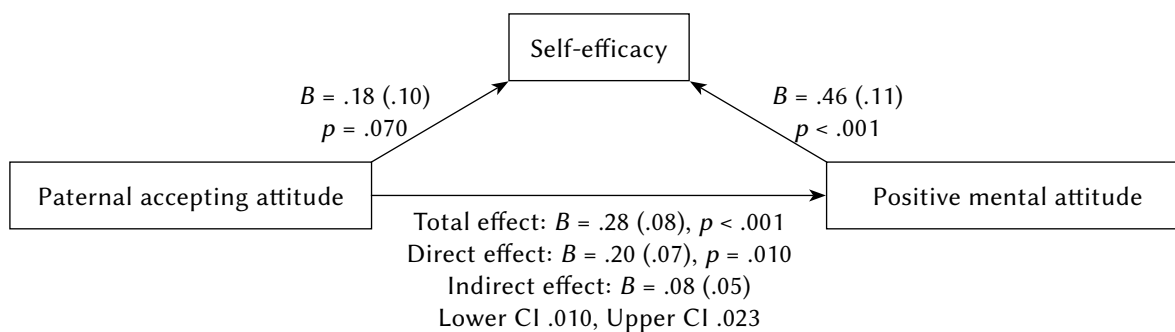
Note. Standard errors in parentheses; number of bootstrap resamples: 5000. Bootstrap CI method: biased corrected; 95%.

Figure 1. Retrospective assessment of maternal accepting attitude, self-efficacy, and positive mental attitude in female students.



Note. Standard errors in parentheses; number of bootstrap resamples: 5000. Bootstrap CI method: biased corrected; 95%.

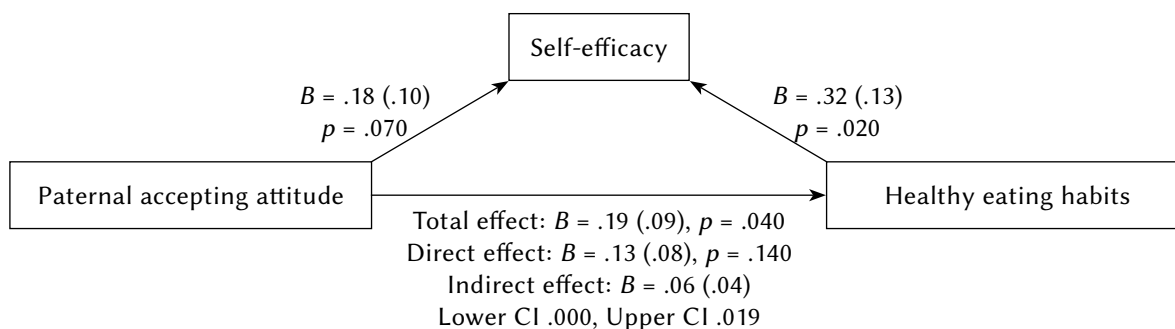
Figure 2. Retrospective assessment of maternal autonomy granting attitude, self-efficacy, and positive mental attitude in female students.



Note. Standard errors in parentheses; number of bootstrap resamples: 5000. Bootstrap CI method: biased corrected; 95%.

Figure 3. Retrospective assessment of paternal accepting attitude, self-efficacy, and positive mental attitude in male students.

Health behaviours in emerging adulthood and the mediating role of self-efficacy



Note. Standard errors in parentheses; number of bootstrap resamples: 5000. Bootstrap CI method: biased corrected; 95%.

Figure 4. Retrospective assessment of paternal accepting attitude, self-efficacy, and healthy eating habits in male students.

reported higher self-efficacy ($a = .18$), which was linked to a higher positive mental attitude ($b = .46$). Adjusted confidence intervals for an indirect effect ($ab = .08$) based on 5000 bootstrap resamples were above zero (from .010 to .023). Moreover, there was also a direct effect of the impact of paternal accepting attitude on a positive mental attitude, showing that male students who perceived their fathers as accepting reported more positive mental attitudes ($c' = .20$, $p = .010$).

In male participants, paternal accepting attitude was indirectly linked to healthy eating behaviours. The participants who felt their fathers' acceptance reported a higher self-efficacy ($a = .18$), which was linked to a higher positive mental attitude ($b = .32$). Adjusted confidence intervals for an indirect effect ($ab = .06$) based on 5000 bootstrap resamples were above zero (from .000 to .019). However, there was no direct effect of the impact of paternal accepting attitude on healthy eating habits ($c' = .13$, $p = .140$).

DISCUSSION

This study aimed to investigate gender differences in health behaviours in emerging adults, the association between their health behaviours and perceived parental attitudes, as well as the mediating role of self-efficacy.

HEALTH BEHAVIOURS AND SELF-EFFICACY IN MALE AND FEMALE EMERGING ADULTS

We noticed significant differences between the male and female participants in the declared health behaviours and self-efficacy. The male participants, compared with the female ones, cared less about a healthy, balanced diet but exhibited a higher sense of self-efficacy. In fact, the men believed that healthy eating habits should be more important for women (El Ansari et al., 2015; Wardle et al., 2004), who are usually more concerned about an attractive physical appearance and achieve it through dieting (Wardle et al., 2004). Furthermore, higher self-efficacy levels in male participants are consistent with the literature, too (Klassen & Chiu, 2010). Our results can be explained by a different pattern of gender socialisation, as boys' social worth depends on their fitness and activity, and not on their appearance. Males more often treat their bodies as a process, not as an object (Franzoi et al., 2012), and this results in a lesser importance of one's appearance and in a satisfaction with one's body provided that it is adequately fit. Females, on the other hand, receive information that they are evaluated through the prism of their appearance and physical attractiveness quite early in the process of gender socialisation. Both boys and girls, as gender socialisation advances, begin to see themselves through the prism of social expectations associated

with their gender. Fulfilling social expectations in accordance with gender stereotypes may be especially important during emerging adulthood, when young men and women more intensively engage in searching for a partner to start a family with. Thus, they care about fulfilling gender norms.

PARENTAL ATTITUDES, HEALTH BEHAVIOURS, AND THE MEDIATING ROLE OF SELF-EFFICACY

In our study, we noticed predominantly the influence of perceived accepting and autonomy granting parental attitudes on the emerging adults' health behaviours. This is consistent with the literature. According to the parental acceptance-rejection theory, parental and other attachment figures' acceptance is critical for the correct psychological development and adjustment of children, adolescents, and later adults (Khaleque & Rohner, 2002). Parents who are warm and accept their children for who they are, who flexibly respond to their children's needs and encourage them to take up responsibilities (an autonomy granting attitude), raise children who are independent, self-assured, and have positive beliefs about their competences and self-efficacy (Bradley-Geist et al., 2014; Collins & Laursen, 2006; Ingoldsby et al., 2004). This, consequently, has a positive effect on a wide range of behaviours, including health behaviours and preventive health behaviours (Riggs, Sakuma, & Pentz, 2007) of both males and females (Mohamadian & Ghannaei-Arani, 2014). Parental attitudes, independently of a child's gender, age, or culture, were found to be especially important for such health behaviours as maintaining a healthy body mass index (Berge, Wall, Loth, & Neumark-Sztainer, 2010) and mood regulation (Rohner, Khaleque, & Cournoyer, 2005). Children of affectionate and autonomy granting parents are more optimistic (Jackson, Pratt, Hunsberger, & Pancer, 2005; Larzelere, Morris, & Harrist, 2013), have better dietary habits (Goldschmidt et al., 2016), and have better health recommendation adherence (Shorer et al., 2011).

The results from previous research are also confirmed in our study, where parental attitudes and self-efficacy mainly predicted such health behaviours as positive mental attitude (of male and female participants), preventive behaviours, and healthy eating habits (of male participants). Furthermore, we noticed that self-efficacy not only determined health behaviours but, more importantly, it also mediated between health behaviours and perceived parental attitudes. Thus, we assume that the quality of parental attitudes influences their child's self-efficacy, which, in turn, determines the quality of health behaviours (positive vs. negative health behaviours). Emerging adults, whose parents support their autonomy and develop their confidence, tend

to exhibit higher self-efficacy (Ingoldsby et al., 2004). Consequently, self-efficacy provides them with the sense of competence, control over one's life, and the ability to overcome challenges, which creates belief that effort invested in certain behaviours (e.g. dieting) will produce positive effects (e.g. lower BMI). Therefore, emerging adults with high self-efficacy are more likely to engage in positive rather than negative health behaviours (Binay et al., 2016; DuBois, Felner, Sherman, & Bull, 1994; Hochhausen et al., 2007; Klein-Hessling, Lohaus, & Ball, 2005; Posadzki, Stockl, Musonda, & Tsouroufli, 2010).

In previous studies self-efficacy was a salient factor for effective weight control, refraining from excessive food intake (Francis & Susman, 2009; Gokee-LaRose, Gorin, & Wing, 2009), managing preventive behaviors (Anderson, Winett, & Wojcik, 2007; Cooper, Wells, & Todd, 2004; Luszczynska & Schwarzer, 2003), and mood regulation (Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003; Donnelly et al., 2013), which are also health behaviours that were predicted by self-efficacy in our study. Furthermore, Reed, Duncan, Lucier-Greer, Fixelle, and Ferraro (2016) found that self-efficacy is an important mediator between autonomy granting parenting and mood disorder and physical health among emerging adults. Interestingly, in our study self-efficacy mainly mediated the relationship between health behaviours and parental attitudes of a same-sex parent, which we discuss in the next paragraph.

GENDER AND ASSOCIATION BETWEEN PERCEIVED PARENTAL ATTITUDES AND HEALTH BEHAVIOURS

In our study, health behaviours of female emerging adults were determined by both maternal and paternal attitudes, while of male ones – primarily by paternal. These results suggest a father's particularly important role in shaping health behaviours, attitudes towards one's own body, and health in young men. Perhaps this effect is related to identity, which is developing intensively during emerging adulthood (Kroger, Martinussen, & Marcia, 2010). In this period, young men explore their identity, especially their gender identity, and refer to their father's attitudes and beliefs. This assumption is confirmed by the finding that a father-son (but not a mother-son) relationship determines the identity exploration process for boys (Grotevant & Cooper, 1985). Furthermore, identity exploration (Stolz, Barber, & Olsen, 2005) and identity achievement in young adult men (e.g. Beyers & Goossens, 2008) depend on the influence of accepting and autonomy granting paternal attitudes, and gender norms that young men identify with are closely associated with their health-related behaviours (Cohen & Burger, 2000). Strong views

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about masculinity among young men predict a higher risk for sexually transmitted infections, substance abuse, or other risk behaviours, which, according to gender stereotypes, are considered typical and frequent for men (Courtenay 1998; Pulerwitz & Barker, 2008). Health-risk behaviours (e.g. unprotected sex, substance abuse) may be considered by some men as evidence of true manhood (Courtenay, 2000). Thus, young men who want to emphasise their masculinity may perceive certain health behaviours through the prism of gender stereotypes, and therefore consider a healthy diet as typically female behaviour. Consequently, despite their awareness of the importance of proper nutrition for their health, these men may choose less favourable nutrition options (Courtenay, 2000). In our studies, paternal accepting attitude positively influenced healthy eating habits of young men, and this relationship was further mediated by self-efficacy. Paternal accepting attitude and the sense of agency (as paternal accepting attitude influenced self-efficacy) could be conducive to building a positive self-image as a man. Thus, perhaps engaging in health behaviours typically attributed to women is seen as less threatening to their masculinity. The quality of the father-son relationship may be related to the boys' masculine identification (Mussen & Dittler, 1959) and reduce adolescent risk behaviours (Zimmerman, Salem, & Notaro, 2000).

In our study, the only health behaviour among female participants predicted by perceived parental attitudes was positive mental attitude. Positive mental attitude is a factor that, according to Juczyński (2009), is related to one's ability to avoid stressful and emotionally challenging situations, and preserve positive mood and thinking. Maintaining psychological well-being and emotional hygiene translates itself into positive outcomes in physical health and greater ability to recover from illnesses (Thayer, Åhs, Fredrikson, Sollers, & Wager, 2012). Nonetheless, among female participants no other health behaviours were predicted by perceived parental attitudes, which is a result that varies from previous research that, for instance, demonstrated that healthy dieting (e.g. fruit and vegetable intake) in adolescent girls is positively associated with close emotional relationship with the father (Berge et al., 2010), and negatively associated with the mother's overprotective parental attitude (Toda, Kawai, Takeo, Rokutan, & Morimoto, 2008). In our study, both mother's and father's perceived parental attitudes were found to play a significant role in predicting positive mental attitude of female participants, namely, accepting and autonomy granting maternal and paternal parental attitudes. This result is in line with previous research indicating the importance of both parents' emotional closeness and acceptance for psychological wellbeing of their offspring in childhood and adulthood (e.g. Rohner et al., 2005). Moreover, both

the father-daughter and mother-daughter relationship determine an identity exploration process for adolescent girls, and a father-son relationship for teenage boys (Grotevant & Cooper, 1985). Thus, we assume that for girls and young women, both the father and mother play important roles as behaviour models, sources of feedback, and agents motivating active exploration, independence, and self-care in the process of their psychological development. Mothers are possibly female role models for their daughters, providing direct and indirect instructions on certain behaviours and attitudes (Grotevant & Cooper, 1985). Fathers provide feedback on whether presented behaviours are accepted, which contributes to their daughters' self-perception (Perkins, 2001), achievement motivation (Cooper, 2009), and lower levels of distress (Byrd-Craven, Auer, Granger, & Massey, 2012).

LIMITATIONS

The results of our study should be considered in the context of certain limitations. The first is a small sample size (147 emerging adults, 101 female and 46 male participants), which is the reason why our results cannot be generalised into the whole population of emerging adults (1). Furthermore, the small sample reduces the statistical power to identify smaller effects, so there is a risk that some significant phenomena between variables will not be observed (Rehbein & Baier, 2013). Thus, future research requires a greater number of participants, especially male ones, whose number in this study was lower than that of women. Another important limitation is the participation of students of social sciences (2). In future studies a wider group of emerging adults should be examined, and not limited to a single faculty or university students in general. In order to reduce the homogeneity of the respondents, it would be necessary to include emerging adults who did not enter higher education, and have already entered a job market. Another limitation of this study is its cross-sectional character (3). As a result, the results of the study do not inform about the course of the development of health behaviours and how they are influenced at the subsequent stages of childhood by the mother, the father, and their parental attitude. We suggest performing a longitudinal study in which children would be followed for several years. Thus, the process of the formation of their health behaviours could be observed and potential influencing factors (e.g. coping skills and self-regulation) measured several times. Furthermore, it would be crucial to observe and gather data about the roles of the mother and the father in health behaviour in the context of gender identity development and the development of views regarding masculinity and

femininity, especially among the male participants. As our results suggested, also the quality of relationships with the opposite-sex parent and its role in health behaviour development should be investigated. Socioeconomic factors, including family type, wealth or health status, should also be considered because these factors may have an influence on the behaviour and attitude of parents towards their children (Hoff, Laursen, & Tardiff, 2002).

CONCLUSIONS

We found that, as expected, perceived parental attitudes predicted health behaviour for both male and female participants, and some of these associations were mediated by self-efficacy. The most pronounced relationships were found between accepting and autonomy granting maternal and paternal parental attitudes and positive health attitude (of both male and female participants), preventive behaviours, and healthy eating habits (of male participants).

In the case of female respondents in emerging adulthood, we observed that perceiving both of their parents as accepting and autonomy-granting, and fathers as consequent (less impulsive, unpredictable, and unstable) boosted their positive mental attitude. Interestingly, no other health behaviour was determined by the perceived mother's or father's parental attitudes in female participants. Self-efficacy mediated the relationship between perceived attitudes of accepting and autonomy granting of mothers and positive mental attitude of young female respondents during emerging adulthood.

In the case of male respondents in emerging adulthood, we observed that the participants who perceived their fathers as more accepting and autonomy granting more frequently declared the usage of preventive behaviours, having healthy eating habits, and manifesting a more positive mental attitude. Additionally, the perceived level of paternal demanding attitude influenced preventive behaviours – the less the father was perceived as demanding and controlling, the more often the male emerging adults reported taking preventive measures. In the case of the mother's parental attitudes, only inconsequent attitude determined lower results in health practices, i.e. the respondents were less likely to undertake daily physical activity and had worse sleeping habits. Self-efficacy mediated the relationship between perceived paternal accepting attitude and positive mental attitude and healthy eating habits.

Our results show the importance of perceived parental attitudes for young adults' lifestyle choices. Parents who accept their children unconditionally and give them autonomy equip them with positive mental attitudes that will help them maintain a healthy lifestyle, and increase their quality of life.

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Stigma and Health

Parental Autonomy Support Predicts Lower Internalized Homophobia and Better Psychological Health Indirectly Through Lower Shame in Lesbian, Gay and Bisexual Adults

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Parental Autonomy Support Predicts Lower Internalized Homophobia and Better Psychological Health Indirectly Through Lower Shame in Lesbian, Gay and Bisexual Adults

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Previous studies have identified myriad negative consequences of *internalized homophobia*, or self-directed antigay prejudice, but few can speak to its developmental antecedents. This work explored whether parenting styles might affect the development of internalized homophobia and negative psychological health outcomes in sexual minority individuals. Specifically, we expected that perceiving parents as *autonomy supportive* during childhood would link to lower internalized homophobia and better psychological health, and that lower levels of shame would help to explain this effect. We tested this in a cross-sectional survey with 484 lesbian, gay, and bisexual (LGB) adults. Results supported the hypothesized model: Those who described their parents as being more autonomy supportive during childhood reported lower internalized homophobia, anxiety, and depression, and greater self-esteem. These relations were mediated by a tendency to experience shame, whereby autonomy support from mothers (but not fathers) related to lower shame, which in turn linked to lower internalized homophobia and better psychological health. This work underscores the importance of autonomy-supportive interventions with families, as it suggests that autonomy-supportive parents may promote resilience against the development of internalized homophobia, a potent risk factor for mental health problems and self-harm.

Keywords: internalized homophobia, autonomy support, self-determination theory, self-stigma, shame

Those with *internalized homophobia*, or self-directed prejudice regarding a lesbian, gay or bisexual (LGB) identity, suffer costs to health and well-being. For example, individuals high in internalized homophobia report more depression, anxiety, substance use, suicidal ideation, and risky sexual behavior, as well as impaired ability to cope

with stress (Newcomb & Mustanski, 2010, 2011; Puckett, Woodward, Mereish, & Pantalone, 2015; Szymanski, Chung, & Balsam, 2001). Given these correlates of internalized homophobia, it is worthwhile to try to understand what gives rise to this harmful attitude toward the self. Yet few studies have examined how internalized homophobia develops in LGB individuals, and what protects against it. To investigate potential interpersonal factors that might influence the development of internalized homophobia, we employed a self-determination theory (SDT) view of how parents and other important socializers might impact self and identity processes throughout development (R. M. Ryan & Deci, 2000, 2017). Specifically, we test a cross-sectional model based in SDT examining whether perceiving parents as *autonomy supportive*, or supportive and accepting of authentic self-expression, links to a lower tendency to feel shame, and in turn, relates to lower internalized homophobia and better psychological health.

Individual Differences in Internalized Homophobia

Internalized homophobia is a type of self-stigma whereby LGB individuals incorporate negative societal views about sexual minorities into their self-concept; it is a product of stigmatizing social

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and cultural views about sexual minorities (Herek, Gillis, & Cogan, 2009). Sometimes referred to as internalized homonegativity (Berg, Munthe-Kaas, & Ross, 2016), or internalized heterosexism (Szymanski, Kashubeck-West, & Meyer, 2008), internalized homophobia is conceptualized as an individual difference with adverse mental health consequences (Newcomb & Mustanski, 2011; Puckett et al., 2015). A growing body of work has identified internalized homophobia as a reliable and robust risk factor for psychopathology and psychological distress (Hatzenbuehler, Dovidio, Nolen-Hoeksema, & Phillips, 2009; Herek et al., 2009; Szymanski et al., 2001; Williamson, 2000), suicide (Meyer, 1995), and sexual identity concealment (e.g., Balsam & Mohr, 2007; Herek et al., 2009).

Fewer studies, however, have identified factors that precede individual differences in internalized homophobia. Although there is certainly variability in LGB individuals' exposure to prejudice, discrimination, and antigay messages, LGB individuals grow up aware of the negative stereotypes and attitudes associated with a sexual minority identity, and as they come to realize their sexual orientation, may apply these negative views to the self (Meyer, 1995). These negative messages may be internalized early, and come from various sources such as school, media, and religion (Human Rights Campaign, 2013; Kubicek et al., 2009). Yet despite the ubiquity of anti-LGB messages, individuals vary greatly in the extent to which they internalize these messages—while some experience deep shame and tension regarding their LGB identity, others live relatively free from self-stigma. For example, in a large and diverse sample of gay and bisexual men, approximately one third of the sample reported no internalized homophobia when they first realized they were gay or bisexual, another third demonstrated high internalized homophobia, and the last third fell somewhere in between (Herrick et al., 2013).

A handful of studies have examined the connection between internalized homophobia and social environments and suggest that a lack of social support, broadly defined, is a possible antecedent of internalized homophobia. Notably, internalized homophobia has been linked with feeling a lack of acceptance about one's sexual identity from others, generally (e.g., Cox, Dewaele, van Houtte, & Vincke, 2010), and from parents specifically (Pachankis, Goldfried, & Ramrattan, 2008; Puckett et al., 2015). Similarly, work by Shilo and Savaya (2011) links social support from family to self-acceptance among LGB adolescents and young adults. A longitudinal study looking at trajectories of internalized homophobia over time found that support from peers and involvement in the LGBT community predicted decreases in internalized homophobia two years later (Puckett, Feinstein, Newcomb, & Mustanski, 2018). Most illustrative of the importance of a supportive family, a prospective study of LGB youth and young adults found that those who reported greater social support from their families at baseline had more positive attitudes about their sexual identity one year later (Rosario, Schrimshaw, & Hunter, 2008). Importantly, Snapp, Watson, Russell, Diaz, and Ryan (2015) found that acceptance from multiple sources—friends, family, and one's community—all positively impacted the self-esteem of LGBT young adults, but when sources were compared, family acceptance mattered the most. Taken together, these studies suggest that supportive others, especially parents, may insulate people from developing high levels of internalized homophobia. Herein we examine a specific form of support from parents, *autonomy support*, or con-

veying acceptance for individuals as they are, as a protective factor for individuals as they become aware of an identity that is stigmatized in society.

Parental Autonomy Support Promotes Resilience

According to SDT, all people have a need for autonomy, or a need to express themselves authentically and fully and to behave in accord with their values, interests, and beliefs (R. M. Ryan, 1993). Parenting styles vary in how much they support their children's autonomy—namely, by providing unconditional acceptance and encouragement for honest self-expression (Assor, Roth, & Deci, 2004; R. M. Ryan, La Guardia, Solky-Butzel, Chirkov, & Kim, 2005). Parents can also thwart autonomy by pressuring, manipulating, or shaming children to shape their behavior to suit their parents' wishes, for example, by conveying that the child is only loveable under certain conditions (Roth & Assor, 2012; Roth, Assor, Niemiec, Ryan, & Deci, 2009). Simply put, autonomy-supportive parents allow and encourage children to "be themselves," while autonomy-thwarting parents pressure their children to be the way others want them to be.

Not surprisingly, this quality of parenting shapes identity development and psychological health (e.g., Chirkov, Ryan, Kim, & Kaplan, 2003; R. M. Ryan, 1995). Starting in infancy, autonomy-supportive parenting fosters feelings of safety (Whipple, Bernier, & Mageau, 2011). Among children and adolescents, autonomy-supportive parents promote an ability to adjust to various life domains (Soenens & Vansteenkiste, 2005), and protects against developing a self-critical style, depression, and disordered eating (Soenens, Luyckx et al., 2008; Soenens, Vansteenkiste et al., 2008). Work on identity development in high school and college students demonstrates that those who reported being more satisfied in their need for autonomy also showed healthier identity development, broadly defined, one semester later (Luyckx, Vansteenkiste, Goossens, & Duriez, 2009).

Based on work in SDT, we argue that when children grow up in autonomy-supportive households they may be better protected from negative messages concerning their identities, particularly stigmatized identities. Importantly, autonomy-supportive parents send messages contrary to stigmatizing messages a child or adolescent may encounter in society, specifically that *all* aspects of the child are acceptable and worth expressing. This climate fosters resilience, for example, by promoting non-defensive, open coping when faced with contentious events (e.g., Hodgins, Yacko, & Gottlieb, 2006) and by promoting fuller integration of personal events and memories into people's self-concept, even those judged as negative or shameful (Weinstein, Deci, & Ryan, 2011). This process of integrating all aspects of oneself and one's experience—not just those that are pleasant or socially valued—has long-been regarded as vital for health and well-being (Rogers, 1961, 1963; Weinstein et al., 2011).

Closely related to the present research, Weinstein and colleagues (2012) showed that perceiving parents as autonomy supportive during childhood predicted more integration around sexual identity; that is, people were more accepting of their sexual orientation and were better able to integrate it into their self-concept, presumably because this identity was more accepted. Furthermore, perceiving parents as autonomy supportive protected individuals from defensively responding to LGB targets with hostility, regard-

less of parents' attitudes toward LGB individuals. This research is a helpful start to understanding the role of parental autonomy support in identity development, but to date no one has examined how parental autonomy support may protect vulnerable individuals from taking in harmful societal messages that are self-relevant. The present research aims to do this and tests a potential mechanism for why this might occur, namely by guarding against a general tendency to feel ashamed of oneself.

Shame

Autonomy support from parents during early development may bolster resilience to internalizing negative, self-relevant messages by protecting individuals from developing a tendency to feel shame. Shame involves feelings of inferiority, self-consciousness, and a desire to hide failings or deficiencies (Tangney, Miller, Flicker, & Barlow, 1996; Tangney, Wagner, & Gramzow, 1992). Individuals who tend to feel ashamed of themselves are especially vulnerable to taking on the negative opinions of others, which is particularly salient for those who hold an identity that is devalued by society at large.

Applied to the issue at hand, it follows that a tendency to experience shame may be a risk factor for self-stigmatization. Indeed, persons with mental illness who are more prone to experience shame exhibit more self-stigma with respect to their mental illness (Hasson-Ohayon et al., 2012). More immediate to the present work, studies with lesbian, gay and bisexual samples reveal a link between a tendency to experience shame and higher internalized homophobia (Chow & Cheng, 2010; Sherry, 2007). Furthermore, being prone to shame reliably predicts poor psychological health outcomes such as depression and anxiety (Kim, Thibodeau, & Jorgensen, 2011; Tangney et al., 1992), including in lesbian, gay and bisexual samples (Bybee, Sullivan, Zielonka, & Moes, 2009; Hequembourg & Dearing, 2013).

In line with these literatures, we explore the idea that autonomy-supportive parenting insulates people from developing internalized homophobia and poor psychological health because it reduces the tendency to experience shame. In previous work, autonomy-supportive parents tended to have children with more stable self-worth, and as a result, higher well-being (Assor et al., 2004; Roth et al., 2009). Conversely, adolescents with autonomy-thwarting parents were more prone to feelings of shame than adolescents with autonomy-supportive parents (Assor & Tal, 2012). In an effort to please parents and important others, people may adopt a tendency to be attuned to the negative evaluations of others, setting the stage for those with a stigmatized, devalued identity to adopt negative societal messages and apply them to the self.

Present Study

Though there have been calls for more research examining the role of social relationships in promoting resilience among LGB individuals (Kwon, 2013; Savin-Williams, 2008), few studies have explored resilience to developing internalized homophobia, and none to date have identified *why* supportive social relationships may be a protective factor. This research builds on the extant literature on internalized homophobia by exploring the role that a specific type of interpersonal support—autonomy support from parents—has, and examining a potential mechanism through

which parental autonomy support protects against internalized homophobia and poor mental health: namely, by protecting against a tendency to experience shame. Herein we test a cross-sectional model guided by self-determination theory, whereby parents shape people's self-concept and well-being. We expected that LGB individuals' retrospective accounts of their parents as being autonomy supportive during childhood would relate to lower levels of current internalized homophobia and better current psychological health.¹ Moreover, we expected these links would be explained by a lower tendency to experience shame. In other words, we hypothesized that autonomy-supportive parenting would link to lower internalized homophobia and better psychological health through a sense of self-worth that is resilient, as opposed to highly vulnerable, to the negative evaluations of others.

Method

Participants and Procedure

We aimed for a sample size above 404 in order to have adequate power (.80) to detect mediated effects from paths with small to medium effect sizes (Thoemmes, MacKinnon, & Reiser, 2010). Participants were recruited through a number of online sources. Participants recruited online via LGB discussion boards, community, and social networking websites were entered into a raffle to win \$50, and participants recruited on crowdsourcing sites like Amazon's Mechanical Turk and Prolific Academic were compensated \$2.00 and \$3.75, respectively (per the sites' recommendations for participant payment) in addition to being entered into the raffle. Recent research has pointed to these two crowdsourcing sites as yielding high quality data with more attentive participants than typical means of subject recruitment (i.e., student subject pools; Hauser & Schwarz, 2016; Peer, Brandimarte, Samat, & Acquisti, 2017). A small number of duplicates were identified with IP addresses and removed. The sample consisted of 491 individuals, although 7 participants endorsed being heterosexual at least once during the survey. Participants were asked at three points to identify their sexual orientation as a way of ensuring that all held an LGB identity. After excluding these individuals (1.4%), our final sample was 484 participants (180 men, 278 women, 15 transgender men, and 9 transgender women, and 2 participants did not respond to this question). Participants varied across sexual orientations (27.7% gay, 22.1% lesbian, and 50.2% bisexual). Furthermore, participants were primarily White (71.9%), 6.4% were Hispanic, 5.4% were Black/African American, 4.5% were Asian, 11.1% identified as other or multiracial, and 0.7% declined to respond. They ranged in age from 18 to 64 years old ($M = 28.4$ years, $SD = 9.2$). The survey was anonymous to encourage participation by LGB-identified persons who may not be comfortable

¹ While cross-sectional work consistently shows a negative relation between internalized homophobia and mental health indicators (Newcomb & Mustanski, 2010), longitudinal work shows that internalized homophobia infrequently predicts worse mental health over time, and with approximately the same frequency as mental health predicted subsequent decreases in internalized homophobia over time (Rosario, Schrimshaw, Hunter, & Gwadz, 2002). With the direction of this path so unclear, we modeled internalized homophobia and mental health indices as simultaneous outcomes.

with others knowing about their sexual orientation. Participants completed surveys over a period of approximately 15 min. Surveys assessed perceived parent autonomy support during childhood, current levels of internalized homophobia, a current, general tendency to feel ashamed of oneself, and current, general psychological health indices. Surveys also assessed variables not included in the hypothesized model, including current levels of outness. The study was approved by an Institutional Review Board. All assessments and data can be found on the study page: <https://osf.io/uh5y7/>.

Measures

Autonomy support. The autonomy subscale from the Basic Need Satisfaction in Relationships Scale (BPNS-R; La Guardia, Ryan, Couchman, & Deci, 2000) was modified for the present study to assess perceived support for autonomy during childhood from both mothers and fathers. Participants were asked to respond to three items for both “moms” and “dads” on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale, using the stem “When I was growing up (younger than age 14). . .” Items were the following: “When I was with my mom [dad], I felt free to be who I am,” “When I was with my mom [dad], I had a say in what happens, and I could voice my opinion,” and “When I was with my mom [dad], I felt controlled and pressured to be certain ways” (reverse coded). These three items were originally adapted in this way by Weinstein and colleagues (2012) to assess autonomy support from mothers and fathers in childhood, showing predictive validity with sexual identity outcomes, and scores on the autonomy subscale of the BPNS-R have been shown to change as a function of autonomy manipulations (Sheldon & Filak, 2008; Weinstein, Legate, Kumashiro, & Ryan, 2016). Items were averaged to create one score for each parent, with higher scores reflecting greater perceived autonomy support, and they showed good internal consistency in the current study (mothers, $\alpha = .81$ and fathers, $\alpha = .76$). The vast majority of participants (98%) reported on both mothers and fathers.

Shame. The tendency to feel ashamed of oneself was measured using the character shame subscale of the Experience of Shame Scale (Andrews, Qian, & Valentine, 2002). This scale correlates highly with other measures of shame and detrimental self-concept, and predicts depression across time (Andrews et al., 2002), as well as anxiety in participants with borderline personality disorder (Rüsch et al., 2007), and lower self-disclosure in those with eating disorders (Swan & Andrews, 2003). Participants responded according to how they have felt in the past year using a scale ranging from 1 (*not at all*) to 4 (*very much*). Example items include, “Have you felt ashamed of the sort of person you are?” and “Have you tried to conceal from others the sort of person you are?” Here, the 12 items showed high internal consistency ($\alpha = .95$).

Internalized homophobia. Seven items from the Internalized Homophobia Scale measured participants’ attitudes toward their own sexual orientation (Meyer & Dean, 1998). Participants responded using a 1 (*disagree strongly*) to 5 (*agree strongly*) Likert-type scale. Items included “I wish I weren’t gay/lesbian/bisexual” and “I feel that being gay/lesbian/bisexual is a personal shortcoming for me.” Internal consistency for this scale was good ($\alpha = .87$). This scale is commonly used when assessing internalized ho-

mophobia, correlates highly with other measures of internalized homophobia (Shildo, 1994), and shows convergent validity with depression and being out about sexual identity (Frost & Meyer, 2009). The scale in this form was used in previous research evaluating the role of autonomy support in internalized homophobia (W. Ryan, Legate, & Weinstein, 2015).

Psychological health. Three indicators of psychological health were measured with items taken from three well-validated scales of anxiety, depression, and self-esteem. These versions of the scales were administered in previous research showing a link between autonomy support and psychological health outcomes in LGB individuals (Legate, Ryan, & Weinstein, 2012; W. Ryan et al., 2015) and other stigmatized groups (Weinstein, Legate, Ryan, Sedikides, & Cozzolino, 2017). Using these items, participant fatigue was reduced while allowing us to test varied indicators of psychological health, and to conceptually replicate previous work focused on psychological health within other stigmatized samples.

State Trait Anxiety Inventory (STAI). Three items were used from the STAI (Spielberger 1983). Participants responded in terms of how they are feeling currently (e.g., “I feel nervous”) using a 1 (*strongly disagree*) to 7 (*strongly agree*) scale ($\alpha = .88$). The STAI has been validated in varied samples including high school and college students (Spielberger, 1983), and in both normal and high distress populations (Spielberger, 2010).

Center for Epidemiologic Studies Depression Scale (CES-D). Three items were used from the CES-D (Radloff, 1977) as an indicator of depression. Participants responded to items in terms of how they are feeling currently (e.g., “I feel sad”) on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale ($\alpha = .85$). Validation work for this scale has been undertaken in the general population (Radloff, 1977), and it has shown both factorial and discriminant validity (Orme, Reis, & Herz, 1986).

Rosenberg Self-Esteem Scale (RSES). Three items were adapted from the RSES (Rosenberg, 1965). The RSES factor structure has been shown to be consistent across 53 countries (Schmitt & Allik, 2005) and has been validated with ages ranging from adolescents to young adults (Robins, Trzesniewski, Tracy, Gosling, & Potter, 2002). Participants responded to items in terms of how they are feeling currently (e.g., “I am satisfied with myself”) on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale ($\alpha = .82$).

Data Analytic Strategy

First, we examined correlations between main study variables before building our path model. Next, we examined whether there were differences across recruitment sources across study variables using multivariate analysis of variance (MANOVA). Then we built a path model to test our hypothesis that perceiving parents as autonomy supportive during childhood would be indirectly linked to lower internalized homophobia and better psychological health through a lower general tendency to experience shame. The path model was created using Mplus Version 7.4 software (Muthén & Muthén, 1998–2014), using full information maximum likelihood procedures to estimate missing data (less than 1.5% on all variables). We correlated the four outcome variables (internalized homophobia and the three indicators of psychological health) and calculated bias-corrected bootstrap standard errors and 95% confidence intervals with 1000 samples for all model parameter esti-

mates. To evaluate model fit, we followed recommendations by Little (1997) and Hu and Bentler (1999): a comparative fit index (CFI) and Tucker-Lewis index (TLI) above .90, and a root mean square error of approximation (RMSEA) and standardized root mean square residuals (SRMR) below 0.08. More specifically, an RMSEA value of 0.05 or less indicates a close fit of the model in relation to the degrees of freedom, and a value of 0.08 or less indicates a reasonable error of approximation (Browne & Cudeck, 1993).

Results

Table 1 provides means, standard deviations, and zero-order correlations (with their 95% confidence intervals) for all variables. Correlations showed that autonomy support from both mothers and fathers was related to lower shame, internalized homophobia, and better psychological health, indicating preliminary support for hypotheses. We found significant differences on demographic variables, as well as recruitment source. Age was unrelated to study variables, but race and sexual orientation correlated with most study variables. Specifically, being bisexual (vs. gay or lesbian) and non-White (vs. White) was related to worse mental health outcomes. To account for these differences, we ran the path model with and without race, sexual orientation, and recruitment source as control variables on outcomes.²

Results from the path model without control variables are presented in Figure 1. The overall model showed good fit to the data, $\chi^2(8, N = 484) = 25.45, p = .001$, CFI = .98, TLI = .96, RMSEA = .07 (90% CI [.04, .10]), SRMR = .04. Perceiving mothers as autonomy supportive in childhood was linked to a lower tendency to experience shame ($B = -.24, SE = .05$, 95% bias-corrected CI [-.33, -.13]), while autonomy support from fathers was not related to shame ($B = -.04, SE = .05$, 95% CI [-.13, .05]). In turn, shame related to greater internalized homophobia ($B = .29, SE = .04$, CI [.21, .36]) and worse psychological health (anxiety: $B = .67, SE = .03$, CI [.61, .72]; depression: $B = .56, SE = .03$, CI [.49, .61]; self-esteem: $B = -.63, SE = .03$, CI [-.69, -.57]). Psychological health indicators were all related to each other (B s ranging from $-.64$ to $.54$, no CI passed through 0), but not to internalized homophobia (B s ranging from $-.03$ to $.05$, all CIs contained 0).

Finally, mediation analyses using bias-corrected bootstrapped confidence intervals indicated that the indirect effect from mothers' autonomy support to internalized homophobia through shame was significant ($B = -.03, SE = .01$, 95% CI [-.05, -.02]), as were the indirect paths from mothers' autonomy support to indicators of psychological health through shame (anxiety: $B = -.11, SE = .03$, CI [-.17, -.06]; depression: $B = -.10, SE = .02$, CI [-.14, -.05]; self-esteem: $B = .10, SE = .02$, CI [.05, .14]). However, no indirect paths from fathers' autonomy support to the four outcomes were significant (B s ranged from $-.02$ to $.02$, all CIs contained 0). In sum, results supported the hypothesis that a general tendency to experience shame explains why parental autonomy support in childhood relates to lower internalized homophobia and greater psychological health. However, we only observed partial support for this hypothesis as the model showed links with mothers, but not with fathers.

Discussion

This study relied on a large sample of LGB individuals to better understand how parenting styles correspond to self and identity processes. We identified that those who perceive autonomy support from their mothers during childhood experienced lower shame and, in turn, lower internalized homophobia and better psychological health. This work informs the emerging literature on LGB resilience. Using Kwon's (2013) framework for LGB resilience, which suggests that supportive others buffer LGB individuals from reactivity to prejudice and psychological problems, it could be that autonomy-supportive parents insulate individuals with an LGB identity from internalizing negative, self-relevant judgments from others and from society at large. Simply stated, parents may help their children build up inner resources to cope with stigma (Kwon, 2013; R. M. Ryan & Deci, 2017).

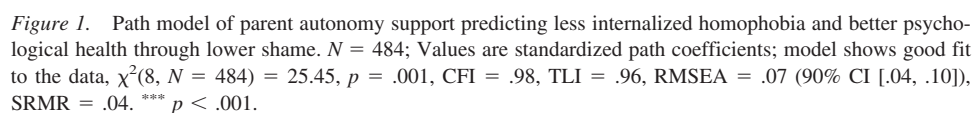
While this model was observed for mothers, it did not hold for fathers, although we saw significant zero-order correlations showing that autonomy support from fathers linked to lower shame, less internalized homophobia, and better psychological health, in line with our expectations. That these findings did not emerge in our path model suggests autonomy support provided by fathers may not uniquely predict these constructs over and above the autonomy support provided by mothers. As an alternative explanation, autonomy support from fathers could be linked to lower internalized homophobia and greater psychological health for other reasons besides shame. For example, fathers who are autonomy supportive may help children who identify as LGB regulate their emotions more adaptively, which may help them to process and cope with negative emotions that arise when facing societal stigma (Roth et al., 2009). Despite the different pattern of results for mothers and fathers, taken together this study provides preliminary evidence that internalized homophobia develops when love and approval from parents is conditional, and when parents are not supportive of authentic self-expression. It also appears that such an environment predicts a general tendency to feel shame; this general tendency to feel shame may lead to the development of internalized homophobia.

This work suggests the importance of autonomy-supportive others to LGB individuals' mental health and self-acceptance. Indeed, past research has shown that a range of autonomy-supportive others, not just parents, can foster wellness in LGB individuals (Legate et al., 2012; W. Ryan et al., 2015), including at

² Because we found significant differences across recruitment sources on some variables, we ran a model controlling for recruitment source (dummy coded as MTurk, Prolific Academic, and other) as well as race and sexual orientation on outcomes (race was dichotomized into White and non-White; sexual orientation was dichotomized into bisexual vs. lesbian/gay). The model fit was not quite acceptable with the presence of these controls ($\chi^2(12, N = 484) = 60.62, p < .001$, CFI = .96, TLI = .88, RMSEA = .09 (90% CI [.07, .12]), SRMR = .06), but the same direct and indirect effects emerged as significant as in the model without control variables. Model paths indicated that participants from MTurk had higher internalized homophobia ($p = .007$) but lower anxiety ($p < .001$) as compared to other recruitment sources, and participants from Prolific Academic had lower self-esteem ($p = .03$) as compared to other sources. Race and sexual orientation were not related to outcomes. Because indirect and direct paths were identical in both models, and for reasons of parsimony and better statistical fit, we focus on the model without controls in the text and in Figure 1.

* $p < .05$. ** $p < .01$. *** $p < .001$.

In sum, our findings are consistent with work showing that social support generally (Cox et al., 2010; Puckett et al., 2018; Shilo & Savaya, 2011), and from parents, specifically (e.g., Pachankis et al., 2008; Puckett et al., 2015), buffers against internalized homophobia, and we build on this research in a number of ways. For one, we explored meaningful relations with parents during childhood, as these relationships are essential for long-term identity development (Bowlby, 1969; Waters, Merrick, Treboux, Crowell, & Albersheim, 2000). Furthermore, although a handful of studies have examined the link between supportive others and internalized homophobia, mechanisms for this link have not yet been identified. In this study we begin to describe a developmental pathway by which supportive parents, especially mothers, shape self-concept and wellness in LGB individuals.



Yet these advances should be considered in light of several limitations of the current research. Most notably, these data were cross-sectional and relied on retrospective accounts of perceived autonomy support from parents during childhood. While our model conceptualizes retrospective reports of parental autonomy support in childhood as protecting against the development of internalized homophobia, it is quite plausible that internalized homophobia may cause people to recall their parents as less accepting in general. This alternative explanation is consistent with theorizing that internalized homophobia may cause individuals to anticipate and perceive more negative treatment on the basis of their identity (Meyer & Dean, 1998). However, longitudinal studies find that social support from family predicts more positive attitudes toward sexual identity one year later (Rosario et al., 2008), and that more social support at baseline predicts less perceived stigma one year later among people recently diagnosed with a mental illness (Mueller et al., 2006). Importantly, these researchers do not find evidence for the reverse path (i.e., baseline perceived stigma does not predict less social support one year later). Although these longitudinal studies support our conceptual model, it is crucial that future research follow children and adolescents over time as they interact with parents and as they develop their sexual identity. Understanding the directionality of these links is crucial to developing family-based interventions. Furthermore, it is important to test whether parental autonomy support predicts lower trajectories of internalized homophobia as LGB individuals get older. Prior work by Puckett and colleagues (2018) suggests that internalized homophobia either decreases over time or it remains stable (as opposed to increasing), and so it would be important to test whether parental autonomy support predicts decreasing levels of internalized homophobia over time. Future work should also use behavioral or observational methods to capture autonomy support from parents, thereby reducing the bias inherent in self-reported and retrospective accounts.

The cross-sectional nature of these data also means that results cannot speak to the directionality of the relation between internalized homophobia and a tendency to feel shame. Rather than internalized homophobia resulting from general feelings of shame, it may be that a tendency to feel shame is an outcome of internalized homophobia. While studies examining these two constructs tend to conceptualize them in the same direction we do (Chow & Cheng, 2010; Hequembourg & Dearing, 2013), they are also cross-sectional, making it critical for future research to disentangle directionality. Finally, we did not examine how diverse parenting circumstances might have affected outcomes, and so future work could examine whether this model holds for those raised by divorced parents, single parents, or same-gendered parents.

Despite these limitations, this work underscores the importance of interventions with important others, particularly parents, as a way of boosting the autonomy support they provide their children. The Family Acceptance Project (C. Ryan, Huebner, Diaz, & Sanchez, 2009) is a model for this: It provides education to families about the importance of accepting their LGB children (and the costs of rejecting them), not just after they come out as LGB, but well before that. Indeed, it may be that such family-based interventions are effective to the extent that they can help parents fully accept their children for who they are, in all of their identities. The present research can further inform such interventions by highlighting the importance of autonomy support specifically, and

focusing on how parents and other important figures can increase the provision of autonomy support. SDT has a strong tradition of creating effective interventions and trainings to increase autonomy support among parents, teachers, health care providers, and others (e.g., Cheon, Reeve, Lee, & Lee, 2018; Edmunds, Ntoumanis, & Duda, 2008; R. M. Ryan, Patrick, Deci, & Williams, 2008). Developing such interventions for parents may further promote resilience in children as they develop their sense of self, and may be particularly valuable to those navigating a stigmatized identity.

The importance of autonomy support to identity development and well-being is not limited to the family context or to childhood (e.g., Legate et al., 2012). Interventions to increase autonomy support from teachers, peers, managers, and coworkers are also likely to increase the well-being of LGB individuals. Critically, experiencing autonomy support at school and at work has been shown to improve well-being, learning outcomes, and productivity of students and workers in general, not just those who hold a stigmatized identity (R. M. Ryan & Deci, 2017). Therefore, interventions that target autonomy support are likely to improve outcomes for everyone and especially for LGB and other stigmatized individuals, without singling out one specific group. Trainings that focus on teaching strategies to provide choice and support for others rather than on reducing sexual prejudice explicitly may be more effective as they may inspire less reactance among participants (Legault, Gutsell, & Inzlicht, 2011). In this particularly heated political climate where identity politics are a source of controversy, designing interventions that are not perceived to be (or actually) targeted toward the benefit of a specific group may be particularly important. Additional research is needed to develop and assess the efficacy of such interventions for parents, schools, and workplaces.

More broadly, the present research represents an important step in understanding the developmental processes involved in how stigma is internalized among LGB individuals. It is crucial to understand the development of internalized homophobia, as it is a reliable and potent risk factor for mental health problems, self-harm, and HIV-risk-taking behavior (e.g., Meyer, 2003; Williamson, 2000). These results may also have implications for other groups vulnerable to self-stigma, such as transgender individuals and those with a disability or mental illness, or who are overweight or obese (Durso & Latner, 2008; Hasson-Ohayon et al., 2012; King, Shultz, Steel, Gilpin, & Cathers, 1993). Given this, it is important to test this model in these other stigmatized groups to see whether having autonomy-supportive parents may promote resilience in these individuals as they come to integrate a stigmatized identity into their self-concept.

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Teaching quality: High school students' autonomy and competence

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Abstract

Background: How teachers manage class learning and interact with students affects students' motivation and engagement. However, it could be that the effect of students' representation of teaching quality on the students' motivation varies between classes. **Method:** Students from 90 classes participated in the study. We used multilevel random structural equation modeling to analyze whether the relationship of the students' perception of teaching quality (as an indicator of the students' mental representation) and students' motivation varies between classes, and if this variability depends on the class assessment of teaching quality (as an indicator of teaching quality). **Results:** The effect of teachers' structure on the regression slope of student perception of student competence was .127. The effect of teachers' autonomy support on the regression slope of student perception of student autonomy was .066. **Conclusions:** With this study we contribute a more detailed description of the relationship between teaching quality, competence and autonomy.

Keywords: Teaching quality, high school, secondary education, competence, autonomy.

Resumen

Calidad didáctica: autonomía y competencia en alumnos de Educación Secundaria. Antecedentes: la calidad didáctica de los profesores de Secundaria afecta a la motivación e implicación de sus estudiantes. Sin embargo, podría ser que la relación entre la motivación y la representación mental que crea el alumnado de la calidad didáctica de su profesor varíe entre las clases. **Método:** estudiantes de 90 clases de Secundaria participaron en el estudio. Se utilizó un modelo multinivel de ecuaciones estructurales. **Resultados:** el efecto del estilo didáctico sobre la pendiente de regresión de la percepción de la estructuración del aula sobre la competencia fue .127. Mientras que sobre la pendiente de la percepción del apoyo a la autonomía sobre la propia autonomía fue .066. **Conclusiones:** con este estudio contribuimos a describir con más detalle la relación que existe entre la calidad didáctica, la autonomía y la competencia de los estudiantes.

Palabras clave: calidad didáctica, institutos, educación secundaria, autonomía, competencia.

Teaching quality is one of the most important school factors that affect students' learning (Wallace, Kelcey, & Ruzek, 2016). Students share a great deal of time with their teachers, and depending on the teaching quality, these hours spent together can be of great value, a waste of time or even detrimental for students. Teaching quality, how teachers manage class learning and interact with students, affects student motivation and engagement (Fauth, Decristan, Rieser, Klieme, & Büttner, 2014).

Guided by Self-Determination Theory (SDT; Deci & Ryan, 1985) a positive teaching quality is characterized by promoting competence and supporting autonomy (Jang, Reeve, & Deci, 2010). A teacher to promote students' competence must provide a structured class by, for example, explaining what he expects from students. On the other hand, a teacher to support students' autonomy should, for example, provide different meaningful options or explain the utility of the class contents (León, Medina-Garrido, & Núñez, 2017). Several authors have observed a linear relationship between those two teaching dimensions (structure

and autonomy support) and students' motivation (Black & Deci, 2000; Ruiz-Alfonso & León, 2017). This implies that a low autonomy support or an unstructured class by the teacher leads to low feelings of autonomy and competence, and vice versa. Nonetheless, the relationship between these teaching dimensions and students' motivation can be understood differently. Following La Guardia, Ryan, Couchman, and Deci (2000), if teachers do not promote autonomy and structure in their classes, they do not become a sensitive or important people for their students and, consequently they do not affect students' motivation.

SDT proposes that students' academic functioning depends on autonomy and competence (Jang et al., 2010). Autonomy denotes the experience of will and psychological freedom, students feel autonomous students when they do interesting tasks and not feel school activities are a chain of obligations (Núñez, Fernández, León, & Grijalvo, 2015; Núñez & León, 2015). Competence refers to the beliefs in its own ability or capacity (Guay, Ratelle, Larose, Vallerand, & Vitaro, 2013). Students feel competent when they are efficient in daily life's school practices (Elliot & Dweck, 2005). These two needs have important implications in the school context for its effect on engagement and performance (Wang & Eccles, 2013).

The issue that arises is how is the relationship between students' autonomy and competence and teaching quality. To address properly this issue, we will explain three aspects: 1)

characteristics of an autonomy supportive and of a well-structured class, 2) importance of students' perception about teaching quality, and 3) two possible explanations of the relationship between the students' perception about teaching quality and the students' needs, autonomy and competence, when there is not an adequate teaching quality.

Concerning the characteristics of an autonomy supportive class, León and Núñez (2015) consider that teachers who adopt an autonomy-supportive style design and use interesting and up-to-date activities with an adequate level of difficulty, identify and develop students' interests and preferences, use a warm language and interact patiently with students. With regard to competence, teachers can promote it by providing instruction step by step, preparing classes in order to provide a high level of structure and avoid chaos and providing optimal challenges and positive feedback (de Naeghel, van Keer, & Vanderlinde, 2014). More specifically, teachers who structure appropriately their classes, provide students clear, concise, and concrete guidance, and communicate students clearly what they expect (Jang et al., 2010).

Until now, we have focused on teaching quality, but what really matters is the students' mental representation about the classroom environment (Reeve, 2002; Stroet, Opdenakker, & Minnaert, 2013), more specifically, what influence students' autonomy and competence is how they perceive their teacher. Thus, we need to pay attention not only to the classroom evaluation of the teaching quality, but also the individual perception of each student in the classroom.

Lastly, about the third aspect, many researchers have observed a linear relationship between teaching quality, and autonomy and competence (Black & Deci, 2000; Ruiz-Alfonso & León, 2017). However, La Guardia et al. (2000) analyzed the relationship of a person with different relational partners (mother, father, romantic partner, and best friend). They detected variability in needs fulfillment across the different relational partners. These authors explained that the variability might not be a maladaptive response, instead, an expected reaction, because subjects might not evaluate the relational partner as an appropriate figure; to put it in other words, when one person does not fulfil the psychological needs of the other person, this other person adaptive functioning is not affected, perhaps because this subject does not consider the relational partner as a sensitive and important person.

Thus, in school contexts, when teachers do not promote autonomy support or structure well the class, students might obviate teachers' behavior, without letting it affect their autonomy and competence. Bearing in mind these two explanations of the relationship between teaching quality and students' competence and autonomy, when there is not an adequate teaching quality, we can forecast two possible scenarios: 1) students' mental representation about teaching quality affects negatively to students, and 2) students' mental representation about teaching quality does not affect students.

Drawing from La Guardia et al (2000) we wonder if the explanation of the results observed using relational partners could be transposed to the relationship between teacher-student. Therefore, we expect different patterns between classes in the relationships between: a) students' autonomy and their perceived autonomy support and b) students' competence and their perceived class structure. To put it differently, we expect some degree of variability in the regression of students' autonomy on students'

perceived autonomy support, and in the regression of students' competence on students' perceived class structure. Finally, we wonder if the variability in the above relationship depends on whether teachers support the students' needs. To sum up, our goal is to examine the effect of teaching quality in the relationship between students' perceived autonomy support and students' autonomy, and in the relationship between students' perceived class structure and students' competence (See Figure 1). More specifically, our study hypotheses are:

H1: The relationship between the students' perceived class structure and the students' competence will vary between classes.

H2: The relationship between the students' perceived autonomy support and the students' autonomy will vary between classes.

H3: The variability of the relationship between the students' perceived class structure and the students' competence will depend on teaching quality.

H4: The variability of the relationship between the students' perceived autonomy support and the students' autonomy will depend on teaching quality.

Method

Procedure

Students provided informed consent to participate, and participation was rigorously voluntary and confidential. Measures were collected at the end of the first quarter of the academic course. During the data collection, a researcher directed all measures to students, and explained how to complete the measures properly.

Participants

1964 compulsory secondary students participated in this study (50% males; mean age at the end of the academic year = 15.22 years, $SD = 1.42$). Students were from 90 classes within six high schools (urban and rural) located in Gran Canaria, Spain. The majority of students were from middle class families. The total sample comprised a similar number of students in each grade (Grade 1, $n = 573$, $M_{age} = 13.76$; Grade 2, $n = 489$, $M_{age} = 14.91$; Grade 3, $n = 491$, $M_{age} = 15.88$; Grade 4, $n = 411$, $M_{age} = 16.86$).

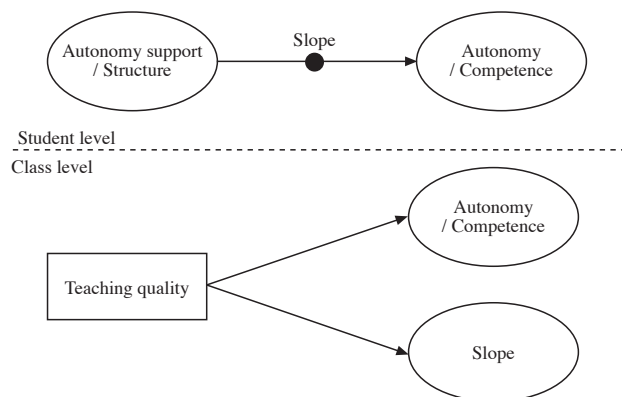


Figure 1. Proposed models for the relationship between autonomy support-structure and between structure-competence

Instruments

To examine scales' reliability and validity we took into account that data might not be independent because students were nested within classes. To analyze how much variance is shared at the group level (L2) we estimated intraclass correlation (ICC1) and ICC2 to explore the reliability of the group average (Morin, Marsh, Nagengast, & Scalas, 2014). Values greater than .05-.10 for ICC and .70-.80 for ICC2 are indicators of not independency (Stapleton, McNeish, & Yang, 2016), therefore, in order to estimate parameters more accurately we need to accomplish multilevel instead of single level analyses of reliability (Geldhof, Preacher, & Zyphur, 2014) and multilevel confirmatory factor analyses (MCFA).

For the MCFA, model fit was assessed using several criteria: χ^2 test, root mean square error approximation (RMSEA), standardized root mean-square residual for the within-class ($SRMR_{within}$) and between-classes ($SRMR_{between}$) matrices Tucker-Lewis index (TLI) and the comparative fit index (CFI). With regard to the estimation method, bearing in mind that participants' ratings were on Likert-type scales, their responses are ordered categorically, so, the estimation method we used was weighted least square mean and variance adjusted (WLSMV), because it does not require multivariate neither univariate normality.

To analyze scales' reliability, we accounted for the fact that Cronbach's alpha can be deflated if loadings are not equal across all items (McNeish, 2017) and the nature of the data is not continuous (Elosua & Zumbo, 2008). Thus, we computed multilevel McDonald's Omega (McDonald, 1999) based on the MCFA factor loadings.

Competence. The next five items were used in order to assess the students' beliefs in their ability or capacity at school context: I often feel competent; I have the feeling that I do things appropriately; I believe that I can face with class requirements; I feel that I can show what I am capable of; I often feel that I am good at things. Students rated their responses using a Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). With regard to construct validity and reliability: χ^2 value and fit indexes were χ^2 (1959, 20) = 5074.729 ($p=.00$), RMSEA=.035, $SRMR_{within}=.015$, $SRMR_{between}=.111$, CFI=.995, TLI=.991. The internal consistency for the within part of the scale was $\omega=.83$ and for the between was $\omega=.96$. Lastly, with regard to the variance partition, ICC=.03 and ICC2=.35.

Structure. The following six items were used to evaluate students' perceptions of teachers' structure: My homeroom teacher explains what he or she expects from me; My homeroom teacher shows me to solve exercises by my own; My homeroom teacher usually behave similar with me; If I cannot solve an exercise, my homeroom teacher shows me different approaches; My homeroom teacher ensures that I understand class contents before continuing; Before beginning a new topic, my homeroom teacher checks that I am ready. Students rated their responses using a Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). With regard to construct validity and reliability: χ^2 value and fit indexes were χ^2 (1960, 18) = 176.419 ($p=.00$), RMSEA=.067, $SRMR_{within}=.029$, $SRMR_{between}=.049$, CFI=.969 and TLI=.949. The internal consistency for the within part of the scale was $\omega=.83$ and for the between was $\omega=.97$. Lastly, with regard to the variance partition, ICC=.24 and ICC2=.87.

Autonomy. In order to analyze the students' autonomy, we used four items: I generally feel free to express my ideas and opinions; I have the possibility to take decisions how to learn at class; I can contribute at the subjects' program; I can give my opinion about the development of class' program. Students rated their

responses using a Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). With regard to validity and reliability: χ^2 value and fit indexes were χ^2 (1960, 4) = 78.965 ($p=.00$), RMSEA=.098, $SRMR_{within}=.024$, $SRMR_{between}=.018$, CFI=.983, TLI=.949. The internal consistency for the within part of the scale was $\omega=.81$ and for the between was $\omega=.99$. Lastly, with regard to the variance partition, ICC=.10 and ICC2=.72.

Autonomy support. Students' perception of the autonomy support provided by the teacher was assessed with the four following items: My homeroom teacher offers different options to do the homework; My homeroom teacher pays attention to my ideas; My homeroom teacher explains the utility of what I am learning at class; My homeroom teacher highlights why is important what we do at class. Students rated their responses using a Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). With regard to validity and reliability: χ^2 value and fit indexes were χ^2 (1960, 4) = 58.555 ($p=.00$), RMSEA=.083, $SRMR_{within}=.028$, $SRMR_{between}=.004$, CFI=.983, TLI=.949. The internal consistency for the within part of the scale was $\omega=.79$ and for the between was $\omega=.98$. Lastly, with regard to the variance partition, ICC=.32 and ICC2=.91.

Data analysis

To test if students' perception of competence or autonomy support predicted student's needs fulfillment, we ran two single level structural equation model (SEM), one for autonomy and one for competence. As explained above, because observed variables were ordered categorically, the estimation method used was WLSMV. To avoid standard errors underestimation produced by the violations of independency, we estimated standard errors using a sandwich type estimator (Muthén & Muthén, 2017). Next, we ran two multilevel random SEM, one for each need, to test if the effect of students' perception of autonomy or competence support on student's needs fulfillment varied between classes, and to test if this variability was due to teachers support for both needs, that is, to test if this effect was stronger/weaker in classes where homeroom teachers supported stronger/weaker the students' needs; this second level variable was an aggregation of students' perception of the teachers support.

It is worth noting that variables at the individual level versus the group level might have different meanings, for instance, students' frequency of homework at the individual level is an indicator of study habits, but at the class level is an indicator of the frequency teachers assign homework (Fernández-Alonso, Suárez-Álvarez, Muñiz, & Muñiz, 2015). Therefore, students' perception of teachers' support at the individual level is an indicator of the student's mental representation of the class, which varies a 76% and 66% for structure and for autonomy respectively, and at the group level (class mean) can be understood as teaching quality. Lastly, we used full information maximum likelihood method (Enders, 2010) to estimate missing data. All of the calculations were done with Mplus 7.4 (Muthén & Muthén, 2017).

Results

Descriptive statistics

Statistics for competence and structure

Table 1 reports means, standard deviations, and correlation among all items of competence and structure.

Table 1
Descriptive statistics and correlation for competence and structure items

	Media	DT	Comp01	Comp02	Comp03	Comp04	Comp05	Struc01	Struc02	Struc03	Struc04	Struc05
Comp01	4.84	1.78										
Comp02	5.33	1.52	.39									
Comp03	5.41	1.52	.35	.45								
Comp04	5.86	1.42	.31	.45	.43							
Comp05	5.42	1.54	.39	.56	.45	.53						
Struc01	4.67	1.89	.17	.20	.27	.17	.19					
Struc02	4.59	2.02	.14	.20	.22	.16	.19	.36				
Struc03	4.89	1.97	.18	.25	.28	.20	.25	.37	.44			
Struc04	5.08	1.91	.14	.26	.30	.22	.24	.38	.43	.60		
Struc05	5.09	1.96	.15	.28	.32	.22	.25	.35	.39	.51	.58	
Struc06	4.42	2.04	.16	.30	.29	.18	.25	.35	.43	.48	.54	.59

Note: Comp = competence. Struc = structure

Statistics for autonomy and autonomy support

Table 2 reports means, standard deviations, and correlation among all items of autonomy and autonomy support.

Models for Structure and Competence

First, we tested a model where students' perception of structure predicted competence fulfillment: $\beta=.53$ [.49, .57]; the χ^2 test and the fit indexes were χ^2 (1963, 43) = 258.04 ($p=.00$), CFI=.980, TLI=.974, and RMSEA=.050 [.045, .056]. Next, we ran a multilevel model with a random slope between classes, the slope's variance was .040 ($p=.023$); -2 log likelihood (-2LL) = 67759.610 and the Akaike information criteria (AIC) was 67917.611. This model explained a 32% of the variance compared to a multilevel model without random slope. Lastly, we tested multilevel random model to analyze the effect of teachers' structure on the slope between students' perception and students' competence, we observed an effect of .127 ($p=.003$); -2LL=67751.07, AIC=67911.070. We observed that teachers' structure moderated the relationship between students' perception of class structure and competence, and, as can be seen in Figure 2, in classes where the teacher provided an adequate structure (one SD above the mean), there was a positive relationship between students' perception and competence, while in classes where the teacher did not provide structure (one SD above the mean), there was an inverse relationship

between students' perception and competence, that is, the lower the students' perception, the higher the competence.

Models for Autonomy

We followed the same steps as in the above paragraph. In the single level model students' perception of structure predicted competence fulfillment: $\beta=.67$ [.63, .70]; the χ^2 test and the fit indexes were χ^2 (1963, 19) = 238.54 ($p=.00$), CFI=.973, TLI=.960, and RMSEA=.077 [.068, .086]. With regard to the multilevel model with random slope, the variance of the slope was .027 ($p=.059$); -2LL=49632.048, AIC=49748.049. This model explained a 15% of the variance compared to a multilevel model without random slope. Lastly, the effect of teachers' autonomy support on the slope between students' perception and students' autonomy was .066 ($p=.040$); -2LL=49628.708, AIC = 49746.708. We observed that teachers' autonomy support moderated the relationship between students' class mental representation and autonomy, and as can be seen in Figure 3, when teachers provided an adequate autonomy support (one SD above the mean), they seemed to affect students' autonomy, but when they did not (one SD above the mean), they still affected students, but in a lower intensity.

Discussion

The purpose of this study was to examine the effect of teaching quality on the relationship between students' perceived autonomy

Table 2
Descriptive statistics and correlation for autonomy and autonomy support items

	Mean	SD	Aut01	Aut02	Aut03	Aut04	Supp01	Supp02	Supp03
Aut01	5.36	1.71							
Aut02	5.09	1.64	.44						
Aut03	4.88	1.67	.43	.48					
Aut04	4.86	1.71	.44	.48	.62				
Supp01	4.74	1.98	.23	.26	.26	.26			
Supp02	5.20	1.88	.41	.36	.39	.39	.44		
Supp03	5.07	1.89	.30	.35	.37	.35	.44	.55	
Supp04	5.21	1.92	.29	.32	.34	.34	.46	.50	.68

Note: Aut = autonomy. Supp = autonomy support

support and students' autonomy, and on the relationship between students' perceived class structure and students' competence. We hypothesized that the relationship between students' perceived class structure and competence, and the relationship between students' perceived autonomy support and autonomy would vary between classes. With regard to competence we gathered evidence of our hypothesis, variability was significant ($p=.023$), but with regard to autonomy, variability was smaller and not significant ($p=.059$). The following hypotheses we tested were that this variability would be due to teaching quality. We observed that the relationship between perceived class structure and competence was due to teacher's class structure. With regard to autonomy, the little variability in the relationship between perceived autonomy support and autonomy was due to teacher's autonomy support.

When we analyzed the relationship between students' perceived class structure and students' competence, we observed variability between classes. This means that students' mental representation affected more to students' competence in some classes than in others. However, when we analyzed the relationship between students' perceived autonomy support and students' autonomy, there was a small variance, meaning that student's perceived autonomy support affected students' autonomy similarly (but not equal) between classes. Thus, for further research it is important to acknowledge that when analyzing the effect of class structure on competence, the single level approach might hide the full picture, but this approach might not be so harmful when analyzing the relationship between students' perceived autonomy support and students' autonomy as the regression between these variables showed less variability across classes.

More central to the study is whether or not this variability is due to the teaching quality. We observed a significant effect of teachers' class structure on the relationship between students' perception of class structure and students' competence. More specifically, we observed that in classes where the teacher structure well the classes, students' competence depended on students' perception, but when teachers do not structure well the class, we observed an inversed regression of students' perception on students' competence. Thus, students seem to take advantage of "good" teachers as observed in many single level studies. Nevertheless, when they have "bad" teachers, although they do perceive that their teacher is not structuring well the class, it does not seem to affect their competence, not only that, but it seems that "bad" teachers are assigned to students who feel competent.

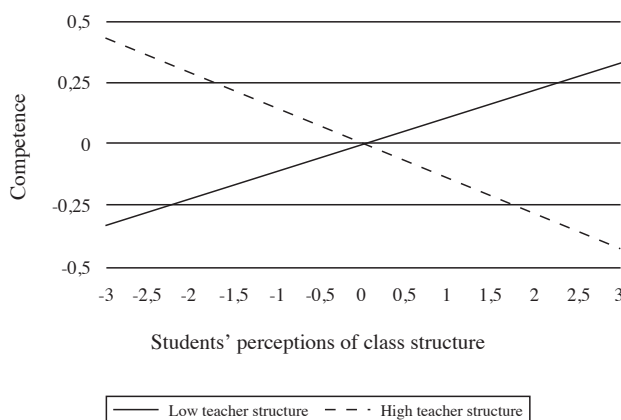


Figure 2. Relationship between students' perception of class structure and student's competence

These results are in line with La Guardia et al. (2000) as these authors observed that when one person does not fulfil the relational partner psychological, this person adjustment does not seem to be affected, probably because this person does not consider the other as an appropriate figure. Based on these results, we believe that we can transpose La Guardia et al. (2000) explanation to the school context, probably the student with a "bad" teacher does not think about the teacher as a person to take into account.

With regard to the effect of teachers' autonomy support, we an effect of the teachers' autonomy support the relationship between students' perceived autonomy support and students' autonomy. As can be seen in Figure 3, in the regression of students' perception on students' autonomy, in the high teacher structure scenario there is a steeper slope than in the low structure scenario. This means that a teacher's positive influence within a high autonomy support classroom is higher than the negative influence within a classroom of a low autonomy support. That is, in the contexts where a teacher does not support autonomy, the negative effects on students are not so detrimental.

Current findings are promising but subject to certain limitations. La Guardia analyzed the relationships between different relational partners, in our study we only focus on the homeroom teacher. It would be interesting for futures studies to analyze the effect of different teachers or even relational partners; because it could be that the different behaviors of both needs might be due to the fact that competence is fulfilled by other figures, such as other teachers, family members or friends. Furthermore, it may be interesting to assess teachers' interpretation of their own teaching quality, and observe whether the relationship between students' perception of the teaching and their needs depends on this measure. Future research could also focus just on one subject, because stronger relationships might be observed in subjects with more hours per week, such as math or english. Finally, we would like to highlight that not taking into account previous achievement or socioeconomic variables might alter true relationships between the studied variables.

Study results contribute to describe a more detailed picture of the relationship between teaching quality and student needs. Our findings show that students are resilient in the face of a teacher that do not structure well enough the class. However, when teachers hold a teaching quality that promotes an adequate functioning, our study underline the importance of promoting students' competence and autonomy, which are two basic factors in the students'

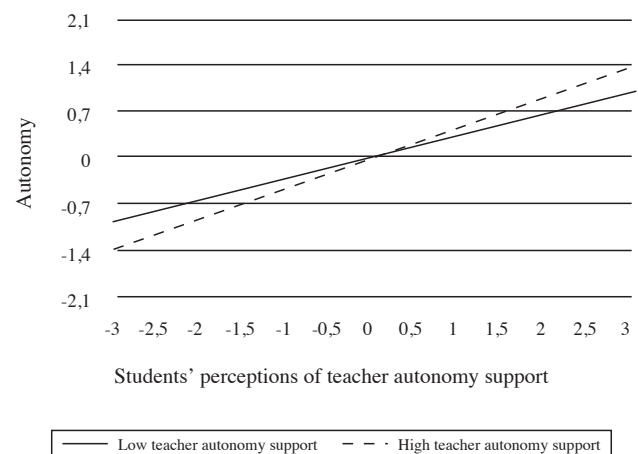


Figure 3. Relationship between students' perception of teacher autonomy support and student's autonomy

engagement and achievement (Jang et al., 2010; León, Núñez, & Liew, 2015). Thus, we highly recommend teachers to acknowledge students' feelings, provide school contents' meaningful rationales, use non-controlling language, offer multiple choices, nurture inner motivational resources, provide instruction step by step, prepare classes, and provide optimal challenges and positive feedback.

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Emotional Intelligence Profiles in College Students and Their Fathers' and Mothers' Parenting Practices

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Abstract

The present study has two objectives: first, to analyze whether the dimensions that make up emotional intelligence (attention, clarity, and repair) give rise to different profiles of university students, and secondly, to determine whether these different profiles are differentially associated with the parenting practices that students report with regard to their fathers and mothers. Results obtained indicate the existence of different profiles of college students. The profile that corresponds to adequate emotional skills presents a lower score in attention, but higher scores in clarity, and especially in mood repair. The other two profiles are inadequate, in the first case because a higher score in emotional attention is accompanied by low scores in mood repair, and in the second case because low scores are presented in all three dimensions. Likewise, we verified the existence of significant differences in the educational practices of parents, the adequate profile is characterized by greater use of parenting dimensions considered to be positive, and at the same time, lower scores on dimensions considered to be negative. One of the dysfunctional profiles is associated with higher scores in positive practices, and is also associated with higher scores in practices considered to produce a negative effect. The second dysfunctional profile is associated with higher scores on the dimensions considered to be negative and lower scores on positive dimensions.

Keywords Adolescence · Parenting practices · Emotional intelligence

Introduction

As Manzeske and Stright (2009) indicate, one important aspect of development during early adulthood is the use of skills to regulate both positive and negative emotions in social, educational, and professional contexts.

This set of skills has received the name emotional intelligence, and has become one of the top fields attracting scientific interest in recent decades. According to the Mayer and Salovey model (1997), the main dimensions of emotional intelligence are perceiving, understanding, and regulating emotions. *Perceiving* refers to the ability to precisely perceive and name emotional expressions and situational and behavioral signs. *Understanding* refers to being able to identify one's own and others' emotions, and *regulating*

emotions is the ability to cope with negative emotions and encourage positive ones.

However, as Alegre and Benson (2010) indicate, the three dimensions of emotional intelligence seem to be differently related to psychological adjustment. While the dimensions of understanding and mood repair (regulating emotions) generally predict the degree of psychosocial adjustment (Fernandez-Berrocal and Extremera 2007; Wong et al. 2007; Berking et al. 2008), the relationship between the attention (perceiving) dimension and adjustment problems is not clear; contradictory results show that attention to feelings may play a different role than understanding and mood repair. Therefore, we concur with Alegre and Benson (2010) that the components of emotional intelligence must be studied separately.

Among the many factors that may determine the emotional development of children and youth, the role of the family must be emphasized. Indeed, the influence of the family context in children's emotional development has been pointed out by diverse authors, whether that influence comes from what parents teach, or from the parents' own

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behavior. For example, Mayer and Salovey (1997) indicate that interactions within the family context mark the beginning of emotional skill acquisition, with parents teaching their children to connect their emotions with social situations that they experience.

One of the aspects of parents' behavior that has great influence on children's development is parenting style (MacCoby and Martin 1983), for which two important dimensions have been identified—*affect* and *control* (Grolnick and Gurland 2002).

The first of these dimensions refers to the parents' availability and their demonstration of support and affection for their children. This set of positive practices has been related to a lower rate of externalizing problems in children, to higher self-esteem, and to good psychological adjustment (Eiden et al. 2007; Khaleque et al. 2007; Rohner 1990).

The second dimension concerning parenting styles is *control*, which is a more complex construct. According to Alegre (2011), some practices that make up this construct show positive relationships to developmental outcomes, while other practices show negative relationships or undesirable outcomes. The former would include behavior control and support for autonomy, along with inductive discipline (De Clercq et al. 2008; Sanders 2008). By contrast, practices that produce negative outcomes include most notably psychological control and harsh discipline (Barnett et al. 2008; Barry et al. 2007; Shelton and Harold 2008).

Despite extensive research on how parenting styles influence many aspects of the development and psychological adjustment of children and youth, little attention has been given to the relationship and influence of parenting styles on the development of emotional intelligence (Alegre 2011). Furthermore, most of the research has focused particularly on children and adolescents, with less attention given to these relationships in youths who are entering early adulthood (Morris et al. 2007).

According to Alegre and Benson (2010), there is evidence that the two main dimensions of parenting styles mentioned above are related to children's emotional intelligence. Namely, parental *affect* has proven to be positively related to children perceiving, understanding, and regulating emotions (Alegre and Benson 2007; Bennett et al. 2005; Eisenberg et al. 1998; Steele et al. 1999). There are also data that show parental *control* to be related to children perceiving, understanding, and regulating emotions (Morris et al. 2007; Pears and Moses 2003; Perlman et al. 2008).

However, as indicated above, the construct of parental control is quite complex and includes a number of practices with different outcomes that need to be analyzed.

Manzeske and Stright (2009) indicate that in early adulthood there are two important types of control: behavior control and psychological control (Barber et al. 1994). On one hand, moderate levels of behavior control have been

associated with positive emotional adjustment in children (Barber et al. 2005). On the other hand, psychological control is a parental behavior that interferes with the adolescent's emotional development, restricting emotional intelligence and diminishing the competency to establish and express one's own feelings. Psychological control interrupts the development of emotional autonomy by interfering with adolescents' ability to establish and express their thoughts and feelings (Barber and Harmon 2002; Manzeske and Stright 2009; Moilanen 2007).

Despite the demonstrated negative influence of parents' psychological control on adolescents' emotional development (Barber and Harmon 2002), few studies have investigated its impact on their emotional intelligence. In the study by Gugliandolo, Costa, Cuzzocrea, and Larcán (2015), parents' psychological control was shown to be negatively associated with the children's emotional intelligence.

More recently, authors like Kerr and Stattin (2000) have proposed a new concept concerning parental control, relating to how well parents know their children; it involves the parents' asking for information and the children revealing it. This form of control can be especially important when children are older.

Similarly, beginning in adolescence, autonomy support through respect for children's independence and decision making constitutes one component of an adequate parenting style (Steinberg et al. 1992).

With respect to parental discipline, punitive and harsh discipline has been shown to be related to low levels of emotional understanding and regulation in children (Morris et al. 2007; Pears and Moses 2003).

However, there are diverse parenting practices whose influence on emotional intelligence has not been investigated. Namely, there are few or no studies on how behavior control, psychological control, autonomy support, or revelation relate to emotional intelligence.

Another important aspect has to do with whether it is useful to differentiate between fathers' and mothers' parenting styles; some results have shown that the two parents' practices may differently influence their children (García-Linares et al. 2011; Lim et al. 2015; Milevsky et al. 2007).

Considering all the above, a number of important questions follow in regard to the scarcity of research on how certain parenting practices relate to their children's emotional intelligence, especially in early adulthood; on the differential behavior of the three main dimensions of emotional intelligence in relation to psychological adjustment; and on the differing influence of fathers' and mothers' parenting styles.

These questions constitute the basis for carrying out the present study, which analyze relations between a substantial number of fathers' and mothers' parenting practices (*affect*, *inductive discipline*, *strict discipline*, *permissive discipline*, *autonomy support*, *behavior control*,

psychological control, and revelation) and the main dimensions of emotional intelligence, in college students. Specifically, the objectives of this study are as follows:

- One To verify whether different types of profiles emerge when combining the dimensions that make up emotional intelligence (perception, clarity, and repair) in college students.
- Two To determine whether there are differences between the established groups, in fathers' and mothers' parenting practices, as reported by the students.

Method

Participants

Participating in the study were 300 freshmen students from different degree programs, all of them within the School of Humanities and Educational Sciences at the University of Jaen. Of the total sample, 5.7% of students were enrolled in the Art History degree, 11% in English Studies, 38% in Psychology, 24% in Early Childhood Education, and 21.3% in Primary Education. The gender distribution was 24.3% male and 75.7% female.

Mean age of the sample was 19.9 years, with a standard deviation of 1.31. The age distribution was 38% 18-year-olds, 25% 19-year-olds, 14.3% age 20, 7% age 21, and 5% age 22; the remaining 10.7% were age 23 or older.

Regarding their father's educational level, 32.7% had a high school education, 22.3% primary school education, 20.7% had vocational training, 11.35% had a bachelor's degree, 9% had not completed any level of education, and 4% had postgraduate studies. Regarding the mother's educational level, 34.7% had a high school education, 23.7% primary school education, 22% had vocational training, 13.3% had a bachelor's degree, 6% had not completed any level of education, and 0.3% had postgraduate studies.

Incidental sampling was used to form the study sample; the degree programs and groups were selected according to their availability. Participants were asked for their written consent. The questionnaires were completed anonymously.

The tests were applied during a single hour-long session, held during class hours within the different degree programs (Art History, English Studies, Early Childhood Education, and Primary Education), with both the professor and the researchers present. Students' collaboration was solicited and they were assured that questionnaire responses were entirely voluntary and confidential.

Instruments

In order to assess the different forms of discipline, we used the *Escala de normas y exigencias* (hereafter, Rules and Demands scale) (Bersabé et al. 2001; Fuentes et al. 1999), which contains three factors or dimensions: inductive discipline (e.g., "He/she reasons with me and we agree on the rules"), strict discipline (e.g., "He/she requires me to follow rules even if I don't understand them"), and permissive discipline (e.g., "He/she doesn't care whether I obey or disobey"). The first two factors each have ten items, while the third factor has eight. All the dimensions are scored on a five-point Likert scale (from 1 = "never" to 5 = "always"). The first two scales produce a total score between 10 and 50, while the total score for the permissive discipline scale falls between 8 and 40. A higher score corresponds to a higher degree of the aspect being assessed. Assessment of parenting practices is done separately for the father and the mother. Internal consistency indices (Cronbach alpha statistic) for the dimensions of inductive, strict, and permissive discipline, relatively, were as follows: for mothers, .85, .74, and .72; and for fathers, .86, .74, and .73. The instrument's convergent validity was obtained using correlation analysis of the scores in the discipline dimensions of the Rules and Demands scale and the factors assessed with the Parental Authority Questionnaire (Buri 1991). Values ranging from 0.38 for permissive discipline and 0.63 for inductive discipline were obtained (Bersabé et al. 2001). The utility of these scales has been proven in several studies that analyze the influence of parenting practices on the functioning of adolescents (De la Torre et al. 2011; García-Linares et al. 2014).

In order to assess the remaining parenting practices, we used the *Escala para la evaluación del estilo parental* (Oliva et al. 2007), or "Parenting Style Assessment Scale." This scale evaluates separately the father's and mother's affect and different types of control. It contains 41 items where the adolescent assesses six dimensions of mother's and father's style on an independent basis. Internal consistency of dimensions was high: Affect and communication ($\alpha = 0.92$), Promotion of autonomy ($\alpha = 0.88$), behavior control ($\alpha = 0.82$), psychological control ($\alpha = 0.86$), revelation ($\alpha = 0.85$), and Humor ($\alpha = 0.88$). For the present study, we used only the following dimensions: Affect and communication, Promotion of autonomy, Behavior control, Psychological control, and Revelation, which together completed the construct control, along with the three forms of discipline assessed by the instrument described above.

The Trait Meta-Mood Scale-24 (TMMS 24; adaptation by Fernández-Berrocal et al. 2004) was used to assess emotional intelligence. The questionnaire is composed of 24 items. Participants are asked to evaluate the degree to which they agree with each of the items on a five-point Likert scale,

ranging from *Totally disagree* (1) to *Totally agree* (5). The scale comprises three subfactors: Attention to one's own feelings, emotional clarity, and mood repair. Fernández-Berrocal et al. (2004) found internal consistencies of .90 for Attention, .90 for Clarity, and .86 for Repair.

Statistical Analyses

Due to the different behaviors of the Emotional Intelligence dimensions of attention, clarity, and repair, we then used the cluster analysis technique in order to determine whether different profiles existed in the grouping of these dimensions, as has been done in prior research (García-Fernández et al. 2015; García-Linares et al. 2015; Gázquez et al. 2015).

The criteria used were the scores obtained on the three dimensions of emotional intelligence assessed by the TMMS-24, that is, attention to emotions, emotional clarity, and repair. Maximizing intergroup differences was the criterion for determining the number of clusters. In addition to this criterion, we also took into account theoretical viability and psychological significance of each of the groups represented by the different profiles of emotional intelligence.

After establishing the different groups by cluster analysis, analyses of variance (ANOVAs) were carried out in order to analyze the statistical significance of between-group differences in parenting practices. In order to analyze the magnitude or effect size of these differences, we considered the η^2 index.

After examining the analyses where there were statistically significant differences, post hoc tests were performed to identify which groups were differentiated by these differences. Data were analyzed using the Statistical Package for the Social Sciences, version 20.0 (IBM, 2011).

Results

Having completed the cluster analysis, shown in Chart 1, three profiles (or groups) were obtained. Upon comparison, the first group has the highest score in the attention and clarity dimensions, and a lower score for repair. The second group presents lower scores in attention, clarity, and repair. Finally, the third cluster has the lowest score in attention, and most especially, the highest score in repair.

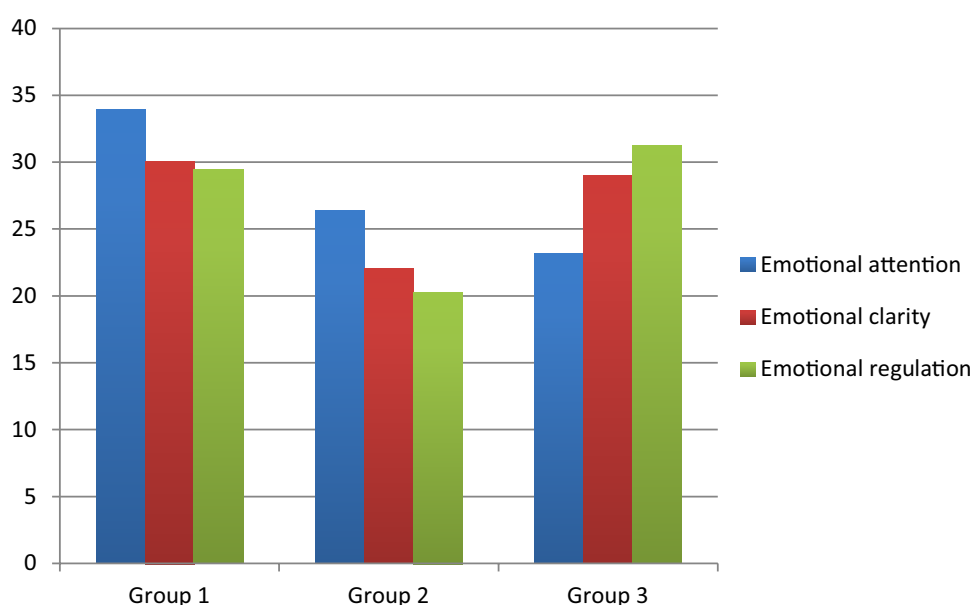
Once the clusters were identified according to scores on the emotional intelligence dimensions, analyses of variance (ANOVAs) were carried out to analyze the between-group differences produced in the dependent measures of father's and mother's parenting practices.

Regarding the mother's parenting practices, results indicate that there are significant differences in the dimensions of inductive discipline $F(2,297) = 8.2$, $\alpha = 0.000$; affect $F(2,297) = 5.45$, $\alpha = 0.005$; and autonomy support $F(2,297) = 4.9$, $\alpha = 0.008$.

Regarding the father's parenting practices, results indicate that there are significant differences in the dimensions of inductive discipline $F(2,297) = 13.8$, $\alpha = 0.000$; strict discipline $F(2,297) = 5.09$, $\alpha = 0.007$; affect $F(2,297) = 9.8$, $\alpha = 0.000$; behavior control $F(2,297) = 3.8$, $\alpha = 0.024$; autonomy support $F(2,297) = 13.4$, $\alpha = 0.000$; psychological control $F(2,297) = 4.8$, $\alpha = 0.009$; and revelation $F(2,297) = 3.8$, $\alpha = 0.023$.

With regard to inductive discipline in both father and mother, a posteriori comparisons using the DSM statistic indicate that Cluster 2 has a lower score than Clusters 1 and 3. Regarding strict discipline from the father, the

Chart 1 Emotional intelligence profiles obtained. Group 1: greater attention and emotional clarity, lower in mood repair. Group 2: low attention, clarity, and mood repair. Group 3: lowest in attention to emotions and highest in repair



Cluster 3 score is significantly lower than scores for Clusters 1 and 2 (see Table 1).

Regarding strict discipline from the father, Cluster 2's score is significantly lower than scores for Clusters 1 and 3. In the autonomy support dimension, for both father and mother, Cluster 2's score is lower than this same score in Clusters 1 and 3.

In father's behavior control, the score for Cluster 1 is higher than for Cluster 3; in father's psychological control, the score for Cluster 3 is lower than for Clusters 1 and 2. Finally, in the dimension of father revelation, Cluster 2 has a lower score than Clusters 1 and 3.

Comments

Regarding our first objective, the results of this study show that we obtain different profiles or groupings by combining the three dimensions that comprise emotional intelligence: attention, clarity, and repair. The three-cluster solution that was selected gives us one pattern that we might describe as dysfunctional, in that it presents higher scores for emotional attention, but lower scores for repair. The second pattern obtained is characterized by low scores on all three dimensions, that is, we might interpret this profile as persons who have few emotional skills in general. Finally, the third profile obtained is characterized by a lower score in attention but higher scores in clarity, and especially in mood repair, thus corresponding to a profile of adequate emotional skills.

The interpretation of these profiles is based on data from several investigations where people with high emotional

Table 1 Means, standard deviations, contrast value, statistical significance, and post hoc comparisons in parenting practices as a function of the different groups

	Gr 1 <i>M (SD)</i>	Gr 2 <i>M (SD)</i>	Gr 3 <i>M (SD)</i>	<i>F</i>	<i>p</i>	<i>post hoc</i> comparisons	η^2
Mother's parenting							
Affect	34.39 (6.6)	31.68 (6.6)	34.41 (5.9)	5.45	.005	G2 < G1 (.005) G2 < G3 (.003)	.035
Behavioral control	21.01 (4.8)	20.53 (5.04)	19.82 (5.33)	1.48	n.s		
Promotion of autonomy	32.77 (6.5)	29.77 (6.75)	31.85 (6.43)	4.9	.008	G2 < G1 (.002) G2 < G3 (.026)	.032
Psychological control	19.78 (5.5)	20.01 (5.48)	18.63 (5.12)	2.014	n.s		
Revelation	18.71 (5.26)	17.63 (4.62)	18.79 (4.7)	1.487	n.s		
Inductive discipline	39.55 (7.66)	35.36 (7.55)	39.10 (7.54)	8.2	.0000	G2 < G1 (.000) G2 < G3 (.001)	.052
Strict discipline	25.29 (7.25)	25.27 (7.16)	23.73 (6.68)	1.77	n.s		
Permissive discipline	18.17 (5.09)	17.54 (4.46)	18.34 (4.90)	.700	n.s		
Father's parenting							
Affect	33.03 (6.17)	28.64 (7.66)	32.35 (7.37)	9.83	.000	G2 < G1 (.000) G2 < G3 (.000)	.062
Promotion of autonomy	32.54 (5.79)	27.59 (7.31)	31.33 (6.79)	13.4	.000	G2 < G1 (.000) G2 < G3 (.000)	.073
Behavioral control	19.70 (5.19)	18.93 (5.80)	17.66 (5.57)	3.8	.024	G1 > G3 (.007)	.023
Psychological control	19.12 (5.55)	19.97 (5.68)	17.66 (5.04)	4.8	.009	G3 < G1 (.049) G3 < G2 (.003)	.030
Revelation	17.22 (5.01)	15.28 (5.43)	17.04 (5.08)	3.82	.023	G2 < G1 (.013) G2 < G3 (.018)	.018
Inductive discipline	39.32 (7.76)	33.10 (8.08)	37.59 (8.44)	13.8	.000	G2 < G1 (.000) G2 < G3 (.000)	.085
Strict discipline	24.20 (7.53)	25.34 (7.35)	22.25 (6.31)	5.09	.007	G3 < G1 (.042) G3 < G2 (.002)	.033
Permissive discipline	18.15 (4.91)	17.38 (4.58)	18.27 (5.13)	.877	n.s		

Group 1: greater attention and emotional clarity, lower in emotional regulation. Group 2: low attention, clarity, and emotional regulation. Group 3: lower attention to emotions and greater mood repair

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

intelligence present a profile with moderate-to-low scores in emotional attention and high scores in understanding and regulating emotions; such a profile is associated with better adjustment and psychosocial well-being (Extremera and Fernández-Berrocal 2002; Salguero et al. 2012).

For example, the dimensions of clarity and mood repair were found to be related to life satisfaction measures, that is, persons who present high levels of clarity and repair manifest greater life satisfaction (Augusto et al. 2006; Cerezo et al. 2016; Extremera et al. 2005; Páez et al. 2006; Palomera and Brackett 2007).

With regard to attention given to the emotions themselves, several research studies report that people who present high levels of attention to emotions manifest a greater number of physical symptoms, depression, anxiety, and a deficit in their physical and social functioning (Extremera and Fernández-Berrocal 2002; Goldman et al. 1996; Salovey et al. 2002; Thayer et al. 2003).

Regarding our second objective, our analysis of fathers' and mothers' parenting practices reveals significant differences between profiles, and so validates their existence. Specifically, the first profile is associated with higher scores in practices considered to be positive, such as inductive discipline, affect, and autonomy support from father and mother, together with revelation and behavior control on the father's part. However, this profile was described as dysfunctional, since it is also associated with higher scores in practices considered to produce a negative effect on psychological development, such as father's strict discipline and psychological control.

The second profile is associated with lower scores on dimensions considered positive: inductive discipline, affect, and autonomy support from father and mother, and revelation on the father's part. Moreover, this profile is associated with higher scores on the dimensions considered to be negative, that is, father's strict discipline and psychological control.

Finally, the third profile or cluster, corresponding to an adequate combination of emotional skills, is associated with higher scores on dimensions considered positive: inductive discipline, affect, and autonomy support from father and mother, and at the same time, lower scores on the dimensions considered to be negative, namely, father's strict discipline and psychological control.

Therefore, the results indicate that an adequate combination of parenting practices, with more use of positive practices and less use of negative practices, is associated with a profile of adequate emotional skills in one's offspring. An inadequate combination of parenting practices, with more use of negative practices and less use of positive practices, is associated with a profile characterized by deficient emotional skills. Finally, what we might refer to as an inconsistent use of parenting practices, given that both positive and

negative practices are used, is associated with what we consider to be a dysfunctional profile, characterized by a higher level of emotional attention but lower mood repair skills.

Although there are no similar research studies with which to compare our results, there are studies that have examined the differences between emotional intelligence profiles with respect to other variables. For example, the study from Gázquez et al. (2015) analyzes adolescents' social behavior and confirms the existence of the three profiles that we found, as well as a fourth profile characterized by high skills in all three dimensions of EI. Students whose profiles correspond to what we call the dysfunctional profile (higher attention and lower repair) and the inadequate profile (low attention, clarity, and repair) show more social inhibition than the remaining students, and the dysfunctional profile also presents a higher level of social anxiety.

Similarly, the study from García-Fernández et al. (2015) analyzes adolescents' learning strategies, and confirms the existence of the same three profiles, as well as a fourth profile characterized by high scores on all three dimensions of EI. This study confirms that students with the adequate profile (low attention and greater repair) use learning strategies to a greater extent than do students with the dysfunctional or inadequate profile. Their results indicate that low levels of attention accompanied by high levels of mood repair improve learning processes, while high levels of attention with low levels of repair hinder adolescents' social and academic adjustment.

Therefore, the studies mentioned ratify the existence of the same profiles found in our study, and confirm that the profile showing lower attention and greater repair is associated with positive results, while the profile with greater attention and lower repair is associated with negative results.

Our study differs from these other studies in that we did not find the profile characterized by high scores in all three dimensions of emotional intelligence. This result may perhaps be explained by the difference in sample: in our case the participants were university students, while the two studies above assessed secondary students.

The distinction between father's and mother's parenting practices made it possible to obtain results that point toward greater relevance of the father's role in comparison to the mother's. With regard to the father's parenting practices, all but one of these (permissive discipline) were marked by significant differences between the different emotional intelligence profiles. In the case of the mother's parenting practices, only three of these, all of them positive, had significantly different scores with respect to the different emotional intelligence profiles.

In this line of results, recent studies (García-Linares et al. 2011; Nishikawa et al. 2010) have asserted that the father's behavior toward the adolescent is as important to the child's well-being as the mother's. In addition, the idea that the

importance of the father's attachment increases with age (Williams and Kelly 2005) seems to be confirmed in this study.

The limitations of the present study, relating to sample representativeness and the fact that the college students were assessed using self-report measures, could be improved upon, thus suggesting prospects for future research work. Additionally, instead of obtaining information from a single source, another improvement would be to use other informers, both for parenting practices (e.g., the parents themselves) and for emotional intelligence. It would also be beneficial to carry out longitudinal studies to determine the developmental course of emotional intelligence.

The results of this study, although only a first approximation, and limited by the effect size found, can nonetheless offer relevant information towards the treatment and prevention of emotional problems in early adulthood. Parents should become aware of the importance of their parenting practices in the development of their children's emotional behavior, and their influence in the development of dysfunctional patterns that may affect their children's psychological well-being.

Finally, it would be advisable for future studies to explore why the role of the father is more relevant than that of the mother in the emotional intelligence of the children. In addition, it would be useful to check whether the result of this research is also obtained in other cultures, since the significance of educational practices may be different depending on cultural factors.

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The Role of Parental Achievement Goals in Predicting Autonomy-Supportive and Controlling Parenting

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Abstract Although autonomy-supportive and controlling parenting are linked to numerous positive and negative child outcomes respectively, fewer studies have focused on their determinants. Drawing on achievement goal theory and self-determination theory, we propose that parental achievement goals (i.e., achievement goals that parents have for their children) can be mastery, performance-approach or performance-avoidance oriented and that types of goals predict mothers' tendency to adopt autonomy-supportive and controlling behaviors. A total of 67 mothers (aged 30–53 years) reported their goals for their adolescent (aged 13–16 years; 19.4 % girls), while their adolescent evaluated their mothers' behaviors. Hierarchical regression analyses showed that parental performance-approach goals predict more controlling parenting and prevent acknowledgement of feelings, one autonomy-supportive behavior. In addition, mothers who have mastery goals and who endorse performance-avoidance goals are less likely to use guilt-inducing criticisms. These findings were observed while controlling for the effect of maternal anxiety.

Keywords Achievement goals · Autonomy support · Controlling parenting · Mastery · Performance

Introduction

Autonomy-supportive and controlling parenting have been repeatedly linked to children's social, academic and psychological adjustment (Grolnick and Pomerantz 2009; Joussemet et al. 2008a; Moreau and Mageau 2013). However, fewer studies have focused on the determinants of these parenting dimensions. This is unfortunate because gaining insight into the obstacles and facilitating factors of more autonomy-supportive, and less controlling, parenting behaviors is important to assist parents in fostering their children's need for autonomy.

Self-determination theory proposes that human beings have an innate and universal need for autonomy, that is, the need to feel a sense of agency and ownership of their behaviors (Deci and Ryan 2000). Children feel autonomous when they are intrinsically motivated or when they have internalized or taken over societal values as their own. They are then said to act because of self-endorsed (or self-determined) reasons, and this can occur even when behaviors are initially prompted externally (Joussemet et al. 2014; Koestner et al. 1984). Typically, parental autonomy support has been operationalized with three behaviors: providing a meaningful rationale for limits and demands (e.g., teeth need brushing each day to avoid cavities), giving choices within these limits (e.g., do you want to brush your teeth now or after the story?), and acknowledging the child's feelings (e.g., it's true, teeth brushing is not always fun; Deci et al. 1994; Grolnick and Ryan 1989; Koestner et al. 1984). More generally, autonomy-supportive parents are empathic, descriptive (i.e., informational instead of evaluative) and they provide opportunities for active participation (e.g., in decisions making or in problem solving) instead of being intrusive, dominating and pressuring (Grolnick and Pomerantz 2009).

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Autonomy support is thus different from permissiveness because it can be combined (and ideally is combined) with parental provision of structure, such as limit settings (Koestner et al. 1984) or rule enforcement (Lessard et al. 2015). Parental autonomy support has been linked to positive outcomes at different developmental stages (see Joussemet et al. 2008a; Moreau and Mageau 2013, for reviews) such as a more secure attachment style (Whipple et al. 2011) and better executive functioning (Bernier et al. 2010) in toddlers, higher social and academic adjustments in elementary school children (Bronstein et al. 1996; Grolnick and Ryan 1989; Joussemet et al. 2005), and higher well-being (Downie et al. 2007; Niemiec et al. 2006; Soenens et al. 2007), more life satisfaction (Sheldon et al. 2009) and less health-risk behaviors (Williams et al. 2000) in adolescence. Importantly, research based on experimental designs has also shown that autonomy-supportive limit-setting facilitates internalization of societal values and expectations compared to controlling conditions, while preserving intrinsic motivation and creativity (Joussemet et al. 2004; Koestner et al. 1984).

The opposite of autonomy support in terms of its psychological significance for the child is autonomy-thwarting or controlling parenting (Grolnick and Pomerantz 2009; Soenens et al. 2007). One often examined type of controlling parenting is psychological control (Barber 1996). Controlling parenting is characterized by pressure, intrusion, and domination (Grolnick and Pomerantz 2009) and can be either externally (e.g., coercive threats) or internally controlling (e.g., conditional love, invalidation, shaming; Soenens and Vansteenkiste 2010). In the present study, controlling parenting is operationalized using both externally and internally controlling behaviors (i.e., threats, guilt inductions, and performance pressures; Mageau et al. 2015a). Controlling parenting has been linked to children's oppositional behaviors (Bronstein 1994), antisocial acts (Barber 1996; Conger et al. 1997; Herman et al. 1997; Joussemet et al. 2008b; Prinzie et al. 2010), and emotional self-regulation problems (Fabes et al. 2001). It also significantly predicts internalized problems (Faubert et al. 1990) such as childhood anxiety (Ballash et al. 2006; Rapee 1997; Wood et al. 2003), depression (Barber 1996; McCranie and Bass 1984; Miller et al. 1990; Soenens et al. 2008a, b), and lower self-esteem (Conger et al. 1997; Garber et al. 1997; Silk et al. 2003). Given the robust linkage between more autonomy-supportive (and less controlling) parenting and children's and adolescents' psychological adjustment (Joussemet et al. 2008a; Moreau and Mageau 2013), it is imperative to uncover the facilitating and impeding factors of these parenting behaviors.

Most studies that investigated the determinants of parenting have identified obstacles of autonomy-supportive behaviors or risk factors that lead parents to be more

controlling. Parents who are perfectionists (Flett et al. 2002) or achievement oriented (Pomerantz and Eaton 2001), who feel anxious when they are apart from their children (Soenens et al. 2006), who hinge their self-esteem on their child's behavior (Grolnick et al. 2007), and who have a strong fear of failure (Elliot and Thrash 2004) were found to be more controlling than parents without these personal characteristics. At the contextual level, children who have a more difficult temperament (Pettit et al. 2001), are less achievement oriented (Pomerantz and Eaton 2001), or are less intrinsically motivated (Courneya and McAuley 1991) tend to elicit more control from their parents and other adults (Anderson et al. 1986). Stressful life events (Grolnick et al. 1996), lower socio-economic status (SES; Dodge et al. 1994), unemployment (McLoyd 1989), and perceived environmental threat (Gurland and Grolnick 2005) are yet other contextual factors associated with controlling parenting. At the situational level, Zussman (1980) showed that situational stress is related to controlling behaviors: Mothers who were asked to supervise their children in a moderately hazardous situation were more controlling when they were also preoccupied with an additional task.

In one of the few studies examining factors that can facilitate autonomy support in the parent–child relationship, Landry et al. (2008) found that mothers' trust that children's development proceeds in a natural and healthy way (i.e., organismic trust) is positively associated with mothers' autonomy-supportive practices. Studies conducted in other types of hierarchical relationships suggest that higher well-being (Stebbins et al. 2011) and viewing subordinates' abilities as reflecting efforts and practice instead of as being a personality trait (Leroy et al. 2007) could also facilitate more autonomy-supportive behaviors.

Taken together, these findings suggest that personal, contextual and situational pressures prevent parents from adopting autonomy-supportive behaviors and trigger more controlling parenting. When interpreting these findings, Grolnick (2003) proposed that pressures orient parents toward more outcome-focused goals, leading them to overlook their child's internal frame of reference and adopt more controlling parenting strategies. Although the hypothesis that parental goals influence parenting behaviors is widely shared, little research has specifically addressed this question (Dix 1992; Goodnow and Collins 1990; Grusec et al. 1997; Kuczynski 1984; Maccoby and Martin 1983). We know that parents who are made to focus on the outcome (by telling them that their children's memory of an event would be tested) are more controlling than parents who are encouraged to focus on the process (by telling them that their children's personal perspective of an event would be assessed; Cleveland et al. 2007). Kuczynski (1984) also found that mothers who were given

a long-term compliance goal (by being told that their child would need to comply when alone) were more likely to use reasoning strategies than mothers who were given short-term compliance goals (child would only need to comply in their presence). Finally, Dix (1992) proposed that goals differ in the extent to which they are parent-centered, empathic, and oriented toward socialization (Dix 1992; Grusec et al. 1997). Relations between parental goals and parenting behaviors can be investigated further by drawing on Elliot and Church (1997)'s achievement goal model, an influential theory in goal research.

In the achievement goal model, achievement goals concern competence development and achievement (Elliot and Church 1997). Applied to parenting, *parental achievement goals* are goals that parents have regarding the development and achievement of their children's own competence. Traditionally, achievement goals have been distinguished as a function of the way competence is evaluated (i.e., mastery vs. performance; Dweck 1986; Elliot et al. 2011; Nicholls 1984). A similar distinction is also made for parental achievement goals. Parents with parental mastery goals want their children to develop their competence and thus evaluate achievement using temporal comparisons (past vs. present performance). In contrast, parents who pursue performance goals work toward a demonstration of their children's competence as evaluated by social comparisons with their peers. In a pioneer study, Gonida and Cortina (2014) provided evidence that parental achievement goals may influence autonomy-support and controlling parenting. Specifically, results showed that the more parents endorsed mastery goals when helping their children with their homework, the more they reported engaging in autonomy-supportive behaviors, and the more parents had performance goals during homework the more they reported using controlling strategies. However, because all measures were based on parent reports, these findings were not free from potential common variance bias.

Furthermore, goal research has established that goals also differ in their motivational orientation (i.e., approach vs. avoidance; Elliot 1999; Elliot and Harackiewicz 1996; Elliot et al. 2011). People can thus be oriented toward achieving high levels of competence/performance or they can focus instead on avoiding failure. Applied to the performance goals in the parenting context, parents with performance-approach goals want their children to exhibit higher levels of performance than their peers, while parents with performance-avoidance goals want to avoid situations where their children would appear incompetent compared to their peers. The distinction between performance-approach and performance-avoidance goals has proved particularly important when predicting learning outcomes. For example, while performance-avoidance goals are

consistently associated with negative learning outcomes (e.g., surface processing, test anxiety, lower GPA, and avoidance of help seeking; see Moller and Elliot 2006, for a review), performance-approach goals have yielded a more complex pattern of associations. Performance-approach goals are related to both positive (e.g., higher performance) and less desirable (e.g., more surface processing and avoidance of help seeking) outcomes. Given the differential outcomes of performance-approach and performance-avoidance goals, their influence on parenting may also greatly differ.

The goal of the present research was thus to extend Gonida and Cortina (2014)'s study (1) by investigating the role of three parental achievement goals (i.e., mastery, performance-approach, and performance-avoidance) rather than only two and (2) by including both mothers and adolescents rather than relying only on parent reports. In light of the important linkage between stress and controlling parenting, these relations were examined while controlling for mothers' anxiety. It was expected that performance goals would orient mothers toward the outcome while mastery goals would facilitate the adoption of a more child-centered approach. Accordingly, we postulated that parental mastery goals would facilitate parental autonomy support but that they would not be associated with controlling parenting. In contrast, performance goals, whether approach- or avoidance-oriented, should predict more controlling parenting, while preventing the adoption of more autonomy-supportive parental behaviors. These effects were expected to be independent of mothers' anxiety. Exploratory analyses were also conducted to investigate if parental goals were more closely linked to some specific parenting behaviors.

Method

Participants

Participants were 67 French-speaking mother–adolescent dyads. We recruited participants via the adolescents' high schools, which were situated in the Montreal area. Mothers were aged between 30 and 53 years ($M = 42.61$ years, $SD = 5.09$ years) while their adolescents (19.4 % girls) were aged between 13 and 16 years ($M = 14.03$ years, $SD = 0.96$ years). Approximately a third of the sample (35 %) had a family revenue between 30,000\$CAN and 49,999\$CAN, while 23.3 % earned between 50,000\$CAN and 69,999\$CAN, 19.9 % earned 70,000\$CAN or higher, and 16.7 % had family revenue below 30,000\$CAN. In terms of education, 28.4 % of the sample completed high school, half also obtained a pre-university or technical diploma (50.7 %), and 20.9 % received a university

degree. Most of the sample (94 %) spoke French at home while a few families spoke both French and English ($n = 4$). One mother reported Arabic as a second language in addition to French and one spoke Italian in addition to French and English.

Procedure

Mothers received a consent form and a questionnaire by mail, which they completed at home and returned in a prepaid return-envelop. The questionnaire assessed parental achievement goals, anxiety trait and demographic variables. Upon receipt of parental consent, research assistants met the adolescents at their school and invited them to complete the Perceived Parental Autonomy Support Scale. A total of sixty-seven dyads were recruited using this procedure.

Efforts were also made to increase sample size. However, only 70 mothers were recruited in this second wave of data collection; adolescents could not be recruited because visits to the school could not be planned before the end of the school year. Mothers recruited in the second wave of data collection did not differ from the others in terms of age, revenue, education level, anxiety or types of goals. Participation to this study was not compensated.

Measures

Parental achievement goals were reported by mothers using the Parental Achievement Goal Questionnaire. This scale was inspired by Elliot and McGregor (2001)'s Achievement Goal Questionnaire. It is comprised of three subscales, each assessing a specific type of goals that mothers can have for their adolescent. Specifically, parental mastery goals (3 items, e.g., I want my child to do his/her best in the activities he/she is involved in; $\alpha = .69$), performance-approach goals (4 items, e.g., I try to encourage my child to finish among the first in what he/she does; $\alpha = .80$), and performance-avoidance goals (4 items, e.g., I do not want my child to do activities in which he/she will be less competent than others; $\alpha = .85$) were assessed. A three factor CFA was conducted and provided acceptable fit indices (χ^2 ($df = 39$, $n = 127$) = 60.10, $p < .02$, $\chi^2/df = 1.75$, CFI = .95, NNFI = .92, RMSEA = .07 [.03/.10]). Items, factor loadings, and factor correlations are presented in Table 1.

Mothers' trait anxiety and socio-economic status (SES) were assessed as potential covariates. Mothers reported their tendency to experience anxiety in general using the 20-item trait anxiety subscale of the State-Trait Anxiety Inventory (Gauthier and Bouchard 1993; Spielberger 1983). Items were rated on a 7-point response scale ranging from "Never" (1) to "Always" (7). A sample item is "I

feel nervous and restless". The trait-anxiety subscale has proven reliable and valid in past studies and yielded an excellent reliability coefficient in the present study ($\alpha = .90$). SES was assessed by averaging the standardized scores of mothers' revenue and educational level.

Adolescents evaluated their mothers' use of autonomy-supportive and controlling behaviors using the Perceived Parental Autonomy Support Scale (P-PASS; Mageau et al. 2015a). The P-PASS measures three autonomy-supportive behaviors and three controlling practices using a 4-item subscale per behavior. Autonomy-supportive behaviors are *provision of choice* (e.g., "My mother gave me many opportunities to make my own decisions about what I was doing"; $\alpha = .63$), *acknowledgement of the child's feelings* (e.g., "My mother was open to my thoughts and feelings even when they were different from hers"; $\alpha = .78$), and *provision of a rationale for rules and demands* (e.g., "When my mother asked me to do something, she explained why she wanted me to do it"; $\alpha = .64$). Controlling behaviors are *guilt-inducing criticisms* (e.g., "My mother made me feel guilty for anything and everything"; $\alpha = .85$), *use of threats* (e.g., "When I refused to do something, my mother threatened to take away certain privileges in order to make me do it"; $\alpha = .85$), and *performance pressures* (e.g., "My mother refused to accept that I could want simply to have fun without trying to be the best"; $\alpha = .67$). Total scores for autonomy support and controlling parenting were obtained by averaging the relevant subscales. Reliability coefficients were high ($\alpha = .85$ for autonomy support and $\alpha = .85$ for controlling parenting). Past research shows that autonomy-supportive and controlling behaviors form two separate factors in exploratory factor analyses (Mageau et al. 2015a). Also, higher-order factor analysis showed that the six subscales load in expected ways on two higher-order factors, with three subscales loading on an autonomy-supportive second-order factor and three subscales loading on a controlling one (Fournier et al. 2010).

Data Analyses

Correlations among mothers' trait anxiety, age and SES, their adolescent's age and gender, and maternal behaviors were first examined to identify potential covariates. Correlations among maternal goals, autonomy support and controlling parenting were then inspected, followed by the main analyses. Two hierarchical regression analyses were conducted, one for maternal autonomy support and one for controlling parenting, to investigate their relations with maternal goals while controlling for potential covariates and for the interrelations among the three goals. In a more exploratory fashion, we also conducted regression analyses to examine the relations among maternal goals and the six

Table 1 Items, factor loadings, and factor correlations of the parental achievement goal questionnaire

Item	Factor 1	Factor 2	Factor 3
“I want my child to do his/her best in the activities he/she is involved in”	.73		
“I try to help my child get better in his/her activities”	.66		
“I wish that my child improves in what he/she gets involved in”	.58		
“I try to encourage my child to finish among the first in what he/she does”		.81	
“I wish that my child be better than others in the activities he/she does”		.73	
“I try to help my child be the best in the activities he/she is engaged in”		.62	
“I would like my child to excel in his/her activities”		.60	
“I do not want my child to do activities in which he/she will be less competent than others”			.91
“I encourage my child to avoid the activities where he/she could feel inferior to others”			.84
“I encourage my child to avoid activities where he/she might not be the best”			.71
“I prefer that my child does not do activities where he/she may not excel”			.55
Correlation with Factor 1		.31*	.08
Correlation with Factor 2			.53*

parenting behaviors separately, controlling for potential covariates.

Results

Correlations revealed that mothers' trait anxiety was unrelated to controlling parenting but was associated with less autonomy support, $r = -.25$, $p < .05$. Mothers' age and SES, and their adolescent's age and gender were not significantly related to autonomy-supportive or controlling parenting. Given these results, maternal anxiety was entered as a covariate in the main regression analyses. No multicollinearity problem was detected during the analyses.

Pearson correlations among maternal goals, autonomy support and controlling parenting are presented in Table 2, along with the means and standard deviations of these variables. Correlations showed that when the common variance among the different types of goals is not taken into account, only performance-approach goals are negatively linked to maternal autonomy support, $r = -.25$, $p < .05$, suggesting that performance-approach goals may

be an obstacle to adopting autonomy-supportive behaviors. There was also a positive correlation between maternal performance-approach goals and maternal performance-avoidance goals, $r = .37$, $p < .01$.

Maternal autonomy support and controlling parenting were submitted to hierarchical regression analyses wherein maternal anxiety was entered in a first block, followed by maternal goals (see Table 3). The overall model was significant for controlling parenting, $F(4, 61) = 2.71$, $p < .05$, with maternal goals explaining 14 percent of the variance above and beyond maternal anxiety. Regression coefficients showed that the less mothers reported having mastery goals ($\beta = -.31$, $p < .05$) and the more they had performance-approach goals ($\beta = .33$, $p < .05$), the more their adolescents observed instances of controlling parenting. For autonomy support, the overall model was only marginal, $F(4, 61) = 2.07$, $p = .10$. Regression coefficients also revealed a marginal link between performance-approach goals and maternal autonomy support, $\beta = -.24$, $p = .09$, although this effect was accounted for by maternal anxiety as suggested by the non-significant difference in percentages of explained variance, $\Delta R^2 = .06$, $F(3, 61) = 1.41$, $p = .25$.

Table 2 Means, standard deviations, and correlations for maternal goals and behaviors

Construct	Means	SD	2	3	4	5	6
Maternal mastery goals	6.12	.91	.21	-.01	-.11	.06	-.22
Maternal performance-approach goals (2)	3.61	1.36		.37**	.21	-.25*	.13
Maternal performance-avoidance goals (3)	1.90	0.93			.48***	-.20	-.12
Trait anxiety (4)	2.18	0.64				-.25*	-.12
Maternal autonomy support (5)	5.39	0.97					-.18
Controlling parenting (6)	2.50	1.07					

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 3 Summary of regression analyses predicting controlling parenting and autonomy support

Block	Controlling parenting			Autonomy support		
	R^2	ΔR^2	β	R^2	ΔR^2	β
1. Anxiety	.01		-.13	.06*		-.24*
2. Anxiety	.15*	.14*	-.14	.12	.06	-.18
Mastery goals			-.31*			.13
Performance approach goals			.33*			-.24
Performance avoidance goals			-.20			-.04

* $p < .05$

In light of the positive correlation between performance-approach goals and maternal autonomy support and given the marginal regression coefficient linking these two variables, we explored the relations among maternal goals and the six parenting behaviors separately, controlling for maternal anxiety (see Table 4). For controlling behaviors, results showed that maternal goals predicted the use of guilt-inducing criticisms ($\Delta R^2 = .16$, $F(3, 61) = 3.96$, $p < .05$) and performance pressures ($\Delta R^2 = .14$, $F(3, 61) = 3.36$, $p < .05$) above and beyond maternal anxiety, but not the use of threats. Regression coefficients revealed that performance-approach goals were key in predicting performance pressures: The more mothers aimed for their child to demonstrate high performance compared to others, the more they applied pressure to achieve their goals, $\beta = .41$, $p < .05$. In contrast, all three goals were predictive of guilt-induction: the less mothers reported having mastery goals ($\beta = -.29$, $p < .05$) or performance-avoidance goals ($\beta = -.30$, $p < .05$) and the more they had performance-approach goals ($\beta = .37$, $p < .01$), the more their adolescents observed instances of guilt-induction. For autonomy-supportive behaviors, results showed that

maternal goals predicted perceived acknowledgement of feelings above and beyond maternal anxiety, $\Delta R^2 = .12$, $F(3, 61) = 2.79$, $p < .05$, but not mothers' provision of rationales or choices. Regression coefficients revealed that the more mothers reported having performance-approach goals, the less their adolescents perceived that their mothers recognized and acknowledged their feelings, $\beta = -.34$, $p < .05$.

Discussion

Overall, results showed that the more mothers have performance-approach goals for their adolescent and the less they focus on task mastery, the more they are perceived as controlling by their adolescent. These findings replicated the link between performance goals and controlling parenting found by Gonida and Cortina (2014) and extended these results (1) by showing that this link applies to performance-approach goals in particular and (2) by documenting an additional negative link between mastery goals and controlling parenting. This study also provided a more

Table 4 Summary of exploratory regression analyses predicting individual maternal behaviors

Block	Guilt-inducing criticisms			Performance pressures			Use of threats			Acknowledgement of feelings			Providing rationales			Choice within limits		
	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β
1. Maternal anxiety	.01	.01	-.06	.03		-.18	.00		-.07	.04		-.21	.08*		-.28*	.01		-.10
2. Maternal anxiety	.17*	.16*	-.04	.17*	.14*	-.23	.06	.06	-.06	.16*	.12*	-.14	.12	.04	-.22*	.05	.04	-.09
Mastery goals			-.29*			-.21			-.23			.22			.00			.09
Performance approach goals			.37*			.41*			.03			-.34*			-.04			-.22
Performance avoidance goals			-.30*			-.09			-.09			.00			-.18			.09

* $p < .05$

conservative test of these associations because key variables were assessed with different informants and while controlling for maternal anxiety. Further investigation of the relations between parental goals and specific controlling parental behaviors allowed for a more refined understanding of the linkage between parental goals and controlling parenting: Having performance-approach goals seem to be a risk factor for using guilt-inducing criticisms and performance pressures in particular. In addition, mothers who focus on task mastery and on preventing failure seem less likely to engage in guilt-induction, as perceived by their adolescents. Maternal goals did not seem to be relevant in predicting mothers' use of threats. For autonomy support, results showed that parental goals did not predict maternal autonomy support in general. However, performance-approach goals may be an obstacle to the adoption of one autonomy-supportive behavior in particular, namely the acknowledgement of feelings.

The non-significant link between mastery goals and autonomy support was unexpected given that this link had been previously observed (Gonida and Cortina 2014). It is possible that mastery goals and autonomy support are in fact related but this relation was not apparent in the present study. Whereas Gonida and Cortina (2014)'s study focused on a specific activity, i.e., doing homework, the present study evaluated goals and parenting behaviors more generally, which may have reduced the link between mastery goals and autonomy support. Yet, it is also possible that the previously observed link between mastery goals and autonomy support reported in Gonida and Cortina (2014)'s study was due to a common variance bias. The potential link between parental mastery goals and maternal autonomy support thus calls for further investigation. Another unexpected finding was that mothers' performance-avoidance goals were related negatively to guilt-induction. This finding suggests that mothers who wish to protect their adolescent from experiencing failure may be highly concerned with creating a safe environment that would not only be failure-free but also guilt-free. Future research is needed to investigate the ramifications of such protective strategies. For example, mothers with performance-avoidance goals may discourage their teenager from participating in competitions, thereby limiting potential learning experiences. Yet, they may also orient their adolescent towards more collaborative learning experiences (e.g., creativity-based activities).

The present research contributes to research on the antecedents of autonomy-supportive and controlling parenting in important ways (Deci and Ryan 1985, 2000). First, it supports Gonida and Cortina (2014)'s proposition that parental achievement goals may be important determinants of autonomy-supportive and controlling parenting. Specifically, the adoption of performance-approach goals

seems to be a risk factor for controlling parenting (and for guilt-induction and performance pressures in particular), whereas focusing on mastery seems to prevent the use of controlling strategies (in the form of guilt-inductions). The fact that the observed relations were obtained while controlling for mothers' general tendency to experience anxiety and when the variables of interest were reported by different informants give strength to these findings.

Second, this research reveals that, in addition to promoting more controlling behaviors, adopting performance-approach goals may be an obstacle to acknowledging adolescents' feelings. Recent research has found that maternal perspective taking predicts change in the use of autonomy-supportive behaviors but that there is no recursive effect (Mageau et al. 2015b). In light of these findings, it seems reasonable to suggest that performance-approach goals may limit parents' tendency to consider their adolescent's perspective, which in turn would reduce their ability to acknowledge their adolescent's feelings in addition to increasing their tendency to use controlling behaviors. The obtained pattern of relations confirms the usefulness of examining maternal behaviors separately (i.e., guilt inductions, performance pressures, threats, acknowledgement of feelings, rationales, choice), in addition to investigating more global parenting dimensions (i.e., autonomy support and controlling parenting), to elucidate how maternal goals translate into behaviors. A more refined understanding of these processes should in turn facilitate the development of more targeted and effective interventions aimed at preventing controlling parenting and promoting parental autonomy support.

This research also extends goal research in showing that people may have achievement goals for another person. Although past studies have focused mostly on goals that people have for their own achievements, research is beginning to show that in relationships people elaborate goals that concern the person with whom they are interacting and that these goals influence their behaviors toward this other person (Carbonneau and Koestner 2014; Soenens et al. 2015). The present findings, together with Gonida and Cortina (2014)'s study, confirm that parents do have goals regarding their children's achievements and that these achievement goals are associated with their parenting behaviors. This research thereby highlights the importance of considering parents' cognitions about their adolescent as these cognitions seem to guide their interpersonal behaviors. Although several authors have suggested that parental goals guide the way parents interact with their children (Dix 1992; Grusec et al. 1997), empirical research on this topic is scarce. By highlighting the usefulness of parental achievement goals in predicting parenting behaviors, the present study should stimulate additional investigations of the impact of parental achievement goals on parenting. In

particular and using a larger sample, future research should examine the impact of parental goals on parenting while distinguishing between the six different goals proposed in Elliot et al. (2011)'s 3×2 achievement goal model.

Experimental and longitudinal work is also needed to pursue the investigation of the impact of parental goals on parenting. Although different informants were used to assess maternal goals and parenting, the design of the present study was correlational. It might be that maternal goals for their adolescent's achievements are yet another consequence of autonomy-supportive and controlling parenting. It is also possible that there are reciprocal effects where controlling parenting and performance-approach goals would fuel one another by maintaining parents' focus away from their adolescent's internal frame of reference. Studying the relations between these variables using experimental and longitudinal designs thus constitutes important research avenues. Another limitation is that our results can only apply to mothers. Although Gonida and Cortina (2014) found relations between parental goals and parenting behaviors with a sample composed of both mothers and fathers, additional research is needed to test these relations with a sample of fathers. Finally, although we controlled for maternal trait anxiety, future studies could include more specific forms of anxiety (e.g., regarding parenting or the child's future) to investigate their potential influence on the relations between parental goals and parenting.

In conclusion, understanding the reasons why some parents engage in more controlling, and less autonomy-supportive, parenting is an essential step to help parents nurture children's optimal functioning and prevent important adjustment problems (see Barber 2002; Grolnick 2003; Joussemet et al. 2008a; Moreau and Mageau 2013, for reviews). This study suggests that parental performance-approach goals are a risk factor for controlling parenting in addition to being a potential obstacle to acknowledging adolescents' feelings, a central autonomy-supportive behavior. Mastery goals are also identified as an intervention target to prevent the use of guilt-inducing criticisms. Future research is now needed to further investigate these effects with larger samples and using experimental and longitudinal designs.

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Is Hovering Smothering or Loving? An Examination of Parental Warmth as a Moderator of Relations Between Helicopter Parenting and Emerging Adults' Indices of Adjustment

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Abstract

The purpose of this study was to examine the moderating role of parental warmth in the relation between helicopter parenting and indices of child adjustment (i.e., self-worth and school engagement) and maladjustment (i.e., risk behaviors) in emerging adulthood. Participants included 438 undergraduate students from four universities in the United States ($M_{\text{age}} = 19.65$, $SD = 2.00$, range = 18–29; 320 women). Regression analyses established that increased helicopter parenting was associated with lower levels of self-worth and higher levels of risk behaviors for those emerging adults who reported low levels of maternal warmth from their parents (especially their mothers), but not for those with high levels of warmth. The discussion focuses on the moderating role of parental warmth and the importance of emerging adult perceptions of the parent–child relationship.

Keywords

helicopter parenting, emerging adulthood, warmth, parental involvement, parental control

Research shows that positive parenting during emerging adulthood has been linked to numerous indices of positive adjustment in young people (e.g., Nelson, Padilla-Walker, Christensen, Evans, & Carroll, 2011). However, parenting that includes higher levels of control is associated with indices of maladjustment (e.g., Nelson et al., 2011). One type of overinvolved, or overcontrolling, parenting that has received a growing amount of scholarly attention is helicopter parenting.

Helicopter Parenting in Emerging Adulthood

Helicopter parenting in emerging adulthood is characterized by parents' overinvolvement in the lives of their children including such behaviors as solving problems and crises for children (Cullaty, 2011) and intervening in issues with roommates, friends, professors, or employers (Kennedy, 2009; Padilla-Walker & Nelson, 2012). Despite the fact that helicopter parenting can be distinguished from behavioral control and psychological control (Padilla-Walker & Nelson, 2012), emerging research has found that not all outcomes of helicopter parenting are negative (Donnelly, Renk, & McKinney, 2013; Padilla-Walker & Nelson, 2012). Hence, its link to indices of adjustment/maladjustment may be rather complex. For example, it has been found that helicopter parenting

is associated with negative aspects of emerging adults' development including more pessimistic views of marriage, indices of anxiety, depression, and lower life satisfaction and psychological well-being (LeMoyne & Buchanan, 2011; Schiffrin et al., 2014; Segrin, Woszidlo, Givertz, Bauer, & Murphy, 2012; Willoughby, Hersh, Padilla-Walker, & Nelson, 2013). On the other hand, helicopter parenting has been found to be related to several positive aspects of the parent–child relationship (i.e., guidance and involvement) in emerging adulthood (e.g., Padilla-Walker & Nelson, 2012).

One of the important factors that might determine whether helicopter parenting plays a facilitative versus debilitative role in the development of emerging adults is the role that parental warmth may play as a context for parental helicoptering. Despite media stereotypes of overly warm, caring (albeit hovering) parents, Padilla-Walker and Nelson (2012) did not find parental warmth to be associated with helicopter parenting. This suggests that helicopter parenting in the

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Table 1. Descriptive Statistics and Correlations Between Parenting and Emerging Adults' Indices of Adjustment.

	1	2	3	4	5	6	7	8
1. Age	—							
2. Maternal helicopter	-.08	—						
3. Paternal helicopter	-.05	.81***	—					
4. Maternal warmth	.01	-.02	.01	—				
5. Paternal warmth	.01	-.03	.08	.61***	—			
6. Self-worth	.09	-.08	-.05	.39***	.42***	—		
7. Risk behaviors	.07	.06	.04	-.23***	-.20***	-.21***	—	
8. School engagement	.06	-.19***	-.17***	.17***	.13**	.22***	-.16***	—
M (SD)	19.65 (2.00)	2.01 (.81)	1.84 (.76)	6.19 (1.01)	5.93 (1.22)	3.32 (.60)	1.16 (.27)	4.29 (.63)
Range	18–29	1–5	1–5	1–7	1–7	1–4	0–5	1–5

* $p < .05$. ** $p < .01$. *** $p < .001$.

context of a warm and supportive parent–child relationship may be quite different than the same approach in a relationship that lacks warmth. Therefore, the purpose of this study was to examine the moderating role of parental warmth in the relation between helicopter parenting and indices of child adjustment (i.e., self-worth and school engagement) and maladjustment (i.e., risk behaviors) in emerging adulthood. Given that emerging adulthood is a period of development in which young people should be granted greater autonomy in an attempt to foster self-reliance and independence (e.g., Aquilino, 2006), we did not believe that helicopter parenting would be linked to indices of adjustment even in the presence of warmth. Instead, it was hypothesized that helicopter parenting in the context of low warmth would be associated with higher levels of both internalizing and externalizing problems.

Method

Participants and Procedures

The participants for the current study ($M_{\text{age}} = 19.65$, $SD = 2.00$, $\text{range} = 18\text{--}29$) consisted of 438 undergraduate students (320 women). We refer the reader to Padilla-Walker and Nelson (2012) for a detailed description of the participants, procedures, and instruments. We measured the following variables: (1) *helicopter parenting* (Padilla-Walker & Nelson, 2012; “My parent makes important decisions for me, e.g., where I live, where I work, what classes I take,” $\alpha = .87$ for maternal and $\alpha = .84$ for paternal helicopter parenting), (2) *parental warmth* (Grolnick, Ryan, & Deci, 1991; Robbins, 1994; e.g., “My parent finds time to talk with me,” $\alpha = .86$ for maternal warmth and $\alpha = .89$ for paternal warmth), (3) *school engagement* (Fredericks, Blumenfeld, & Paris, 2005; e.g., “I complete my homework/assignments on time,” $\alpha = .83$), (4) *self-worth* (Neeman & Harter, 1986; e.g., “I am happy being the way I am,” $\alpha = .84$), and (5) *risk behaviors* (adapted from Add Health, e.g., marijuana use, use of prescription drugs without permission, and shoplifting, $\alpha = .66$).

Table 2. Regression Analyses for Child-Reported Helicopter Parenting and Parental Warmth.

	Self-Worth	School Engagement	Risk Behaviors
Step 1:			
Gender ^a	.04	.11*	-.19***
Age	.09	.07	.06
Step 2:			
Maternal helicopter (A)	-.01	-.15	.06
Maternal warmth (B)	.21***	.13*	-.15**
Paternal helicopter (C)	-.07	-.04	-.01
Paternal warmth (D)	.30***	.05	-.10
Step 3:			
A × B	.11*	.04	-.14*
C × D	.10	-.06	-.11
R ²	.25***	.08***	.14***

Note. All values represent standardized beta weights.

^aFemales have the higher coded value.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Results

Regression Analyses With Child-Reported Helicopter Parenting and Warmth

Means, standard deviations, and bivariate correlations for all study variables are presented in Table 1. Hierarchical regression analyses were conducted for each of the three dependent variables (self-worth, school engagement, and risk behaviors, see Table 2), with standard procedures used to avoid collinearity and plot and test simple regression slopes for interactions (Aiken & West, 1991).

Self-worth. Both maternal and paternal warmth were positively associated with self-worth, $F(4, 429) = 28.69$, $p < .001$. There was also a significant two-way interaction between maternal helicopter parenting and warmth, $F(2, 427) = 8.81$, $p < .001$. Simple slope follow-up analyses suggested that maternal helicopter parenting was negatively associated with self-worth at -1 SD of maternal warmth ($\beta = -.22$, $t = -3.84$, $p < .001$).

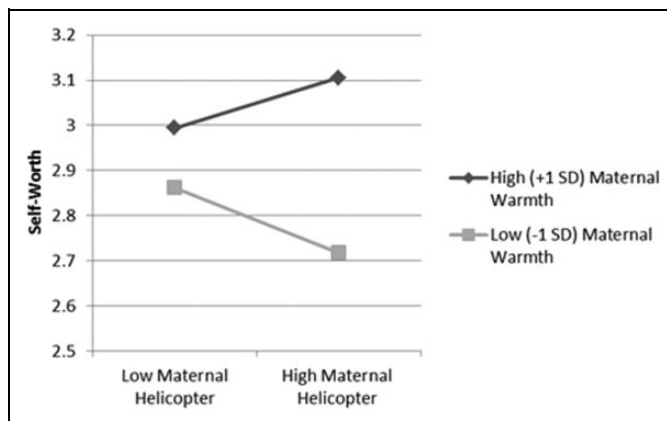


Figure 1. Two-way interaction predicting self-worth. Note. Simple slope follow-up analyses were significant at -1 SD of maternal warmth and marginally significant at $+1$ SD of maternal warmth.

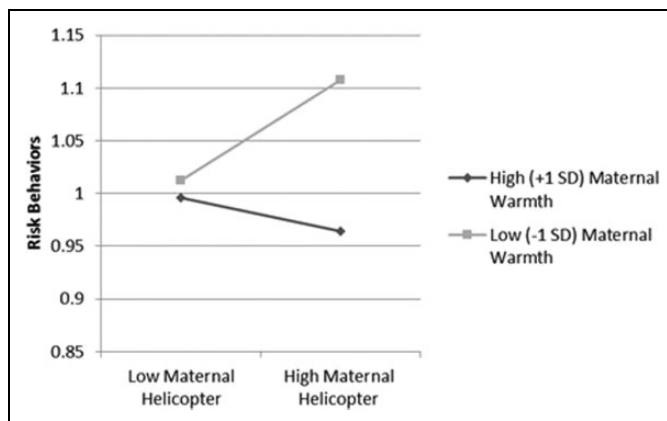


Figure 2. Two-way interaction predicting risk behaviors. Note. Simple slope follow-up analyses significant at both -1 SD and $+1$ SD of maternal warmth.

and marginally associated with self-worth at $+1$ SD of maternal warmth ($\beta = .12$, $t = 1.92$, $p = .056$; see Figure 1).

School engagement. Maternal warmth was negatively associated with school engagement, $F(4, 429) = 6.99$, $p < .001$.

Risk behaviors. Maternal warmth was negatively associated with risk behaviors, $F(4, 429) = 6.22$, $p < .001$. There was also a significant two-way interaction between maternal helicopter parenting and warmth, $F(2, 427) = 10.09$, $p < .001$. Simple slope follow-up analyses suggested that maternal helicopter parenting was positively associated with risk behaviors at -1 SD of maternal warmth ($\beta = .21$, $t = 3.51$, $p < .001$) and negatively associated with risk behaviors at $+1$ SD of maternal warmth ($\beta = -.14$, $t = -2.12$, $p < .05$; see Figure 2).

Discussion

Results of this study revealed that increased helicopter parenting was associated with lower levels of self-worth and

higher levels of risk behaviors for those emerging adults who reported low levels of maternal warmth from their parents. Furthermore, increased helicopter parenting was associated with lower levels of risk behaviors for those who reported that their mothers exhibit higher levels of warmth. These findings, although few in number, help make a significant contribution to our growing conceptual and empirical understanding of the role that helicopter parenting plays in the lives of emerging adults by demonstrating that helicopter parenting appears to be especially harmful when used in the context of low warmth.

In previous work we suggested that helicopter parenting might be “inappropriately intrusive and managing” but done out of “strong parental concern for the well-being and success of the child” (Padilla-Walker & Nelson, 2012, p. 1186). We recognize now that such a description may be inaccurate. With the contribution of this study, it is becoming increasingly clear that helicopter parenting (a) in and of itself is not inherently warm, (b) is not facilitative of emerging adults’ development, and (c) represents another form of control (besides behavioral and psychological control) that is linked to indices of maladjustment in emerging adulthood. This is not meant to suggest though that warmth does not play a role in the ways in which helicopter parenting may be linked to young people’s adjustment/maladjustment but rather suggests that warmth (or the lack thereof) might serve as the context in which helicoptering occurs. Our results show that helicopter parenting is associated with a number of indices of maladjustment, especially when it occurs outside the context of parental warmth, providing evidence that the absence of parental warmth might be a key determinant in whether or not helicopter parenting becomes predictive of maladjustment in emerging adulthood.

Limitations

Despite its contributions, this study was not without limitations. First, although our discussion was framed in a way that suggested parenting was the driving force in children’s outcomes, the cross-sectional nature of the data precluded us from drawing any definitive conclusions in that regard. It may be that characteristics of some emerging adult children elicit more overly controlling behaviors from their parents. Another limitation is that the findings might not be generalizable to a nonstudent population, to all cultures around the world, or to all ethnic groups within the United States. Next, the fact that all of the variables were measured via self-report might lead to inflated relations due to shared method variance. Finally, although the items we used to measure helicopter parenting tended to focus on parents making decisions for their children in important life domains, other aspects of helicopter parenting might include invading their emerging adults’ privacy, giving excessive and underserving praise, or otherwise infantilizing their emerging adult children. **Future work should give a more careful consideration of other indices of what might makeup the construct of helicopter parenting and examine the role of warmth in conjunction with them.**

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Parental Involvement in Adolescents' Education: An Examination of the Interplay Among School Factors, Parental Role Construction, and Family Income

Sira Park and Susan Holloway

Abstract

Whereas the focus of most parental involvement research has been on examining its effects on student outcomes, the goal of our study was to explore the determinants of parental involvement. Drawing on a nationally representative dataset of families with a student in high school, we investigated a hypothesized model in which positive associations between school factors (i.e., welcoming environment, informative communication, parental satisfaction with school) and levels of parental involvement in their adolescents' education are mediated by parents' construction of their role. We found that parents reportedly became involved in their children's education in response to inclusive school practices and also to compensate for perceived deficits in student experiences at school. Economically disadvantaged parents who were dissatisfied with the school were particularly likely to become involved. We also found support for a direct relationship between school factors and parental involvement, as well as an indirect path via parents' perceptions of their role in promoting their involvement. Implications for promoting parental involvement during adolescence are discussed.

Key Words: parents, involvement, adolescents, school factors, parental role construction, family income, high schools, communication, welcoming

Introduction

Many studies have documented a strong link between children's academic performance and parental involvement in their schooling. Parental participation is significantly associated with higher grades (Galindo & Sheldon, 2012; Hill & Craft, 2003; Tan & Goldberg, 2009), greater academic motivation (Grolnick & Slowiaczek, 1994; Simons-Morton & Chen, 2009), higher graduation rates (Fan & Chen, 2001; Sanders & Herting, 2000), and better school attendance (Jeynes, 2007). Moreover, parental involvement has been associated with more favorable social and emotional outcomes for students, such as less disruptive behavior (El Nokali, Bachman, & Votruba-Drzal, 2010; Gutman & Midgely, 2000), greater social competence (Domina, 2005; McWayne, Fantuzzo, Cohen, & Sekino, 2004), and better mental health (Wang & Sheikh-Khalil, 2014). But what factors set the scene for more frequent and effective involvement by parents? This is the core question addressed in our study.

In most studies, parental involvement is conceptualized as the participation of parents or other significant caregivers in education-related activities expected to promote the academic and social/emotional well-being of children (Fishel & Ramirez, 2005). For parents of high school students, this could include engagement in activities at the school, such as volunteering in the classroom, as well as in the home, such as discussing college plans or supporting extracurricular activities. The most common framework for modeling the factors that precipitate parental involvement has been proposed by Hoover-Dempsey and her colleagues (Hoover-Dempsey & Sandler, 1997; Walker, Wilkins, Dallaire, Sandler, & Hoover-Dempsey, 2005). The Hoover-Dempsey framework features psychological characteristics of the parents—including their self-efficacy regarding involvement and their beliefs about whether involvement is part of the parental role—and characteristics of the school, including the extent to which parents perceive the school as a welcoming environment and view the staff as willing to communicate effectively about student progress. Numerous studies have established that these features of the family and the school are all related to parents' likelihood of becoming involved (e.g., Anderson & Minke, 2007; Deslandes & Bertrand, 2005; Green, Walker, Hoover-Dempsey, & Sandler, 2007).

Our study builds on these investigations but extends them in three ways. First, we explore the idea that, rather than directly affecting parental involvement, the nature of the school environment and staff communications constitute an *indirect* force whose effects on parental involvement are mediated by their effects on parents' construction of their role *vis a vis* the education system. Based on a constructivist perspective (Kim, Sheridan, Kwon, & Koziol,

2013), we argue that the stance that school staff members take regarding parental involvement constitutes an influential social force that shapes parents' sense of their role. This is a significant departure from previous literature in which school factors and parents' role beliefs are conceptualized and tested as *independent* predictors of parental involvement. The idea of a mediated pathway from school invitations to parental involvement via parents' role construction has never been tested to our knowledge.

Second, we introduce the notion that parental involvement is also motivated by parents' perception of the *need* for their involvement in order to offset limitations of what the school can provide. This dynamic effect of perceived need exists in tension with the previously discussed notion that only positive elements such as the environment and effectiveness of communication prompt parents to become involved. Accordingly, we sought to examine the role of parent satisfaction with the school—including its academic program, discipline practices, teacher quality, and staff services—in shaping their involvement. Our view is that parents who perceive the school as less satisfactory on these dimensions will be more likely to view their academic support role as important and hence become more involved.

Third, we examine the relationship of these features of schools to parental involvement separately for parents of higher and lower income levels. In Hoover-Dempsey's model, parental resources (i.e., their education level, income, time availability) are considered, but their role is not elaborated in depth. Clearly, all these forms of capital shape parents' opportunities for particular kinds of involvement. It is well established that economically disadvantaged parents may view education as the purview of the school rather than the family (Lareau, 2003) or may feel particularly uncertain about how to help their adolescents as the curriculum becomes increasingly advanced. Additionally, substantial evidence suggests that many teachers and administrators perceive low-income parents to be uninterested in their children's education and thus do not create a welcoming or informative environment (e.g., Baquedano-López, Alexander, & Hernandez, 2013; Mapp, 2003). Our approach is designed to shed light on the complex role of family income level in shaping the perceptions and expectations of parents and school staff.

Background

Parental Involvement in Adolescents' Education

Previous research has consistently shown that many forms of parental involvement decline as children move into the middle and high school years (Eccles & Midgley, 1990; Green et al., 2007; Seginer, 2006; Spera, 2005).

However, certain distinctive activities can come to the forefront, such as fostering educational and occupational aspirations, discussing learning strategies, and making preparations and plans for college (Chao, Kanatsu, Stanoff, Padmawidjaja, & Aque, 2009; Hill & Tyson, 2009; Stevenson & Baker, 1987). Not all parents feel equally confident about their ability to engage in these forms of involvement. Confronting an institution of the size and complexity of most high schools, parents may have difficulty figuring out how to obtain information or advice and may not develop close relations with any of the shifting array of teachers. Furthermore, high school teachers may employ fewer strategies to help families stay involved than do teachers in the lower grades, expecting students to take responsibility for their own schoolwork (Adams & Christenson, 2000; Pelco & Ries, 1999). Yet, in spite of this general tendency, some schools are effective in communicating to parents that their involvement is welcome. It is these delicate and sometimes difficult interactions between school staff and parents that we seek to understand in this study. The conceptual model guiding our approach is depicted in Figure 1.

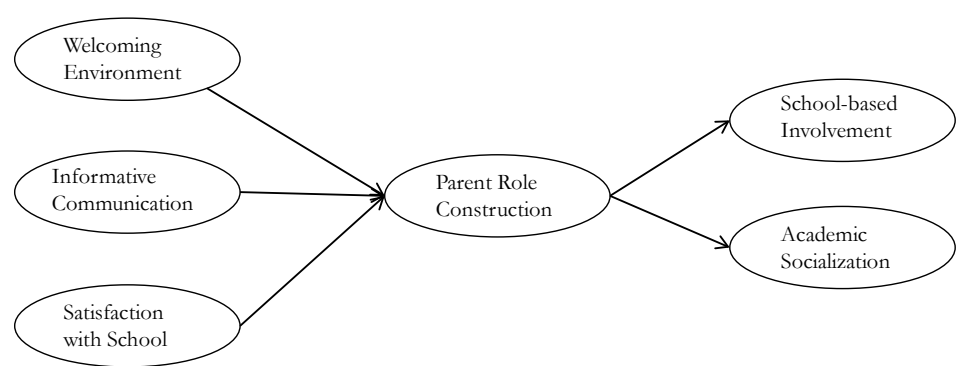


Figure 1. Conceptual model of the mediational role of parental role construction on the relation between school factors and parental involvement.

School Factors

Our study focuses on two school factors that may promote parental involvement during adolescence: creating a welcoming school environment, and facilitating informative communication between schools and families. In the Hoover-Dempsey framework (Hoover-Dempsey & Sandler, 1997; Walker et al., 2005), the authors suggested that creating a welcoming school atmosphere is an important strategy for promoting parental involvement. The importance of creating a welcoming environment—including provision of space for parents to congregate—or the creation of a respectful, friendly climate has been

demonstrated in studies of students in elementary and middle school settings (Anderson & Minke, 2007; Deslandes & Bertrand, 2005; Green et al., 2007; Sheldon & Van Voohris, 2004). For parents from marginalized populations, who may lack confidence in their own skills or who may have been treated with disrespect in other settings, it may be particularly important to feel that the school welcomes their involvement. For instance, one large parent survey conducted in urban elementary and middle schools found that parent perception of the schools' responsiveness to their needs and requests was more strongly associated with parental involvement than parent education, family size, marital status, or children's grade level (Dauber & Epstein, 1993; see also Mapp, 2003). However, in spite of the promising nature of these findings, few studies of these environmental factors have been conducted at the high school level, nor have they examined the mediating element of parents' role construction.

Perhaps one of the most important elements of the school environment is the nature of the communications between school staff and parents. Through frequent and well-crafted communications, schools can provide useful information to parents about student progress, upcoming events, features of the curriculum, and supporting learning at home, which affects parents' attitudes and beliefs about their role (Chrispeels & Rivero, 2001). Prior research suggests that creating ample opportunities for communication does indeed encourage parental involvement (López, Sánchez, & Hamilton, 2000; Simon, 2004). Recently, advances in technology provide an inexpensive, easy-to-use tool to further facilitate parent-school communications. For example, text messaging allows teachers and administrators to send educational prompts and reminder messages in real time for parents to read at their convenience. Intervention studies found a positive effect of text messaging on parental involvement (Hurwitz, Lauricella, Hanson, Raden, & Wartella, 2015). This need for informative communication is particularly critical in the high school years when parents and adolescents are making decisions about course selection, college admissions, and other important academic matters.

The third construct of interest in our study—parental satisfaction with the school—has frequently been construed as an outcome of school practices. For example, previous research found that school communication, curriculum, school safety, school environment, staff quality, and transportation services are related to overall parent satisfaction (Hausman & Goldring, 2000; Maddaus, 1990; Martinez, Godwin, & Kemerer, 1996; Tuck, 1995). The relatively few studies examining the role of parents' satisfaction with the school in motivating their involvement have focused on parental dissatisfaction and have linked it to some form of school choice (Friedman, Bobrowski, & Markow, 2007). For instance, using the National Education Longitudinal Study of 1988 [NELS:88]

dataset, Walsh (2010) found that parents of children attending underfunded schools were more likely to engage in volunteer activities than were those whose children were enrolled in well-funded schools and argued that such parents viewed their involvement “as a substitute, rather than a complement, for perceived school quality” (p. 960). Our study explores these somewhat contradictory features of parental involvement by examining how parent satisfaction, in combination with school outreach, is related to the range of parental behaviors that support a teenager’s school success.

Parental Role Construction

Previous research on parental involvement has emphasized the notion that parents’ beliefs about what they can and should do for their children is shaped by external factors including messages from the school. According to theoretical formulations in this area, role-related expectations are communicated by those with social status to those with less power, thus creating a system of norms that guide behavior (Biddle, 1986). Indeed, empirical evidence confirms that parents pick up cues from the school which guide their choices about how to become involved in their children’s schooling (Deslandes & Bertland, 2005; Green et al., 2007; Kim et al., 2013; Semke, Garbacz, Kwon, Sheridan, & Woods, 2010; Sheldon, 2002; Shumow & Lomax, 2002). However, it is also crucial to recognize the agency of parents in this role construction process. Far from being passive receptacles of messages from the school, parents also evaluate their own resources in order to identify how and when to become involved (Hoover-Dempsey & Sandler, 1997). Moreover, they monitor the resources of the school and evaluate how well their own children are being served in the school context (Walsh, 2010). Parents construct their own involvement strategy based on these perceptions and judgments as they engage in transactions over time with school staff.

While empirical verification has been obtained of the relation between messages from the school and parental involvement, the mediating role of parent role construction has rarely been tested. In one of the few tests of this notion, a recent empirical study demonstrated that parental perceptions of school expectations for involvement and school climate predicted parental role beliefs about their own involvement at home and school at the elementary school level (Whitaker & Hoover-Dempsey, 2013).

Family Income

Much of the literature on conventional forms of parental involvement demonstrates an association of parental involvement to family income level (Cooper, 2010; Gershoff, Aber, Raver, & Lennon, 2007; Lee & Bowen, 2006).

Parents living under the poverty line (i.e., annual income less than \$35,000) are less likely than other parents to be involved at the school site but are equally or more likely to engage in certain types of home-based behavior (Park & Holloway, 2013). The reasons for these household income differences can be located in the forms of capital that are available to parents from diverse backgrounds. At a purely economic level, low-income families may find it difficult to attend school-based events due to their long or unpredictable work hours or lack of transportation and childcare. From a cultural capital perspective (Bourdieu, 1987), middle-class families are more likely to have resources that align with schools' expectations, enabling them to engage in interactions at the school site relatively effortlessly and smoothly (Lareau, 2003). Higher income parents are more likely to see themselves as equal partners with the school and believe that they have the right and responsibility to raise issues of their choosing and to scrutinize or monitor teachers; in contrast, lower income parents are more likely to view children's learning as the responsibility of the school (Barnard, 2004; Gillies, 2008; Lareau, 2003). To the extent that they view teachers as professionals with specialized knowledge they themselves lack, lower income parents are less likely to express their concerns about school practices and policies (Cheadle, 2008).

In addition to identifying income-level differences in the views and practices of parents, it is also crucial to acknowledge that another source of income-level differences in parental involvement pertains to the attitudes and practices of the schools. Many schools do not engage in sufficient or effective outreach to low-income parents (Baquedano-López et al., 2013). Teachers and other staff frequently hold stigmatizing expectations and beliefs concerning the motivations, commitment, and skills of socioeconomically marginalized parents. Even when school personnel reach out to parents, these efforts are more likely to benefit families with higher amounts of capital. For example, Cooper (2010) found that although poor parents reported higher levels of involvement when schools had higher levels of outreach, the non-poor parents benefitted more from the outreach efforts. In light of these family income differences in benefits of school outreach as well as the propensity of parents to evaluate school practices, we constructed separate models for parents who are economically disadvantaged and those who are relatively advantaged. This strategy enables us to offer a descriptive account of income differences in the amount of school factors and parental role construction, as well as specify differential pathways by which these factors may contribute to parental involvement in the two groups.

The Current Study: Purpose and Research Questions

The goal of this study was to investigate the determinants of parental involvement during the high school years. We focused on two crucial school factors: parental perception of a welcoming school climate (Adams & Christenson, 2000; Bryk & Schneider, 2002; Hoover-Dempsey & Sandler, 1997), and the ability of the school to provide regular and informative communication (Griffith, 1998; Lopez et al., 2000; Patrikakou & Weissberg, 2000; Simon, 2004). In addition, we documented the extent to which parents were satisfied with the performance of the school in educating, nurturing, and protecting their children. We sought to specify the process through which these school factors are related to parental involvement behavior. In particular, we hypothesized that parents' perceptions of the school are related to their construction of their own role in their adolescents' education, which in turn contributes to their level of actual involvement. Lastly, we examined whether the hypothesized mediation model works equitably for economically disadvantaged and nondisadvantaged families.

To our knowledge, no previous research has examined the mediated pathway from school factors to parental involvement via parents' role beliefs, especially with a nationally representative sample of families with high school students. Further, while previous research indicates that families of varying socioeconomic backgrounds display distinctive patterns of family-school relations, the potential differences in the relationship of high school factors to parental role beliefs and involvement have rarely been tested across different income groups.

In summary, we address four crucial questions about the role of the school and the family in promoting parents' involvement in the education of their adolescent:

- RQ 1: What is the relationship of parents' perceptions about the school climate and communication with families to their involvement in their adolescent's schooling (i.e., school-based involvement and academic socialization)?
- RQ2: Is there a direct inverse relationship between parents' overall satisfaction with the school and their involvement in their adolescents' schooling?
- RQ3: Is the relationship of parental perceptions of school factors (i.e., school environment, communication, overall parent satisfaction) to parental involvement mediated by parents' role construction?
- RQ4: Does the mediated pathway differ depending on family income?

Method

Data Source

We used data from the Parent and Family Involvement in Education Survey (PFI) of the 2007 National Household Education Surveys Program (NHES:2007). PFI interviews were conducted with parents or guardians of a nationally representative random sample of 10,681 children enrolled in kindergarten through twelfth grade. For this study, we selected those parents of high school students who were being educated in private (11%) or public schools (89%). Students who were homeschooled were excluded from the analyses. To maintain some control over variability due to family racial/ethnic background, we included families from the three largest groups: White (71%), Black (12%), and Latino (17%). The final sample for this study included 3,248 participants. In most cases, the participant was the child's mother (73%) or father (21%), followed by a grandparent (5%) or relative (1%). Approximately two-thirds of the participants were between 36 and 45 years of age and reported having attended some college or attained a college degree. Participating households contained roughly equal numbers of boys and girls, and the adolescents were evenly distributed across Grades 9–12. To obtain unbiased population estimates, we employed sample weights in our analyses.

The survey weight variable for estimating the characteristics of children and their family in the PFI data files is FPWT (Hagedorn et al., 2008). This weight contains all of the adjustments for the probabilities of selection, nonresponse, and under coverage. The PFI–NHES:2007 sample design and data collection procedures are further described at <http://nces.ed.gov/nhes>.

Measures

Welcoming School Environment

A single item was used to measure welcoming school climate, asking to what extent the respondent perceived that the focal child's school was welcoming of the family. A four-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*) was used.

Informative Home–School Communication

Informative home–school communication was measured with 5 questions asking parents to rate how well the school kept them informed about (a) their own adolescent's performance, (b) helping with homework, (c) their adolescent's course placement decisions, (d) planning for college or vocational programs, and (e) the parents' role in supporting student achievement. A four-point Likert scale was used for all of the items, ranging from 1 (*doesn't do*

it at all or *don't know*) to 4 (*does it very well*). To facilitate analysis and scaling of the variables, PFI coded *don't know* answers as a score of 1 (see Herrold & O'Donnell, 2008).

Parent Satisfaction With School Practices

Parent satisfaction with school practices was measured by asking parents how satisfied they were with (a) the school their adolescent attends this year, (b) their adolescent's current teachers, (c) the academic standards of the school, (d) the maintenance of order and discipline at the school, and (e) school staff interactions with parents. A four-point Likert scale was used for all of the items, ranging from 1 (*very dissatisfied*) to 4 (*very satisfied*).

Parent Role Construction

To measure the degree to which parents' role construction was oriented toward becoming involved in children's schooling, respondents were asked to what extent they thought it was the parents' responsibility to teach their children to value education and success in school and to what extent it was the parents' responsibility to attend meetings with teachers or other school staff. Both questions had a four-point response scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*).

School-Based Parental Involvement

Parents were asked whether they or anyone else in their household had done the following things since the beginning of the school year: (a) attended a school meeting, (b) attended a parent-teacher conference, (c) attended a PTA meeting or other school event, (d) engaged in volunteer activities, and (e) engaged in fundraising efforts. Parents were given two response options: *yes* or *no*.

Academic Socialization

Aligned with Hill and Tyson's (2009) definition of academic socialization, four questions were selected reflecting parents' academic support, including whether or not someone in the family had (a) worked on a project with the adolescent, (b) discussed how to manage his/her time, (c) enrolled the adolescent in a program to prepare for college entrance exams, and (d) planned to help the adolescent pay for his/her education after high school. For the first three questions, the response options were *yes* or *no*, while for the last question, parents were also given a third option: *haven't thought about yet*. To facilitate the analysis and scaling of the variables, the response *haven't thought about yet* was coded the same as *no*.

Disadvantaged Household Income

This variable indicates whether a focal adolescent resided in a household categorized as economically disadvantaged. Respondents indicated the household

income level on a 14-point ordinal scale from *\$5,000 or less* to *over \$100,000*. In our study, households were characterized as economically disadvantaged or not disadvantaged using household income and household size. If a household fell below the poverty line as indicated in the 2006 Census poverty threshold figures (U.S. Census Bureau, 2006), we coded it as 1 (economically disadvantaged). All households falling above the poverty threshold were coded as 0 (not economically disadvantaged). The Appendix summarizes questions used for each measure, as well as reliability scores and factor loading scores.

Analytic Strategies

Mediation analysis was used to address Research Questions 1, 2, and 3 (Baron & Kenny, 1986). The first step was to show that parental involvement (the outcome) could be predicted by the three school factors (the predictors). This step enabled us to answer Research Questions 1 and 2. The second step was to examine whether role construction (the mediator) was predicted by the three school factors. The third step was to determine whether the effects of the three school factors were shown to be reduced (partial mediation) or eliminated (full mediation) when the mediator was included in the equation. This final step addressed Research Question 3. The model parameters were estimated using Stata 13.

The significance of the mediating effect was tested using a bootstrapping approach. Traditional tests for mediation (e.g., Sobel's test) are designed for variables that follow standard normal distribution and may reduce statistical power to detect mediation. The bootstrapping procedure doesn't assume a normal sampling distribution and corrects the standard errors of mediating effects (Frazier, Tix, & Barron, 2004; Shrout & Bolger, 2002). For the purpose of this study, we requested 1,000 bootstrap samples. Following conventional practice, we reported confidence intervals of the mediation effects. If the confidence interval for a mediated path did not span zero, then we could conclude that there was statistically significant mediation at the .05 level.

For Research Question 4, we conducted multigroup Structural Equation Modeling (SEM) analyses. To evaluate the generalizability and robustness of the hypothesized model, we first tested it separately in the disadvantaged and nondisadvantaged groups. Upon establishing model fit separately in each group, we conducted multigroup SEM to evaluate model invariance across the two income groups.

Results

Descriptive Analyses

Intercorrelations among the study measures as well as the means and standard deviations for both income groups are presented in Table 1. The relationships among study variables were similar for both groups. For instance, high positive correlations, ranging from $r = .42$ to $.61$, were found among the three school factors in both groups. The relations between the school factors and school-based involvement were all positive and significant. In contrast, the relationships between the school factors and academic socialization were varied; engaging in academic socialization was not related to perceptions of a welcoming environment in either group ($r = .03$ for nondisadvantaged; $r = .02$ for disadvantaged), while it was positively related to perceptions of informative communication ($r = .10$ for nondisadvantaged; $r = .08$ for disadvantaged) and negatively related to satisfaction with school practices ($r = -.07$ for nondisadvantaged; $r = -.05$ for disadvantaged). Parent role construction displayed a significant positive association with all three school factors ($r = .20$ to $.39$ for nondisadvantaged; $r = .19$ to $.35$ for disadvantaged) and with both types of parental involvement ($r = .26$ and $.12$ for nondisadvantaged; $r = .21$ and $.20$ for disadvantaged).

Table 1 highlights clear income-level differences in the two types of parental involvement behaviors and their predictors. Multiple t -test results revealed that economically disadvantaged parents were less likely to feel responsible for their adolescents' education and were less likely to perceive their children's school as being welcoming, informative, and satisfactory. They were also less involved in school-based activities and academic socialization.

Evaluation of the Measurement Model

The model to be tested is presented in Figure 1. For the sake of clarity, individual items (observed variables) were omitted from the figure. They were, however, included in all analyses. Confirmatory factor analysis (CFA) was conducted for each latent construct prior to examining the relationships among them. The standardized loadings were all statistically significant (see Appendix). Inspecting the modification indices suggested that there were no significant cross-loadings. Model fit for an unconstrained model was good for the overall sample ($\chi^2_{(199)} = 1,357.50$, $p < .001$, TLI = .97, CFI = .97, RMSEA = .04).

Table 1. Means, SDs, and Intercorrelations Among All Latent Variables

Variable	1	2	3	4	5	6
Welcoming Environment	–	.42***	.60***	.35***	.18***	.02
Informative Communication	.45***	–	.61***	.19***	.21***	.08**
Satisfaction With School	.60***	.61***	–	.19***	.07*	-.05*
Parent Role Construction	.39***	.20***	.21***	–	.21***	.20***
School-Based Involvement	.23***	.30***	.18**	.26***	–	.21***
Academic Socialization	.03	.10**	-.07*	.12**	.22***	–
Mean (SD)						
Disadvantaged	3.24 (.66) ***	2.85 (.91) ***	3.31 (.76) ***	3.54 (.46) ***	0.47 (.28) ***	0.57 (.41) ***
Nondisadvantaged	3.43 (.64)	3.00 (.80)	3.38 (.62)	3.71 (.41)	0.64 (.26)	0.84 (.43)

Note. $N = 3,248$ (Disadvantaged = 596, Nondisadvantaged = 2,652). Upper diagonal part displays correlations for the economically disadvantaged families, while lower diagonal displays correlations for the nondisadvantaged families.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Evaluation of the Structural Model

Testing the Direct Paths Between School Factors and Parental Involvement

The first step was to test the direct paths from the school factors to the parental involvement variables without the mediating variable of parent role construction. The results indicated that two of the school factors significantly contributed to academic socialization and school-based involvement (see Figure 2). Parents' perception of a welcoming school environment was positively associated with school-based involvement only ($\beta_i = .13, p < .001$). Informative home-school communication was the strongest predictor of both types of parental involvement ($\beta_{\text{school-based involvement}} = .28, p < .001$; $\beta_{\text{academic socialization}} = .12, p < .001$, respectively). In contrast, parental satisfaction with school practices had significant, but negative, associations with both types of parental involvement ($\beta_{\text{school-based involvement}} = -.07, p < .01$; $\beta_{\text{academic socialization}} = -.11, p < .001$, respectively).

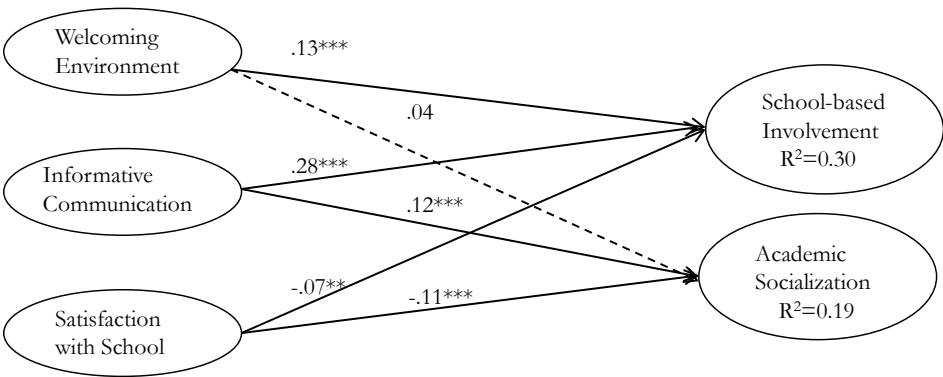


Figure 2. A test of the direct path model (standardized path coefficients provided for all paths). Ovals represent latent variables, and arrows define the hypothesized direction of relationship among variables.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Testing the Mediating Effects of Parent Role Construction

In the second step, we first showed that the mediator—parent role construction—could be predicted from the predictors. As shown in Figure 3, welcoming environment ($\beta = .29, p < .001$) and informative communication ($\beta = .10, p < .001$) were positively associated with parent role construction, while satisfaction with school was negatively associated ($\beta = -.08, p < .001$). The third step was to demonstrate that the direct path coefficients from the

predictor to the outcome decreased or vanished when the indirect path was included in the model. As can be seen from Figures 2 and 3, the direct path coefficients between the school variables and parental involvement variables dropped subsequent to the addition of parental role construction. This suggests that parent role construction *partially* mediated the relations between the three school factors and parent involvement. The goodness-of-fit indices suggested that the proposed mediated model in Figure 3 was a good fit to the data ($\chi^2_{(143)} = 1,712.33, p < .001$; TLI = .91; CFI = .92; RMSEA = .04).

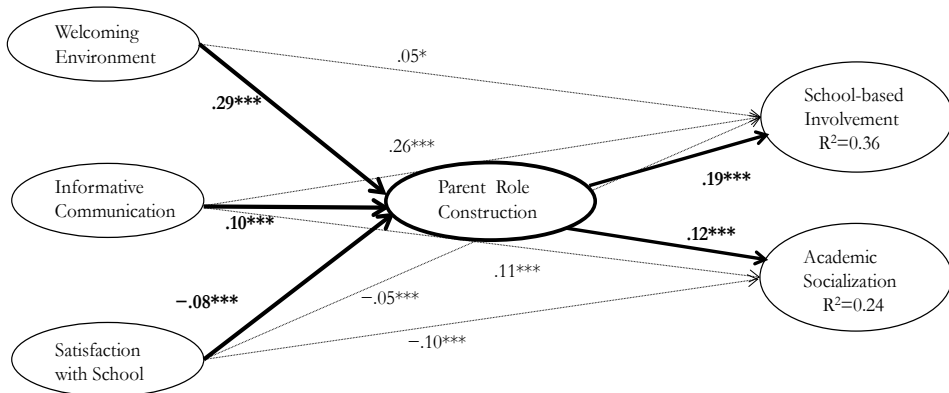


Figure 3. A test of the mediation model (standardized path coefficients provided for all paths). All paths missing from school factors to parental involvement were examined, but only those found to be significant are indicated in the figure. Boldface paths depict mediation effects.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Subsequently, the hypothesis of mediating effects was tested by examining a total of six indirect effects. The parameter estimate of the indirect effect, standard error, and confidence intervals are presented in Table 2. The results confirmed that parent role construction mediated the effects of the school factors on school-based involvement and academic socialization. The size of the indirect effect of welcoming environment on school-based involvement via role construction was $k^2 = .11$. That is, the observed indirect effect was 11% as large as the maximum possible direct effect. This effect is considered medium-sized (Preacher & Kelley, 2011). For the other five paths, the effect size (k^2) ranged from .07 to .02 (see Table 2).

The mediated path from welcoming school environment to academic socialization through parent role construction was significant, despite the fact that the direct association between the two was not significant (see Figure 2). Here we note that previous work suggests that the presence of a direct significant relation between two variables is not a necessary prerequisite for testing a mediated pathway (Shrout & Bolger, 2002). In addition, it is noteworthy that parents' satisfaction with school practices seems to operate quite differently from the other two school variables. These findings suggest that parents who are dissatisfied with the schools may be prompted to think that involvement in their children's schooling is their role/ responsibility which may, in turn, lead to their active involvement.

Table 2. Bootstrap Analysis of Indirect Effects and Effect Sizes of Indirect Paths

Independent Variable	Mediator Variable	Dependent Variable	Estimates	Standard Error	95% CI (lower, upper bound)	Effect Size (k^2)
WE →	RC →	SI	.04	.02	(.03, .05)	.11
IC →	RC →	SI	.01	.01	(.01, .03)	.04
SS →	RC →	SI	-.01	-.01	(-.03, -.01)	.03
WE →	RC →	AS	.08	.01	(.05, .11)	.07
IC →	RC →	AS	.03	.01	(.01, .04)	.03
SS →	RC →	AS	-.03	-.01	(-.04, -.01)	.02

Note. WE = Welcoming Environment, IC = Informative Communication, SS = Satisfaction with School, RC = Role Construction, SI = School-based Involvement, AS = Academic Socialization, CI = Confidence Intervals, k^2 = a ratio of the observed indirect effect to the maximum possible indirect effect that is contingent on the sample variance (Preacher & Kelley, 2011).

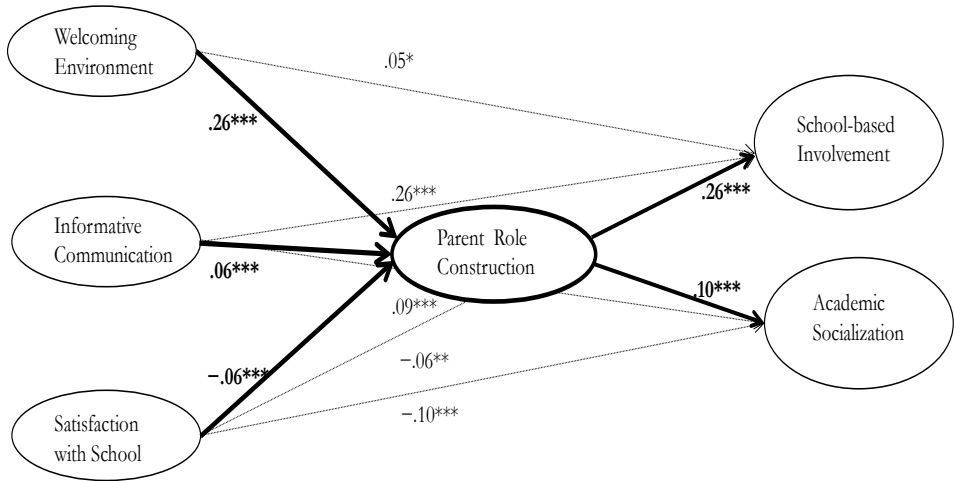
Multigroup Analyses Between Economically Disadvantaged and Nondisadvantaged Groups

After establishing measurement equivalence, all structural paths (those between the latent constructs) were constrained to be equal across two groups. Although this model fit the data adequately, the fit differed significantly from that of the baseline model ($\Delta\chi^2_{(10)} = 25.72, p < .01$), indicating that at least one of the constrained paths in the model is variant across the two groups.

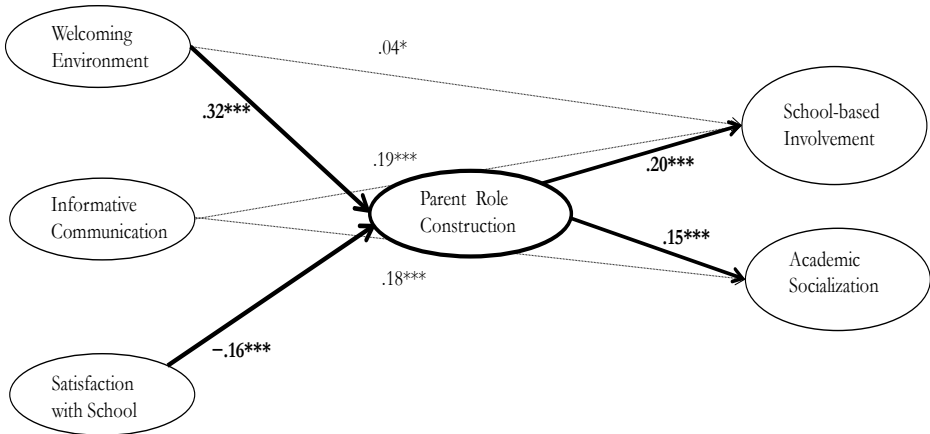
Inspecting the freely estimated model and the constrained models, we found the following three paths were invariant across two groups: (a) between informative communication and role construction; (b) between satisfaction with school and academic socialization; and (c) between satisfaction with school and school-based involvement. Informative communication was associated with role construction for the economically nondisadvantaged group ($\beta = .06, p < .001$) but not for the economically disadvantaged group ($\beta = .01, p < .50$). The direct negative associations between parent satisfaction with school practices

and the two parental involvement indicators were significant for the economically nondisadvantaged group ($\beta_{\text{school-based involvement}} = -.06, p < .01$; $\beta_{\text{academic socialization}} = -.10, p < .001$, respectively), but not for the economically disadvantaged group ($\beta_{\text{school-based involvement}} = -.02, p < .50$; $\beta_{\text{academic socialization}} = -.03, p < .50$). Significant path coefficients of the models across the two groups are presented in Figure 4.

After releasing three constraints, the fit was no longer significantly different from that of the baseline model ($\Delta\chi^2_{(7)} = 7.75, p < .66$). This finding implies that the hypothesized mediation model was applicable to both groups with the three path coefficients showing significant differences across the two groups.



(a) Nondisadvantaged Group



(b) Disadvantaged Group

Figure 4. A test of the mediated model with the economically nondisadvantaged vs. disadvantaged groups.

Discussion

The primary aim of this study was to better understand how key features of the school setting are implicated in parents' decisions about becoming involved in the education of their adolescent children. We hypothesized that schools that succeed in communicating with parents and that truly welcome their involvement can stimulate the construction of parents' beliefs about their role, which in turn can lead to actual involvement behavior at home and at the school site. Our empirical test of this hypothesis indicated that, indeed, parents' perception of a welcoming school environment and informative home-school communication was positively related with their heightened sense of responsibility to be involved, which in turn was also positively associated with actual involvement. At the same time, parents who were less satisfied with the school were also more likely to define their role to include school involvement and were also more likely to report actually being involved. This model provided a good fit with the data from those families who were living below the poverty line as well as those living above it. For families living in poverty, the extent to which they felt welcome at the school was particularly strongly related with their belief that involvement was an important part of their role. For these parents, dissatisfaction with the school was also a particularly strong factor in how they constructed their role. For the comparatively advantaged parents, there were more direct significant paths between the school factors and the parental involvement variables. For instance, the role of dissatisfaction was a contributor to their role construction but was also directly related to their involvement.

In general, this study confirms the critical importance of high schools' efforts to inform and connect with parents in order to promote their involvement. These findings are consistent with those of previous work conducted with elementary and middle school children (Anderson & Minke, 2007; Deslandes & Bertrand, 2005; Green et al., 2007; Martinez-Lora & Quintana, 2009). We found that each school factor displayed a different pattern of influence on parental involvement. Overall, informative home-school communication was the strongest predictor of both types of involvement. In contrast, the presence of a welcoming school environment displayed a strong relation only with school-based involvement. We also found that parental satisfaction with the schools had negative associations with both types of parental involvement, suggesting that parents who are dissatisfied with school practices tend to get more involved, similar to the results of Spera, Wentzel, and Matto (2009). This result is consistent with previous research findings that parents' view about the quality of the school's educational curriculum and instructors, as well as their

perceptions of safety and climate, are factors guiding school choice (Taske & Schneider, 2001). This indicates that parents do attempt to compensate for perceived deficits in school practices at the high school level (Walsh, 2010).

In our study, the three school factors explained more variance in school-based parental involvement than in academic socialization. This is not surprising to the extent that the attitudes and behaviors of school staff are more likely to motivate parents to visit and engage directly with them than to affect how they interact with their own children. Other factors may better account for parents' academic socialization practices, including student history of academic performance (McNeal, 2012) or parent expectations regarding adolescents' college attendance (Chao et al., 2009). Thus, a new comprehensive framework might be necessary to understand diverse forms of parental involvement during their children's adolescence.

Overall, our results suggest that the factors identified by Hoover-Dempsey and her colleagues (Hoover-Dempsey & Sandler, 1997; Walker et al., 2005) are powerful determinants of parental involvement at the high school level, particularly at the school site. However, the relative magnitude of these effects was somewhat different than those found in studies of young children. For instance, previous work by Deslandes and Bertrand (2005) suggests that invitations by elementary school staff for parents to become involved was the most powerful predictor of parental involvement, whereas in our study, the more powerful school factor was informative home-school communication.

Conceptually, our study departs somewhat from the Hoover-Dempsey model because we conceptualized parent role construction as a mediating factor that results from ongoing transactions between school staff and parents rather than an exogenous predictor of parental involvement. Our findings are consistent with the notion that the proximal social environment is influential in shaping and maintaining individuals' ideas and beliefs about their role (Biddle, 1986). From our study, it appears that schools create a social context in which parents construct their role and build their capacity to help their adolescent children achieve school success.

In addition to demonstrating the mediating effect of role construction, our study also contributes to the literature by introducing the notion of parental satisfaction with the school as a third school-based determinant. Parents who are not satisfied with the school were more likely to take on responsibility for encouraging their adolescents to achieve in school and formulate plans for college attendance. Although it is often assumed that parental involvement is stimulated by effective school practices and thus serves to *complement* them, our study identifies a *compensatory* dynamic in which parents attempt to remedy perceived deficits in the school through their own involvement.

Study Limitations

The current study has several limitations. As with any secondary analysis, the questions we could ask were constrained by the data available. We would have liked to have a sense of the adolescents' disposition regarding their parents' involvement. Given that adolescents are increasingly able to evaluate and even rebuff parental efforts at involvement, this is a particularly important construct to include in future studies (Deslandes & Bertrand, 2005). A second limitation is that we were unable to explore some important but less direct types of involvement, including establishing residence in areas served by higher quality schools or drawing upon social capital from extended family or community members (Li, Holloway, & Bempechat, 2008; López, 2001). We would have also liked to be better able to evaluate the frequency and quality of school outreach to parents. Issues related to tone, clarity, and type of information seem especially relevant to parents' comprehension of and response to schools' explicit and implicit expectations of parental involvement.

From a methodological standpoint, the large sample size used in the present study presents both a strength and weakness. While the sample size provides substantial statistical power, we urge caution in interpreting statistically significant findings that may have debatable substantive importance. In addition, self-report measures of parental involvement might be vulnerable to exaggeration, falsification, or social desirability bias. In future studies, observational measures of parental involvement or teachers' report of parental involvement should be used to provide more objective appraisals of their behavior. Such data would not only provide objective evidence of this construct, but also circumvent the issue of shared method variance.

Lastly, it must be mentioned that causal processes cannot be definitively verified with a cross-sectional, nonexperimental study design such as this. It is possible, for instance, that parents' involvement prompts certain attitudes and behaviors on the part of the staff who may, in turn, become more welcoming and communicative over time. A longitudinal study design would be required to test these mediating pathways over time.

Implications for Educational Policy and Practices

Given that relatively little has been studied about the connections that exist between schools and families when students are in high school, the results of this study have important implications for educational policy and teacher education programs. While, according to our findings, informative home-school communication is a strong predictor of parental involvement at the school site and at home, teachers report that they receive little training in working effectively with families (Graue & Brown, 2003). Given the challenging nature of

home–school relationships, we think it is important to develop preservice and in-service programs to help teachers identify effective formats and modes of communicating with families. Furthermore, instead of merely meeting district or state requirements for notifying parents of school rules and policies, schools might devise active and ongoing lines of communication with parents not only to share important information pertinent to students’ learning, but also to provide varied forums and opportunities to share and build on the strengths within the parent community. Along these lines, previous research suggests that taking time to develop trusting relationships via informal and personalized contacts is more likely to be effective than relying on formal methods such as newsletters (Bryk & Schneider, 2002; Halsey, 2005; Scribner, Young, & Pedroza, 1999).

In addition, our study suggests that the creation of a welcoming environment is particularly important for economically disadvantaged parents. The actual physical environment is one important component. For example, in a qualitative study by Mapp (2003), some parents commented that a school that is clean and colorfully decorated with examples of students’ work contributed to their feeling of being welcome. Perhaps even more important than the physical environment is the psychological context. For instance, invitations to school activities are not likely to be effective if they come across as pro forma (Halsey, 2005). Effective invitations flow from personal interactions with parents and genuinely communicate respect for the contributions that parents can make to the school and to their own children’s achievement.

The findings of this study suggest that a desirable framework for working with parents is a family–school partnership/collaboration model, rather than a simple parental involvement model (Kim & Sheridan, 2015). Achieving a true partnership is difficult when the parties differ in their relative status and when each side has distinctive goals. In these delicate interactions, school psychologists can play an important bridging role (Christensen & Sheridan, 2001). They can assist teachers in reflecting on their own preconceptions about parents and in interrogating each other regarding negative stereotypes based on SES or race. They can help teachers see how to frame interactions with parents that are informative and respectful. At the same time, they can also provide support and consultation to parents as they become involved in their children’s educational lives. Particularly for parents who are economically disadvantaged, it is difficult to act as an effective advocate if it involves challenging the existing system or requesting resources from an underfunded institution. School psychologists can help parents find ways to construct a role that is powerful but also supportive of the school’s mission. Effective parent consultation can be achieved by bringing families and school staff together to

engage in joint problem solving and decision-making within the context of mutual, collaborative relationships (Sheridan et al., 2012). Lastly, this study suggests the importance of helping teachers and administrators support parents in the implementation of involvement strategies that are appropriate to the developmental level of their children. In contrast to the hands-on engagement demanded of parents whose children are young, parents of adolescents are attempting to foster independence while also communicating appropriate educational expectations and aspirations and helping their children develop realistic and feasible plans for their academic and/or vocational futures.

Conclusion

In this study of families with adolescents attending high school, we were able to evaluate the power of a mediated model in which features of the school promoted a certain conceptual frame that, in turn, resulted in parental involvement in their children's education. Specifically, our model—in which three important school factors promoted parents' role construction, which in turn affected their involvement—explained 24% of the variance in academic socialization and 36% of school-based involvement, with very robust fit indices. We found that parent efforts complement school practices but also compensate for perceived deficits in what schools are able to accomplish. The dissatisfaction that economically disadvantaged parents feel is a particularly strong motivator of their engagement in their children's schooling. For advantaged as well as disadvantaged parents, the direct effects of these school features are complemented by the mediating role of parental role construction. Thus, this research represents a promising approach to study determinants of parental involvement by examining the interrelatedness of school and family factors.

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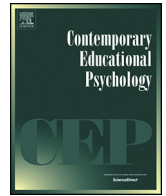
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Appendix. Item Description, CFA Standardized Factor Loading, and Reliability Scores ($n = 3,248$)

Item	Item Description	Factor Load- ing	Reli- ability Scores
	School Factors		
	Welcoming environment		
PL3C	(Child)'s school as a whole is welcoming to my family		
	Informative communication		$\alpha = .80$
	Tell me how well (child)'s school has been doing the following things this year		
PJ2A	Let you know between report cards how (child) is doing in school	.76	
PJ2B	Provides information about how to help (child) with (his/her) homework	.80	
PJ2C	Provides information about why (child) is placed in particular groups or classes	.67	
PJ2D	Provides information on how to help (child) plan for college or vocational school	.68	
PJ2E	Provides information on your expected role at (child)'s school	.70	
	Satisfaction with school		$\alpha = .86$
PK1A	You are satisfied with the school (child) attends this year	.69	
PK1B	You are satisfied with the teachers (child) has this year	.71	
PK1C	You are satisfied with the academic standards of the school	.70	
PK1D	You are satisfied with the order and discipline at the school	.86	
PK1E	You are satisfied with the way that school staff interacts with parents	.78	

	Parent Role Construction		
	Role construction ^a		$r = .54$
PL3D	It is the parents' responsibility to teach their children to value education		
PL3E	It is the parents' responsibility to attend meetings with teachers or other school staff		
	Parent Involvement		
	School-based involvement Since the beginning of the school year, (have/has) (you/any adult in your house):		$\alpha = .74$
PI1A	Attended a general school meeting, (e.g., an open house, or a back to school night?)	.69	
PI1B	Attended a meeting of the parent-teacher organization?	.71	
PI1C	Attended a regularly scheduled parent-teacher conference with (child's) teacher?	.89	
PI1D	Attended school or class event, such as a play, dance, sports event, or science fair?	.79	
PI1E	Served as a volunteer in (child)'s classroom or elsewhere in the school?	.56	
PI1F	Participated in fundraising for the school?	.51	
	Academic socialization Has anyone in your family done the following things with (child)?		$\alpha = .71$
PN13A	Worked on a project together?	.67	
PN13B	Discussed with (child) how he/she would manage his/her time?	.71	
PN13C	Enrolled in programs to prepare (child) for college entrance exam?	.70	
PH13	Does anyone in your family plan to help (child) pay for his/her education after high school?	.59	

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Empirical study

Daily interest, engagement, and autonomy support in the high school science classroom

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ABSTRACT

The current investigation examined relations between high school students' daily and cumulative situational interest in science class and their engagement, as well as their perceptions of the motivational climate of the classroom. Two-hundred and eighteen high school students in 43 science classes participated in a diary study in which students provided reports of their classroom experiences after each class session for a six-week instructional unit. Multilevel modeling results suggested that interest during science class and behavioral engagement declined over the course of the unit. Daily and cumulative interest during science class predicted behavioral engagement (working hard, participating, and paying attention), cognitive engagement, and agentic engagement. Students' interest during science class also predicted perceptions that teachers engaged in the motivationally supportive practice of emphasizing student choice during the same and the following class day. Results suggested that the links between interest with working hard and perceptions of choice provision were stronger early in the instructional unit compared to later in the unit. Moreover, some variation was found in these relations depending on students' gender and ethnicity, as well as depending on the course content and level. Implications for practice, theory, and future research are discussed.

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1. Introduction

What prompts students to engage in scientific questions and attempt to learn about various topics in science? Though there are many possible answers to this question, psychologists, teachers, parents, students, and even scientists themselves would likely point to the important role that interest plays in the classroom and beyond. Indeed, interest has long been argued to be an important predictor of students' engagement, learning, and achievement (e.g. Dewey, 1913; Hidi & Harackiewicz, 2000; Renninger & Bachrach, 2015; Schiefele, 2009). Though studies within kindergarten through 12th grade classrooms are scarce, the extant research suggests that interest is likely to support various forms of student engagement, enhancing attention, cognitive processing, involvement, and persistence (e.g. Ainley, Hidi, & Berndorff, 2002; Durik & Harackiewicz, 2007). Understanding this relation between interest and engagement in kindergarten (k) through 12th grade classrooms is important, as the behavior and cognitions that define engagement are closely linked with learning and achievement (e.g. Harackiewicz, Durik,

Barron, Linnenbrink-Garcia, & Tauer, 2008; Rotgans & Schmidt, 2011a, 2012).

Moreover, understanding the role of interest in the high school science classroom in particular is important given the increasing demand for individuals with knowledge in the areas of science, technology, engineering, and mathematics (STEM) in the current global marketplace (e.g., Bureau of Labor Statistics, 2011; National Science Board, 2010) relative to the modest number of students who pursue STEM careers (Organisation for Economic Co-operation and Development [OECD], 2006). This societal conundrum has led educational and psychological researchers to become increasingly concerned with understanding predictors of student engagement in STEM (Tytler, Osborne, Williams, Tytler, & Cripps Clark, 2008), particularly during high school, given theory and evidence suggesting that students clarify their career goals during this time (Gottfredson, 1981) and have higher odds of completing a STEM degree if they reported an interest in STEM at a time more proximal to college (e.g., Maltese, Melki, & Wiebke, 2014). Focusing on the function of interest in science class during high school may be especially important given current data suggesting that a large percentage of high school students may actually become less engaged in STEM fields from the start of high school to graduation (e.g., Morella, 2013). Moreover, a number of student and classroom factors, including the students' gender, ethnicity, or the specific content of the science course, may influence students' interest, engagement, perceptions of the environment, or the relations among those

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variables in ways that are specific to the science domain (e.g., Sinatra, Heddy, & Lombardi, 2015), making it all the more essential for researchers to focus specifically on the role of interest within the science classroom so that science-specific heterogeneity can be explored.

However, despite the importance and complexity of understanding the role of interest in the high school science classroom, the majority of the research linking situational interest, a temporary psychological state aroused by the context and often characterized by positive emotional tone (Ainley & Hidi, 2002; Schiefele, 2009), to learning-relevant behaviors has been conducted for text-based processing or outside of the K through 12th grade classroom. Given the long-standing concern about the generalizability of research based on college student samples in a university laboratory (e.g., Carlson, 1971; Dipboye, 1979; Sears, 1986) and growing empirical evidence that findings based on college student samples routinely differ in magnitude and direction when compared to findings based on non-college student samples (e.g., Henrich, Heine, & Norenzayan, 2010; Peterson, 2001), the limited research explicitly examining the role of interest in student outcomes within K through 12th grade classrooms is a concern. Findings related to the nature and consequences of interest among college science students are not unlikely to differ from those for younger students, given that college students have, more often than younger students, self-selected to pursue science coursework, while a significant proportion of science coursework is required at the high school level. Consequently, it is important to examine questions about the links between students' interest, engagement, and classroom perceptions across a variety of student samples and settings, and particularly in the high school context where research is lacking, if trustworthy guidelines for practice are to be eventually developed.

Further, few (if any) studies have explored the link between *daily* classroom interest and engagement over time. Given that it is engagement accumulated across individual days that will lead to achievement in science coursework and long-term investments in STEM, it would seem important to understand the extent to which students' interest in the science classroom predict engagement both on any given school day and cumulatively over time, as well as the extent to which such relations may change as a science course progresses and different contextual demands become salient.

Finally, while some interest research has focused on how situational interest is triggered by the environment (e.g., Linnenbrink-Garcia, Patall, & Messersmith, 2013; Rotgans & Schmidt, 2011a, 2011b), little is known about how students' interest may actually influence the environment. That is, in line with the notion of reciprocal determinism (e.g., Bandura, 1997) and the likelihood that students' motivation and learning in the classroom is best understood to unfold in a complex cyclical interaction between the student and the environment, it seems likely that teachers will be perceived to fluctuate in their support for interest and engagement from one day to the next in response to students' interest in the classroom. All in all, addressing these lingering issues is important to the extent that gaining insight into how situational interest functions to support high school science students' engagement in the classroom and perceptions of the environment both on a given day and cumulatively over time is likely to provide valuable information that can facilitate teachers practice and the development of precise interventions focused on enhancing science interest and engagement.

To address these limitations, in the present investigation we conducted a diary study in which high school science students reported on their experiences in science class every class day over the course of a six-week instructional unit. The goals of this investigation were three-fold: (1) to examine the relations between students' daily and cumulative experience of interest with behavioral, cognitive, and agentic aspects of engagement over time in authentic high school

science classrooms, (2) to examine how students' daily interest experiences relate to and shape students' perceptions of their teachers' practices over time, and (3) to explore variations in such relations across time and across various characteristics of students (e.g., sex, ethnicity, and socioeconomic status) and science classrooms (e.g., content and level). The chosen design in which students' situational interest, engagement, and perceptions of the classroom environment were assessed repeatedly over days provided an opportunity to collect strong evidence regarding the predictive role of interest in explaining changes in engagement and perceptions of the context from one day to the next.

1.1. The role of interest in engagement and learning in school

Interest as a motivational variable represents a psychological state that potentially serves as an antecedent to engagement or predisposition to engage and reengage with particular classes of objects, events, or ideas over time (Hidi & Renninger, 2006; Schiefele, 2009). Interest is often conceptualized as a relational construct that reflects an affective-cognitive relationship between a person and an object, event, or idea (e.g., Krapp, 2002). In general, two forms of interest, individual and situational, have been identified in psychological and educational research to distinguish the momentary psychological state of interest from an enduring predisposition (e.g., Hidi & Renninger, 2006; Schraw, Flowerday, & Lehman, 2001). While *individual interest* is a relatively stable affective-evaluative disposition of the person involving regular positive feelings and value-related evaluations toward certain objects, events, or ideas over time (cf., Hidi & Renninger, 2006; Schiefele, 2009), in contrast, and more relevant to the day to day happenings in the classroom, *situational interest* refers to interest that primarily emerges from and is supported by the environment (Hidi & Renninger, 2006; Krapp, 2002). Situational interest is a momentary psychological state marked by positive emotional tone that is triggered by the environment (i.e. by the interestingness of the current content or activity) that may or may not last over time or re-occur when similar stimuli are presented.

Moreover, interest serves an important function in educational contexts, having consequences for students' learning outcomes. Years of research on interest as both a fleeting psychological state and an enduring disposition have suggested that interest supports an array of positive cognitive and behavioral outcomes that mediate the link between interest and learning (e.g., Ainley et al., 2002; Harackiewicz et al., 2008; Köller, Baumert, & Schnabel, 2001; Renninger, Ewen, & Lasher, 2002; Sansone, Smith, Thoman, & MacNamara, 2012). A substantial body of literature conducted for text-based processing has provided evidence for the benefits of situational interest in supporting engagement and cognitive processing, particularly in the form of enhanced attention and persistence (for reviews see Hidi, 1990, 2001; Schiefele, 2001, 2009; Schraw & Lehman, 2001). For example, using multiple assessments within a single daylong problem-based learning session for undergraduates, Rotgans and Schmidt (2011a) found that situational interest predicted achievement-related classroom behaviors and in turn achievement. In an experimental laboratory study, Durik and Harackiewicz (2007) found that situational interest was positively related to task involvement. Taken together, this research suggests that situational interest has the potential to shape students' engagement and learning-related behavior in the classroom.

Clearly, there has been substantial progress made in research focused on understanding the role of situational interest in learning-related behaviors. However, few studies have examined this process within an authentic high school classroom environment, where understanding interest processes may be particularly important. Moreover, engagement is routinely conceptualized as a construct involving multiple components, including a behavioral dimension

focused on effort, attention, persistence, participation, and intensity, an emotional dimension that conceptually overlaps with situational interest and is focused on interest, enthusiasm, enjoyment, and other positive emotions, a cognitive dimension that includes attention to and regulation of the learning and thinking process, and an agentic dimension in which students actively attempt to influence the flow of instruction (Archambault, Janosz, Morizot, & Pagani, 2009; Fredricks, Blumenfeld, & Paris, 2004; Reeve & Tseng, 2011; Skinner, Kindermann, Connell, & Wellborn, 2009). Given the critical role that interest is expected to play in engagement and cognitive processing, it would seem important to explore the function of situational interest for the components of engagement in order to have a precise understanding of its role in supporting engagement in the classroom, though interest research has yet to adopt this differentiated view of engagement.

In addition, little (if any) research has explored the links between daily fluctuations in students' experience of situational interest and students' ongoing learning-related behavior. That is, the experience of situational interest is likely (virtually by definition) to fluctuate from one day to the next and from one setting to the next. We predict that even minor variation in students' experience of situational interest from one day to the next can subtly influence daily fluctuations in classroom engagement. Further, we also predict that any beneficial effects of situational interest on any particular day may accumulate over time and lead to adaptive learning-related behavior in that class as whole. However, the research designs that have been used to examine situational interest have not allowed investigators to explicitly test these predictions. This issue may be particularly important to address because day, person, and classroom level effects are conceptually and statistically independent (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000). Whereas person (and classroom) level effects ask what interest during science class, averaged over time, can explain about how one student (or one classroom of students) behaves compared to another, day level effects address the extent to which interest during science class explains variation in a students' learning-related behavior relative to his or her own baseline. The fact that analyses at multiple levels of analysis are conceptually distinct is highlighted by research demonstrating different patterns of relations at day- versus trait-levels (e.g. Larsen & Cutler, 1996; Reis et al., 2000).

Finally, it remains a tenable possibility that the daily relations between interest and engagement vary over time in a classroom as instruction progresses and comes to a close, often ending with some form of evaluation. Thinking of the natural progression that occurs in most high school classrooms in which content is divided into units in which related content is delivered over days or weeks, becoming more complex as it progresses, and units end with a unit exam, we hypothesized that while interest may play a strong role in determining the extent to which students are engaged in the classroom early on in the unit, as the external consequences of mastering the material become more salient (i.e. as exam time approaches) interest may play a smaller role in determining students' learning-related behaviors. Such predictions seem reasonable in light of the multitude of behavioral research demonstrating that external consequences effectively control behavior and influence performance (e.g. Cerasoli, Nicklin, & Ford, 2014; Skinner, 1953) and interact in complex ways, sometimes undermining interest (e.g. Deci, Koestner, & Ryan, 1999). A recent meta-analysis focused on intrinsic motivation and extrinsic incentives provides support for this notion (Cerasoli et al., 2014). Though this synthesis of research did not specifically focus on interest, the conceptual link between interest and intrinsic motivation (intrinsic motivation being a state of wanting to perform a specific activity in a given situation out of interest; e.g., Ryan & Deci, 2000) allow the findings to serve as important groundwork for our predictions. Specifically, in support of our hypotheses, this meta-analysis suggested that although both intrinsic motiva-

tion and extrinsic incentives predicted variance in school performance, the relation between intrinsic motivation and performance was "crowded out," becoming less important when extrinsic motivation in the form of incentives for good performance were present. In contrast, intrinsic motivation was a stronger predictor of performance when incentives were less directly tied to performance. To address the many issues we have highlighted, the current investigation examined daily interest and behavioral, cognitive, and agentic components of engagement over time in high school science classrooms. Given the conceptual overlap between situational interest and emotional engagement, we opted not to examine the links between interest and affective engagement.

1.2. The relation between interest and the classroom climate

Given the potential of interest to support important academic outcomes, a critical task for psychologists has been to identify how situational interest can be supported in educational settings. Although empirical research examining classroom factors leading to situational interest in particular is relatively small, a large body of research focused on classroom support for interest-based motivation across various theoretical perspectives has converged on the overarching verdict that teachers who engage in practices that are supportive of students' experiences of autonomy facilitate students' interest and adaptive classroom attitudes and activity (e.g. Assor, Kaplan, & Roth, 2002; Benware & Deci, 1984; Black & Deci, 2000; Patall, Dent, Oyer, & Wynn, 2013; Reeve & Jang, 2006; Reeve, Jang, Carrell, Jeon, & Barch, 2004; Skinner & Belmont, 1993). In particular, the provision of student choice and control over work is a prototypical autonomy supportive practice commonly utilized by teachers (Flowerday & Schraw, 2000) and an important classroom climate predictor of situational interest and intrinsic motivation (e.g. Ciani, Ferguson, Bergin, & Hilpert, 2010; Linnenbrink-Garcia, Patall, & Messersmith, 2013; Tsai, Kunter, Lüdtke, Trautwein, & Ryan, 2008; Wijnia, Loyens, Deros, & Schmidt, 2015; see Katz & Assor, 2007; Patall, Cooper, & Robinson, 2008 for reviews).

While a good deal of research has accumulated to support the notion that autonomy relevant practices are likely to support an array of motivation outcomes, including interest, relatively little (if any) research has explored the extent to which students' interest during class time influences teachers' practice. Nevertheless, it would seem to be important to understand whether students' initial interest may influence teachers' autonomy-supportive practice in the classroom given that such practices, particularly choice provision, can trigger a sequence in which students' interest-based motivation may lead to engagement and learning. Moreover, while autonomy support is important across contexts, the increasing need for autonomy and independence as students enter adolescence (Eccles et al., 1993; Erikson, 1968) make understanding the predictors of teachers' choice provision particularly important in the context of secondary school classrooms. Likewise, given that discovery and innovation, recognition of ambiguity, and learning from past discoveries are all core values of science, teacher support of student autonomy would seem to be particularly important within science education.

Though research has yet to examine this issue directly, there is reason to believe students' interest in the science classroom will influence teachers' provision of student choice and in turn, students' perceptions of that practice. Broadly, social psychological research suggests that teachers or individuals in other positions of authority are more motivationally supportive in general, providing clearer feedback, more attention, and more opportunities for learning difficult material (e.g. Brophy & Good, 1970; Chaikin, Sigler, & Derlega, 1974; Cooper & Good, 1983; Rist, 1970; Rosenthal, 1974; Rubovits & Maehr, 1973) when they have more positive expectations of those in student or subordinate roles. To the extent that positive expectations may include teachers' perceptions that

students are interested, this literature leads us to predict that students' daily situational interest will predict greater perceptions that teachers subsequently provide more student choice. More directly relevant, [Skinner and Belmont \(1993\)](#) revealed in path analyses that student behavioral engagement measured in the spring was associated with the teachers' autonomy supportive behavior with students during the subsequent fall. [Pelletier, Séguin-Lévesque, and Legault \(2002\)](#) found that when teachers perceived their students to be self-determined, they were more autonomy supportive in their teaching. Similarly, [Pelletier and Vallerand \(1996\)](#) found that when supervisors were led to believe that a subordinate was intrinsically motivated, that is, motivated out of internal factors like interest, they were more autonomy supportive and less controlling.

Thus, all in all it would seem that when students have a positive motivational orientation such as high interest or engagement, to the extent that teachers perceive it, they react by being more motivationally supportive, particularly in the form of autonomy-supportive practices. Thus, while we might hope that teachers would attempt to modify students' interest and other forms of motivation by using strategies intended to support such motivation, the research suggests that, at least in part, just the opposite is likely to occur. With this broader literature as a base, we predicted that science students' interest might exhibit a similar relationship with science teachers' provision of choices on a day to day basis. That is, on days that students experience situational interest, students might perceive teachers to react by providing more support for their autonomy in the form of a greater emphasis on student choice and control on the same and following class day. However, much like our predictions regarding the potential for the interest-engagement relation to vary over the course of an instructional unit, we thought it likely that the interest-teachers' choice provision relation would vary over a unit. That is, while teachers may be particularly receptive to students' interest early in an instructional unit, as external incentives and consequences for student learning (i.e. students doing well on unit exams) become more salient, teachers' motivational practice may be perceived to be influenced by student interest to a lesser extent.

1.3. Variation across science students and science classrooms

A number of student and classroom factors may be particularly important to take into consideration when exploring the form and function of interest, engagement, and perceptions of the classroom environment in the domain of science (e.g., [Sinatra et al., 2015](#)). Economic and social demands have led to a broad push within the United States to increase the number of individuals with STEM knowledge and who pursue STEM careers ([Carnevale, Smith, & Melton, 2011](#); [Langdon, McKittrick, Beede, Khan, & Doms, 2011](#)). Concerns about having a sufficient STEM workforce in the future have led to increased efforts to promote greater STEM engagement among all students, but especially among groups typically underrepresented in STEM fields such as women, black and Hispanic individuals, and low income students (e.g., see [Riegle-Crumb & King, 2010](#); [Sinatra et al., 2015](#) for discussion). However, research suggests that students of various genders, ethnicities, and socioeconomic statuses are not equally interested in pursuing STEM fields (e.g., [Lichtenberger & George-Jackson, 2013](#)) and attempts to increase diversity in STEM fields have generally not been met with much success (e.g., [Bidwell, 2015](#)). Moreover, not all science fields are equally attractive to students. Research has long indicated that students have higher course enrollment and more favorable attitudes towards biology relative to other science fields like physics or chemistry (e.g., [Häussler & Hoffmann, 2002](#); [Osborne, Simon, & Collins, 2003](#); [Whitefield, 1980](#)), with women being particularly likely to favor biology topics ([Su & Rounds, 2015](#)).

Taken together, this evidence suggests that it is important to consider the role of students' gender, ethnicity, and socioeconomic status, as well as the nature and content of science courses, in research focused on students' psychological experiences in the science domain. Though we had limited information on which to base predictions regarding the role of student and course characteristics in interest relations, we predicted that situational interest may play an especially important role in supporting the daily engagement of female, black, Hispanic, and low-income students, individuals who have traditionally not demonstrated strong personal interest in science domains and thus may benefit more from the psychological support that comes from experiences of situational interest within the classroom context. Likewise, for similar reasons, we expected that situational interest may play an especially important role in supporting the daily engagement of students in required grade-typical and physical science as opposed to advanced or elective and biological science courses given the greater personal interest students typically demonstrate in advanced and biological science courses. Finally, we expected that female students in particular would potentially be less likely to perceive the classroom environment as responsive to their interest in science, given the long history of research suggesting that females have limited interest in pursuing science knowledge and careers (e.g., [Su & Rounds, 2015](#)). Given these considerations, we included a variety of student and class characteristics as control variables and moderators of the relations involving interest, engagement, and perceptions of the environment.

1.4. The present study

This study sought to contribute to the small body of classroom research that has explored the role of situational interest in the classroom for eliciting behavioral, cognitive and agentic components of engagement, as well as perceptions of the classroom climate. To address some of the limitations in past research, including the limited data linking interest, engagement, and classroom climate from real-life classrooms at the high school level and in science classrooms in particular, as well as the unknown role of time and level of analysis, the current investigation made use of a diary method that repeatedly assessed high school science students' experiences of interest during class. This method was also used to capture reports of students' behavioral, cognitive, and agentic engagement during class and their perceptions of science teachers' choice provision practices every class across a six-week instructional unit. The current design extends prior research by providing an opportunity to examine daily changes in engagement and perceptions of the climate as a function of interest on a given day, a subsequent day, and aggregated over time within an authentic high school science classroom. Moreover, the current investigation attempted to explore heterogeneity in those relations across student and classroom factors that might be especially pertinent to the science domain. As such, this investigation sought address the following questions:

- (1) To what extent is students' experience of interest in the science classroom related to their behavioral, cognitive, and agentic engagement, both on a given day and over time, and do these relations change during the course of an instructional unit?
- (2) To what extent is students' experience of interest in the science classroom related to their perceptions of teachers' provision of choices, both on a given day and over time, and do these relations change during the course of an instructional unit?
- (3) Are the links between interest, engagement, and perceptions of teachers' provision of choice moderated by student or classroom characteristics, including students' sex, ethnicity, and socioeconomic status, or science class content and level?

2. Methods

2.1. Participants

Two-hundred and eighteen urban and suburban high school science students (13–18 years of age; 55% female) from 43 science classrooms across eight public high schools in two districts in the southwest region of the United States participated in a diary study in which they were asked to provide reports of their experiences after every science class during a six-week instructional unit between January 2012 and May 2014 (2306 total reports across all students). Forty percent of students were in the 9th grade, 25% were 10th graders, 18% were 11th graders, and 17% were 12th graders. The average grade point average (GPA) at the start of the study was 3.04 on a 4 point scale. The urban district from which students were drawn serves a population of students in which 52% are economically disadvantaged, 67% are Hispanic or Black, and 26% are White. The suburban district from which students were drawn serves a population of students in which 22% are economically disadvantaged, 28% are Hispanic or Black, and 63% are White. In our sample, at least 42% of participating students received free or reduced lunch (not all students reported their eligibility). Thirty-two percent of the students across these classes were Caucasian ($n = 69$), while 40% were Hispanic/Latino ($n = 88$), 10% were African American ($n = 22$), 4% were Asian ($n = 8$), and 13% were of mixed ethnicities or another ethnicity ($n = 28$). Two students did not share their ethnicity. A comparison of the racial and economic make-up of our student sample across both district's student demographics suggests that we successfully recruited a student sample that was representative of the student populations being served at these eight schools.

Each of the 43 classrooms was led by a different science teacher. The majority of the science classrooms were required survey science courses such as biology, chemistry, and physics (grade-typical biology: $n = 7$, pre-AP biology: $n = 8$, grade-typical chemistry: $n = 5$, pre-AP chemistry: $n = 5$; grade-typical physics: $n = 6$, pre-AP physics: $n = 3$, and integrated physics and chemistry: $n = 3$). A small number of courses covered advanced elective topics in the biological (e.g., anatomy: $n = 2$, aquatic science: $n = 2$), or physical sciences (e.g., engineering: $n = 1$, environmental systems: $n = 1$). All of the units in the science courses were consistent with Texas Essential Knowledge and Skills (TEKS) for science classrooms, which is the state's curriculum document. Examples of topics covered in science courses included cell structure and genetics in biology, how atoms form ionic and covalent bonds in chemistry, or the impact of human growth on aquatic systems in aquatic science. A wide range of pedagogical practices (i.e., group work, formative and summative assessment, classroom discussions, research projects, lab experiments, etc.) were used across the unit within these science classrooms. The number of students participating in the study from each class ranged from three to six. Approximately 47% of students were enrolled in a grade-level survey biology (16%), physics (15%), or chemistry (10%) or a combined physics and chemistry (6%) course and 38% were enrolled in an advanced (i.e., pre-AP) survey biology (19%), chemistry (12%), or physics (7%) course. The remaining 15% students were enrolled in one of the specialty topic science courses. Across grade-typical and advanced course levels, approximately 44% of students were in a biological sciences course, with the remaining 56% enrolled in a physical sciences course.

Participation was voluntary and students under the age of 18 secured parental permission to participate. In recruiting students, the project goal was to randomly select five student participants from each of the 43 classes among those students that volunteered to participate. In the majority of classrooms (38 of 43), at least five students volunteered to participate and students were randomly selected in cases where more than 5 volunteers were available. In some classes, less than five students volunteered. Four students

participated in each of 5 classes and in 1 class just three students participated. Given the reduced student level sample size in six of the 43 classes, we allowed a total of six students to participate in each of 10 other classes. Five students participated in each of the other remaining classes (27). Students were paid \$5 for every survey completed and received a \$50 bonus for completing all reports for which they did not have an excused absence from class.

Teachers' years of experience ranged from 0 to 40 ($M = 10.45$, $SD = 9.62$). Teachers were 25–66 years of age ($M = 38$; $SD = 12.29$). The majority of teachers were Caucasian ($n = 30$; 70%) and female ($n = 31$; 72%). One teacher was African American (2%), three were Asian (7%), four were Hispanic/Latino (9%) and five were of mixed ethnicities or another ethnicity (12%). Teachers received \$50 for their participation in the study and schools received \$100 for each participating teacher.

2.2. Procedure

Recruitment of participants for this study occurred in stages. Recruitment began with obtaining permission from two southwestern school districts followed by contacting high school principals, vice principals, and science chairs in order to obtain permission to meet with science teachers and recruit their participation in the study. Group information sessions were held at each of the eight schools that agreed to allow science teachers and students to participate. Teachers were informed that participation would involve the researchers collecting information about students' experiences in one of their classes, which the teacher would self-select, on a daily basis over the course of a six-week instructional unit. Teachers were also allowed to select the instructional unit during which the study occurred among those between January 2012 and May 2014. Allowing teachers to choose the participating class and control the timing of the study maximized the diversity of teachers willing to participate because some teachers were more willing to participate at certain times of year or with particular class sections. Given that most teachers appeared to select a class they considered a prototypical class and given that students were required to respond every day of a six-week instructional unit, we believe allowing teachers to make these selections had a minimal influence on the nature of the data and that the six weeks of data is likely to still be fairly representative of the school year as a whole.

Student participants were recruited via in-person visits to the class in which one member of the research team described the study and distributed a parent information letter and consent documents in both English and Spanish. To minimize teacher knowledge of which students were participating in the study, students were asked to return signed consent documents in a sealed envelope to a box located at the main office of the school. As previously described and by design, 5 students from each class typically participated in the study.

Upon recruitment and selection, participating students first met with a member of the research team to learn about their responsibilities as a participant, as well as to receive and set-up an Apple iPod Touch used to complete surveys for the duration of the diary study. During this initial meeting, student participants practiced using the iPod by completing a short background survey regarding their age, grade level, sex, ethnicity, and free or reduced lunch eligibility. In addition, this initial meeting was used to establish the students' school and personal schedule and determine the ideal time for the student to receive and complete daily reports.

Following the start of the six-week instructional unit, students were emailed a survey asking them to respond to questions about their experiences in class and their teachers' choice practices after each class session for the unit during their first free period (i.e. non-instructional time). All questionnaires were programmed using Qualtrics and completed by students online using the Apple iPod

Touch provided by the researchers. All classes met on a block schedule, approximately every other school day. The number of report opportunities varied depending on the class and number of class sessions that occurred in the particular six-week instructional unit, ranging between 11 and 17 report opportunities. Daily report surveys remained available for students to complete until the next class session began. The number of reports that student participants completed across the instructional unit ranged from 1 to 17 (Mean = 11; SD = 3.73; Mode = 10).

2.3. Measures

2.3.1. Student reported daily interest

Students' daily interest in science class was assessed with two items ("I felt interested today in science class" and "I enjoyed science class today") adapted from the Engagement versus Disaffection with Learning Student Report (e.g. Furrer & Skinner, 2003; Skinner & Belmont, 1993; Skinner, Kindermann, & Furrer, 2009). Students rated the extent to which they agreed with each item on a 5-point Likert scale ranging from not at all true (1) to extremely true (5). The validity and reliability of the scale for cross-sectional research have been established in previous studies (Furrer & Skinner, 2003; Skinner et al., 2009). Daily Cronbach's alphas ranged between 0.74 and 0.90 (mean $\alpha = 0.82$) for daily interest.

2.3.2. Student reported daily behavioral engagement

Students' behavioral engagement in science class was assessed with three items ("I worked as hard as I can in science class today", "I participated today in science class discussions", and "I paid attention today in science class") adapted from the Engagement versus Disaffection with Learning Student Report (e.g. Furrer & Skinner, 2003; Skinner & Belmont, 1993; Skinner et al., 2009). Students rated the extent to which they agreed with each item on a 5-point Likert scale ranging from not at all true (1) to extremely true (5). For this investigation, given that each item reflects a rather distinct aspect of behavioral engagement, we opted to explore relations between daily interest and each aspect (item) of behavior engagement separately rather than creating a scale reflective of behavioral engagement as a whole.

2.3.3. Student reported daily cognitive engagement

Students' cognitive engagement in science class was assessed with four items measuring learning strategies (e.g. "I tried to connect what I was learning in science class today with my own experiences", "I tried to make different ideas fit together and make sense in science class today", "When doing work for science class today, I tried to relate what I'm learning to what I already know", and "I made up my own examples to help me understand the important concepts in science class today") adapted from the Metacognitive Strategies Questionnaire (Wolters, 2004). This abbreviated scale is based on the widely used Motivated Strategies for Learning Questionnaire (Pintrich, Smith, Garcia, & McKeachie, 1993) and has been used successfully in prior research exploring student engagement (e.g. Reeve, 2013). Students rated the extent to which they agreed with each item on a 5-point Likert scale ranging from not at all true (1) to extremely true (5). The validity and reliability of the scale for cross-sectional research have been established in previous studies (Reeve, 2013; Reeve & Tseng, 2011; Wolters, 2004). We used this particular scale because it conceptualized cognitive engagement with several homogeneous items that reflected strategic learning (e.g., using elaboration-based learning strategies) and because it was short and appropriate for daily reporting. Daily alphas ranged between 0.80 and 0.92 (mean $\alpha = 0.86$) for daily cognitive engagement.

2.3.4. Student reported daily agentic engagement

Students' agentic engagement or "constructive contribution into the flow of the instruction they receive" (Reeve & Tseng, 2011) in science class was assessed with four items (e.g. "I let my science teacher know what I needed and wanted today", "During science class today, I expressed my preferences and opinions", "During science class today, I asked questions to help me learn", and "I let my science teacher know what I am interested in today") adapted from the Agentic Engagement Scale (Reeve & Tseng, 2011). Students rated the extent to which they agreed with each item on a 5-point Likert scale ranging from not at all true (1) to extremely true (5). The validity and reliability of the scale for cross-sectional research have been established in previous studies (Reeve, 2013; Reeve & Tseng, 2011). Daily alphas ranged between 0.72 and 0.87 (mean $\alpha = 0.80$) for daily agentic engagement.

2.3.5. Student reported daily teacher provision of choice

Students' perceptions of the extent to which the teachers provided opportunities for student choice and encouraged students to work in student determined ways was assessed with five items (e.g., "My teacher provided options for the kinds of assignments or activities I could do today" or "My teacher allowed me to choose how to do my work in the classroom today") designed explicitly for use in this diary study and based on prior measures used in cross-sectional research (e.g. Patall et al., 2013; Wellborn & Connell, 1987). Students rated the extent to which they agreed with each item on a 5-point Likert scale ranging from not at all true (1) to extremely true (5).

Multilevel exploratory factor analyses (MLEFA) conducted on this measure of teachers' choice provision along with other teacher practices unrelated to the current investigation reported were conducted to establish the structure of the measure. The results of these analyses, as well as a full list of all teacher practice items, can be found in other reports of this investigation (Patall, Vasquez, Steingut, Trimble, & Pituch, submitted for publication) or requested from the first author. The daily alpha for choice provision ranged between 0.74 and 0.89 with a mean α of 0.83.

3. Results

3.1. Variance partitioning for situational interest and engagement

In order to gauge the within-person (daily) variation in students' situational interest during class, as well as engagement over the course of the six-week instructional unit, we began by testing a series of three-level regressions with days (within-students) nested within pupils (between-students) and pupils nested within classes (between-classes) in which no predictors were entered. Variance partition coefficients (VPC; Goldstein, 2011), and intraclass correlation coefficients (ICC; Kreft & de Leeuw, 1998) were computed (see Table 1).¹

VPCs suggested that between 34% and 59% of the variance in interest, thoughts and behavior is at the day level. A similar amount of variance is at the student level (VPCs ranged between 37% and 59%) and limited variability was observed at the classroom level (VPCs ranged between 4% and 11%). Results suggest there was a substantial proportion of daily variation in students' experience of situational interest in class and engagement over the course of the unit, in addition to a great deal of variation across individual students.

¹ Although classes were distributed across 8 schools and 2 school districts, random variance components for these levels were not included in models given the small number of units at each of these upper levels, the limited amount of variability that was observed at the class level, and to avoid overly complicated models with four or more levels.

Table 1
Variance partition coefficients (VPC) and intraclass correlation coefficients (ICC).

	Day level	Student level		Class level
	VPC	VPC	ICC	VPC/ICC
Interest	0.46	0.43	0.54	0.11
<i>Forms of engagement</i>				
Working hard	0.59	0.37	0.41	0.04
Participation	0.52	0.43	0.48	0.04
Paying attention	0.57	0.38	0.43	0.05
Cognitive engagement	0.34	0.59	0.65	0.08
Agentic engagement	0.42	0.50	0.58	0.07
Choice provision	0.54	0.38	0.46	0.08

Note. Level 1 (daily reports) $n = 2306$ reports. Level 2 (students) $n = 218$. Level 3 (classes) $n = 43$. Calculation of the VPC and ICC is identical at the highest level of any model.

3.2. Change in situational interest and engagement over time

We continued our exploration of the data by examining how students' experiences of situational interest in class and engagement change over an instructional unit. To explore this question, we estimated a series of three-level regression models using the Mixed procedure in SPSS 21 in which we included response day to represent time over the course of the unit at level 1. We also included three control variables at the student level (level 2): student sex (0 = male, 1 = female), student ethnicity (0 = Caucasian or Asian, 1 = Black, Hispanic, or other ethnicity), and students' free or reduced price lunch eligibility (0 = eligible, 1 = not eligible), as well as two class level (level 3) control variables: whether the class was a biological science versus another science area (e.g., physics, chemistry, engineering, environmental science; 0 = non-biological focus, 1 = biological focus), and whether the class was advanced or grade typical (0 = grade typical, 1 = advanced). All variables were grand-mean centered. To accommodate for any missing data, we used a maximum likelihood estimation procedure with robust estimates of standard errors (REML). Because adjacent residuals in repeated measures data are usually correlated across measurement occasions, we specified an AR(1) correlated error structure.

Results (see Tables 2 and 3) suggested that situational interest and indicators of behavioral engagement (working hard, participation, and paying attention) during class declined across the six-week instructional unit. There was no systematic change in cognitive or agentic engagement across the six-week instructional unit. Sex predicted situational interest, participating, and agentic engagement such that female students reported less interest, participation, and agentic engagement across the six weeks than male students. Ethnicity predicted participation such that Caucasian and Asian students participated less than Black, Hispanic, and other minority students. Class type predicted attention and cognitive engagement such that students in advanced courses were more attentive and cognitively engaged than students in grade-typical courses.²

² We examined whether student and class characteristics (sex, ethnicity, free or reduced price lunch eligibility, class content, and class type) moderated the change in interest or engagement over time during the instructional unit in a series of three-level regressions that added all interactions between time and each of the aforementioned variables to the previously described models. For these models, we specified random intercepts and random slopes for response day across individuals and classes. There was no evidence that any of the student or class characteristics moderated the trajectories of interest or engagement.

3.3. Relations between situational interest with engagement

Hypotheses about the relations between students' situational interest in class and their engagement were tested with a series of three-level random intercept only regressions. For each multilevel model, at level 1 we included time, daily situational interest in class, and the outcome reported on the previous day. The prior day's value for the outcome was entered to control for possible carryover effects from one day to the next (e.g. see Reis et al., 2000 for an example of this strategy). The most recent day of reporting was carried forward for the purposes of lagging when reports were missing. Including the prior day's outcome value allowed us to model change in the outcome from one report to the next as a function of students' experience of interest in class reported on the same day as the outcome. At level 2 and 3, we included the mean of in-class interest across days for each student and the mean of in-class interest across days and students within a class. Within-student results allowed us to assess day-to-day variation in student's engagement as a function of student's daily interest in class. Between-student results assessed relations between students' cumulative in-class interest with engagement aggregated across the six-weeks by calculating the mean for each participant across the 17 possible class days. Between-class results assessed the relation between each class's experience of interest with engagement by calculating the mean for each classroom across all participating students in each class and the 17 possible class days. In addition to mean interest, we also included five student or class characteristics (sex, ethnicity, free/reduced price lunch eligibility, class content, and class type) as control variables at the student and class levels (level 2 and 3).

To decompose between and within-person effects and reduce collinearity, daily within-student interest was person-mean centered (around each person's own average score), between-student mean interest were class-mean centered (around the average score for the class), and between-class mean interest were grand mean centered (around the sample mean). Time, the prior day's score for the outcome, and other student and class characteristics were grand-mean centered since they were mainly control variables in these models. Again we used the Mixed procedure in SPSS 21, a maximum likelihood estimation procedure with robust estimates of standard errors (REML), and specified an AR(1) correlated error structure. A separate model was estimated for each outcome (working hard, participating, paying attention, cognitive engagement, and agentic engagement). The results of these analyses can be seen in Table 4.

All five forms of engagement were positively predicted by students' situational interest in class on the same day, as well as individual students' interest during class aggregated across the unit and the classes' interest across the unit, controlling for time, the outcome on the prior class day, and the five student and class characteristics. Several patterns in the findings are worth noting. Namely, the effect of interest during class was generally stronger at the student level relative to the day level. This suggests that a students' experience of interest in class does generally accumulate and grow stronger in its relation with engagement aggregated over time. It is also worth noting that although many of the day level effects were small (β s ranged from 0.14 to 0.23), daily interest in class appeared to be about as good of a predictor as an identical measure of the student's own engagement during the prior class period. In some cases (e.g. paying attention during class) daily interest was a stronger predictor than the outcome from the prior class.

3.3.1. Variation in relations between situational interest and engagement across time

To explore our hypothesis that the daily relations between interest and engagement may vary over the course of an instructional unit, we estimated a series of three-level random intercept only regressions that included the interaction term between interest and

Table 2

Multilevel regressions with time predicting students' situational interest and behavioral engagement in science class.

Predictor	Interest		Working hard		Participation		Paying attention	
	<i>b</i> (SE)	β	<i>b</i> (SE)	β	<i>b</i> (SE)	β	<i>b</i> (SE)	β
<i>Class level</i>								
Intercept	2.95(0.08)		3.20(0.06)		2.88(0.07)		3.70(0.05)	
Class content	0.06(0.16)	0.02	0.16(0.13)	0.09	0.13(0.15)	0.05	0.05(0.10)	0.02
Class type	0.26(0.16)	0.11	0.21(0.13)	−0.10	0.21(0.15)	0.08	0.34(0.10)	0.17**
<i>Student level</i>								
Sex	−0.35(0.12)	−0.15**	0.06(0.12)	0.02	−0.30(0.13)	−0.11*	−0.15(0.10)	−0.07
Ethnicity	0.19(0.14)	0.08	0.26(0.13)	0.11*	0.11(0.15)	0.04	0.08(0.11)	0.04
Free/reduced lunch	−0.01(0.14)	−0.002	−0.01(0.14)	−0.004	−0.17(0.15)	−0.06	−0.12(0.11)	−0.06
<i>Day level</i>								
Time	−0.01(0.005)	−0.06***	−0.03(0.005)	−0.10***	0.01(0.005)	0.04*	−0.03(0.004)	−0.13***

Notes. Level 1 (daily reports) $n = 2306$ reports. Level 2 (students) $n = 218$. Level 3 (classes) $n = 43$. The "time" variable reflects the day of reporting across the 6 week instructional unit. For student sex, 0 = male and 1 = female. For student ethnicity, 0 = Caucasian or Asian and 1 = Black, Hispanic, or other ethnic minority. For free and reduced lunch eligible, 0 = not eligible for free/reduced lunch and 1 = eligible for free/reduced lunch. For class content, 0 = non-biological science and 1 = biological science. For class type, 0 = grade typical class and 1 = advanced class. b = unstandardized regression coefficient. β = standardized regression coefficient. Standardized estimates were computed using the following formula (Hox, 2010): $\beta = (b * \text{sd}_x) / \text{sd}_y$. Standard deviation values reflected the variability at the given level (not total variability). SE = standard error.

* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.**Table 3**

Multilevel regressions with time predicting students' cognitive and agentic engagement in science class.

Predictor	Cognitive engagement		Agentic engagement	
	<i>b</i> (SE)	β	<i>b</i> (SE)	β
<i>Class level</i>				
Intercept	2.75(0.07)		2.50(0.07)	
Class content	0.14(0.14)	0.06	0.01(0.14)	0.01
Class type	0.32(0.14)	0.15*	0.19(0.13)	0.09
<i>Student level</i>				
Sex	−0.17(0.12)	−0.08	−0.22(0.11)	−0.11*
Ethnicity	0.15(0.14)	0.07	−0.11(0.12)	−0.06
Free/reduced lunch	0.03(0.14)	0.01	0.19(0.13)	0.09
<i>Day level</i>				
Time	−0.001(0.004)	−0.005	0.01(0.004)	0.03

Notes. Level 1 (daily reports) $n = 2306$ reports. Level 2 (students) $n = 218$. Level 3 (classes) $n = 43$. The "time" variable reflects the day of reporting across the 6 week instructional unit. For student sex, 0 = male and 1 = female. 0 = Caucasian or Asian and 1 = Black, Hispanic, or other ethnic minority. For free and reduced lunch eligible, 0 = not eligible for free/reduced lunch and 1 = eligible for free/reduced lunch. For class content, 0 = non-biological science and 1 = biological science. For class type, 0 = grade typical class and 1 = advanced class. b = unstandardized regression coefficient. β = standardized regression coefficient. Standardized estimates were computed using the following formula (Hox, 2010): $\beta = (b * \text{sd}_x) / \text{sd}_y$. Standard deviation values reflected the variability at the given level (not total variability). SE = standard error.

** $p < 0.01$.*** $p < 0.001$.* $p < 0.05$.

time at the daily level only. That is, for these models we excluded the student-level and class-level interest predictors since the focus for these analyses was to examine whether the relation between daily interest and engagement varied across days. Otherwise, the model for each engagement outcome was identical to those previously described.

Results provided support for our hypothesis that the relation between daily interest and engagement would vary over an instructional unit. Namely, a significant interaction between daily in-class interest and time was found for working hard ($B = -0.02$, $SE = 0.007$, $\beta = -0.05$, $p < 0.007$), controlling for the prior day level of engagement and the five student and classroom characteristics, indicating that daily in-class interest predicted less of an increase in working hard as the unit progressed. To get a better sense of this interaction, we conducted simple slope analyses that tested the significance of the relation between daily interest and working hard early in the unit at day 3 and later in the unit on day 10. Whereas the coefficient for interest was $\beta = 0.23$ ($p < 0.001$) on day 3, it was

slightly smaller by day 10 ($\beta = 0.15$, $p < 0.001$), though still statistically significant. Results suggest that daily in-class interest predicted increases in working hard more so early in an instructional unit compared to later in the unit. The interaction between interest and time was not statistically significant for other forms of engagement.

3.3.2. Variation in relations between situational interest and engagement across individuals and classrooms

In exploratory analyses, we examined whether student and classroom characteristics (sex, ethnicity, free or reduced price lunch eligibility, class content, and class type) might moderate the relations between interest and engagement in a series of three-level regressions that added interactions between daily interest, student mean interest, or class mean interest with each of the aforementioned variables. For these models, we specified random intercepts and random slopes for response day across individuals and classes. To simply each model, we examined interactions involving each student or class characteristic in separate models. When

Table 4

Multilevel regressions with situational interest in class predicting five forms of engagement in separate models.

Predictor	Working hard		Participation		Paying attention		Cognitive engagement		Agentic engagement	
	<i>b</i> (SE)	β	<i>b</i> (SE)	β	<i>b</i> (SE)	β	<i>b</i> (SE)	β	<i>b</i> (SE)	β
<i>Class level</i>										
Intercept	3.20(0.04)		2.90(0.05)		3.71(0.04)		2.75(0.04)		2.53(0.04)	
Interest _{mean}	0.38(0.08)	0.17***	0.54(0.11)	0.22***	0.43(0.08)	0.23***	0.45(0.09)	0.23***	0.47(0.07)	0.25***
Class content	0.12(0.08)	0.05	0.09(0.11)	0.04	0.01(0.08)	0.01	0.10(0.09)	0.05	-0.01(0.08)	-0.01
Class type	0.09(0.08)	0.04	0.05(0.11)	0.02	0.26(0.08)	0.13*	0.16(0.09)	0.08	0.06(0.08)	0.03
<i>Student level</i>										
Interest _{mean}	0.43(0.05)	0.25***	0.54(0.07)	0.29***	0.45(0.06)	0.31***	0.36(0.06)	0.24***	0.43(0.05)	0.30***
Sex	0.20(0.07)	0.08**	-0.11(0.10)	-0.04	-0.002(0.08)	-0.001	0.02(0.09)	0.01	-0.05(0.07)	-0.02
Ethnicity	0.14(0.08)	0.06	-0.03(0.11)	-0.01	-0.04(0.09)	-0.01	0.02(0.10)	0.01	-0.17(0.08)	-0.08*
Free/reduced lunch	-0.01(0.08)	-0.003	-0.14(0.11)	-0.05	-0.11(0.09)	-0.06	0.02(0.10)	0.01	0.17(0.08)	0.08
<i>Day level</i>										
Interest	0.27(0.03)	0.17***	0.39(0.03)	0.23***	0.29(0.02)	0.22***	0.20(0.02)	0.14***	0.30(0.02)	0.23***
Time	-0.01(0.005)	-0.05**	-0.001(0.004)	-0.004	-0.02(0.005)	-0.10***	0.01(0.003)	0.03*	0.01(0.003)	0.04*
Lagged outcome	0.25(0.02)	0.25***	0.14(0.02)	0.14***	0.04(0.02)	0.04*	0.22(0.02)	0.22***	0.23(0.02)	0.23***

Notes. Level 1 (daily reports) $n = 2306$ reports. Level 2 (students) $n = 218$. Level 3 (classes) $n = 43$. Each outcome was examined in a separate model that included situational interest in class, along with the lagged outcome, time, three student characteristics, and two classroom characteristics. The "time" variable reflects the day of reporting across the 6 week instructional unit. The "lagged outcome" variable reflects the prior day's value for the outcome. Interest in class was measured at the day level. The student-level in-class interest variable was created by computing the mean of interest across days for each student. The class-level in-class interest variable was created by computing the mean of interest across days and students within a class. To indicate that each of these variables were aggregates, the subscript "mean" was added to the predictor label. For student sex, 0 = male and 1 = female. 0 = Caucasian or Asian and 1 = Black, Hispanic, or other ethnic minority. For free and reduced lunch eligible, 0 = not eligible for free/reduced lunch and 1 = eligible for free/reduced lunch. For class content, 0 = non-biological science and 1 = biological science. For class type, 0 = grade typical class and 1 = advanced class. b = unstandardized regression coefficient. β = standardized regression coefficient. Standardized estimates were computed using the following formula (Hox, 2010): $\beta = (b \cdot \text{sd}_x) / \text{sd}_y$. Standard deviation values reflected the variability at the given level (not total variability). SE = standard error.

* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.

examining the role of student characteristics as moderators of the relation between interest and engagement, we specified interactions between the student characteristic and interest at both the day and student levels (daily interest, student mean interest). When examining the role of classroom characteristics as moderators of the relation between interest and engagement, we specified interactions between the class characteristic and interest at all three levels of analysis (daily, student mean, and class mean interest). Otherwise, models were identical to those previously described examining the main effects of daily, student mean, and class mean interest on engagement outcomes, controlling for time, the prior day's outcome value, and the five student and classroom characteristics.

A significant interaction between daily interest and ethnicity for cognitive engagement ($B = 0.12$, $SE = 0.05$, $\beta = 0.06$, $p < 0.04$) indicated that the increase in cognitive engagement as a function of daily interest was greater for Black, Hispanic, and other minority students compared to Caucasian and Asian students. Simple slope analyses suggested that whereas the coefficient for the relation between daily interest and cognitive engagement was $\beta = 0.17$ ($p < 0.001$) for Black, Hispanic, and other minority students, the coefficient for daily interest was $\beta = 0.08$ ($p = 0.006$) for Caucasian and Asian students. In addition, a significant interaction between daily interest and content for working hard ($B = -0.14$, $SE = 0.07$, $\beta = -0.05$, $p < 0.05$) indicated that the increase in working hard as a function of daily interest was greater for students in non-biological science courses compared to biological science courses. Simple slope analyses suggested that whereas the coefficient for the relation between daily interest and working hard was $\beta = 0.21$ ($p < 0.001$) for students in non-biological science courses, the coefficient for daily interest was $\beta = 0.12$ ($p < 0.001$) for students in biological science courses. Finally, a significant interaction between daily interest and course level for agentic engagement ($B = -0.09$, $SE = 0.04$, $\beta = -0.05$, $p < 0.04$) indicated that the increase in agentic engagement as a function of daily interest was greater for students in grade-typical courses compared to advanced courses. Simple slope analyses suggested that whereas the coefficient for the relation between daily interest and

working hard was $\beta = 0.27$ ($p < 0.001$) for students in grade-typical courses, the coefficient for daily interest was $\beta = 0.19$ ($p < 0.001$) for students in advanced courses. There were no other interactions between student or class characteristics with interest at the student or class level.

3.4. Variance partitioning for perceived teacher provision of choice

Next, we conducted a series of analyses to explore our hypotheses that students' experience of situational interest would shape their perceptions of teacher provision of choice. First, in order to gauge the daily variation in perceptions of teacher choice provision over the course of the six-week instructional unit, we began by testing a three-level regressions with days (within-students) nested within pupils (between-students) and pupils nested within classes (between-classes) in an unconditional model in which no predictors were entered. Variance partition coefficients (VPC; Goldstein, 2011), and intraclass correlation coefficients (ICC; Kreft & de Leeuw, 1998) were computed (see Table 1). VPCs suggested that 54% of the variance in perceptions that teachers provided choices was at the day level, 38% was at the student level and on 8% was observed at the classroom level. Results suggest there was a substantial proportion of daily variation in students' perceptions of their teachers' provision of choices, in addition to a great deal of variation across individual students.

3.5. Relations between situational interest and perceived teacher provision of choice

To test our hypotheses that students' greater situational interest in class would relate to their perceptions of teachers' engaging in more autonomy supportive practice in the form of choice provision, we conducted a series of three-level regressions identical to those previously described for engagement outcomes with one modification. Namely, we conducted two sets of multilevel regressions for perceived teacher provision of choice. One set of regressions

included daily situational interest during class measured on the same day as the perceived practice outcome and the other set of models included daily situational interest during class measured on the class day prior to that in which the perceived practice was assessed. The results of these analyses can be seen in Table 5.

Controlling for time, the perceived teacher provision of choice on the prior class day, and the five student and class characteristics, students' situational interest during class significantly predicted perceptions that teachers provided greater opportunities for choices at day, student, and class levels in both the model in which interest measured on the same day as the perceived practice was included and in the model in which in-class interest for the class session prior to that for the perceived teacher practice was included. Not surprisingly, a weaker relation between interest and perceived provision of choice was found at the daily level when prior day in-class interest was entered as a predictor of perceived teacher provision of choice compared to models with same day interest as the predictor. These results suggest that students' experience of interest in class on any given day may influence the extent to which teachers (are perceived to) subsequently increase their support for motivation through providing choices on the same and following class day. The relation between interest and perceived teacher practices were generally stronger at student and class levels relative to the day level.

3.5.1. Variation in relations between situational interest and perceived provision of choice across time

As we had done with analyses exploring relations between interest and engagement, to explore our hypothesis that the daily relations between interest and perceived choice provision may vary over the course of an instructional unit, we estimated two three-level random intercept only regressions that included the interaction term between in-class interest (either same day or prior day) and time at the daily level only. Again, we excluded the student-level and class-level interest predictors in these models since the focus for these analyses was to examine whether the relation between daily interest and engagement varied across days. Otherwise, the model structure was identical to those previously described.

Results provided some support for our hypothesis that the relation between daily in-class interest and perceived choice provision would vary over an instructional unit. Namely, a significant interaction between prior day in-class interest and time ($B = -0.02$, $SE = 0.005$, $\beta = -0.06$, $p < 0.002$), controlling for the prior day level of perceived choice provision and the five student and classroom characteristics, indicated that prior day interest predicted a smaller increase in perceptions that teachers provided choices as the unit progressed. Again, we conducted simple slope analyses that tested the significance of the relation between prior day in-class interest and perceived choice provision early in the unit at day 3 and later in the unit on day 10. Whereas the coefficient for prior day interest was $\beta = 0.11$ ($p < 0.001$) on day 3, the coefficient for prior day interest was negligible by day 10 ($\beta = 0.01$, $p = 0.48$). Results suggest that students' interest predicted increases in perceptions that teachers provided choices during the following class day early in the instructional unit, but not later in the instructional unit. There was no interaction between same day interest and time for perceptions of choice provision.

3.5.2. Variation in relations between situational interest and perceived provision of choice across individuals and classrooms

Finally, in exploratory analyses, we examined whether student and classroom characteristics (sex, ethnicity, free or reduced price lunch eligibility, class content, and class type) might moderate the relation between in-class interest and perceptions of teachers' provision of choice in a series of three-level regressions that added interactions between daily interest, student mean interest, or class mean interest with each of the aforementioned variables. For these

Table 5

Multilevel regressions with situational interest in class predicting perceptions of teacher provision of choice.

Predictor	Same day interest predicting choice		Prior day interest predicting choice	
	<i>b</i> (SE)	β	<i>b</i> (SE)	β
<i>Class-level</i>				
Intercept	2.47(0.03)		2.48(0.04)	
Interest _{mean}	0.32(0.07)	0.17***	0.30(0.07)	0.17***
Class content	-0.14(0.07)	-0.07	-0.14(0.07)	-0.07
Class type	0.04(0.07)	0.02	0.04(0.07)	0.02
<i>Student-level</i>				
Interest _{mean}	0.27(0.04)	0.20***	0.27(0.04)	0.20***
Sex	0.02(0.06)	0.01	0.01(0.07)	0.01
Ethnicity	-0.10(0.07)	-0.05	-0.10(0.08)	-0.05
Free/reduced lunch	0.22(0.07)	0.11*	0.23(0.08)	0.12*
<i>Day-level</i>				
Interest	0.17(0.02)	0.13***	0.06(0.02)	0.04*
Time	0.01(0.003)	0.06***	0.01(0.004)	0.05**
Lagged outcome	0.32(0.02)	0.32***	0.31(0.02)	0.31***

Notes. Level 1 (daily reports) $n = 2306$ reports. Level 2 (students) $n = 218$. Level 3 (classes) $n = 43$. The "time" variable reflects the day of reporting across the 6 week instructional unit. The "lagged outcome" variable reflects the prior day's value for the outcome, perceived teacher provision of choice. Interest in class were measured at the day level. The day-level interest variable was measured on the same class day as the outcome in the first model and on the class day prior to the outcome in the second model. The student-level in-class interest variable was created by computing the mean of interest across days for each student. The class-level in-class interest variable was created by computing the mean of interest across days and students within a class. To indicate that each of these variables were aggregates, the subscript "mean" was added to the predictor label. For student sex, 0 = male and 1 = female. 0 = Caucasian or Asian and 1 = Black, Hispanic, or other ethnic minority. For free and reduced lunch eligible, 0 = not eligible for free/reduced lunch and 1 = eligible for free/reduced lunch. For class content, 0 = non-biological science and 1 = biological science. For class type, 0 = grade typical class and 1 = advanced class b = unstandardized regression coefficient. β = standardized regression coefficient. Standardized estimates were computed using the following formula (Hox, 2010): $\beta = (b * sdx) / sdy$. Standard deviation values reflected the variability at the given level (not total variability). SE = standard error.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

models, we specified random intercepts and random slopes for response day across individuals and classes. As we had done with models examining engagement outcomes, we examined interactions involving each student or class characteristic in separate models and included interactions with class mean interest only when examining the role of classroom characteristics.

Results suggested that the relation between prior day in-class interest and perceived choice differed by sex. A significant interaction between prior day interest and sex ($B = -0.12$, $SE = 0.05$, $\beta = -0.07$, $p < 0.03$), controlling for time, the prior day level of perceived choice provision, as well as the other four student and class characteristics, indicated that prior day in-class interest predicted an increase in perceptions that teachers provided choices more so for male compared to female students. Again, we conducted simple slope analyses that tested the significance of the relation between prior day in-class interest and perceptions of choice provision separately by sex. Whereas the coefficient for prior day interest was $\beta = 0.09$ ($p < 0.003$) for males, the coefficient for prior day interest was negligible for females ($\beta = -0.0003$, $p = 0.99$). Results suggest that male students perceived their teachers to increase their emphasis on student choice on days following those class sessions in which they felt interested. However, female students' in-class interest did not predict a change in perceived choice provision on the subsequent class day. No other interactions between student or classroom characteristics and interest were found.

4. Discussion

4.1. Empirical and theoretical contributions

The present investigation examined the role of high school students' daily and cumulative experience of situational interest during science class in their engagement and perceptions of the classroom climate. To explore these links, we used a diary method to track daily fluctuations in students' experience of interest in class, indicators of behavioral engagement (working hard, participation, and paying attention), cognitive engagement, and agentic engagement during science class over a six week instructional unit. We also tracked daily fluctuations in students' perceptions of the extent to which their teachers emphasized student choice, a practice routinely identified by motivation researchers to be relevant to the experience of autonomy and motivation. This investigation was unique in that it allowed us to explore the trajectories of students' experience of situational interest in class and engagement over time and examine relations for in-class interest both on a given day and over time within the context of an authentic high school science classroom. Thus, overall we sought to examine (1) the relations between students' daily and cumulative experience of situational interest with their behavioral, cognitive, and agentic engagement in authentic high school science classrooms over time, (2) how students' daily interest experiences relate to and shape perceptions of their science teachers' provision of choice over time, and (3) whether student and classroom characteristics, including students' sex, ethnicity, and free or reduced lunch eligibility, as well as the science class content and level (advanced or grade typical) moderate the relations among situational interest, engagement, and perceptions of teachers' choice provision.

In line with interest theories (Dewey, 1913; Hidi & Harackiewicz, 2000; Schiefele, 2009) and our hypotheses, results suggested that students' experience of interest during science class predicted all five forms of engagement assessed, both on a daily basis as well as cumulatively over the six-week instructional unit. That is, students' experience of interest in science class on any given day predicted an increase since the last class session in their participation, attention, and effort put forth toward work in class, as well as an increase in their use of cognitive learning strategies and attempts to influence the flow of instruction in ways that might maximize their learning experience (agentic engagement). We thought it was notable that the sizes of these daily effects, though small, were relatively similar to strength of the prior class day's outcome for predicting itself on the following class day. For some outcomes such as paying attention during class, daily interest was a notably better predictor than the outcome itself from the prior class, suggesting that it has as much or more influence than students' habitual ways of behaving in class.

Such findings provide insight into pathways through which situational interest may come to influence students' learning and achievement in the science classroom. These various forms of engagement are considered to be precursors to learning and achievement in school during adolescence, predicting high school grades and achievement test scores (Goodenow, 1993; Roderick & Engel, 2001; Willingham, Pollack, & Lewis, 2002), as well as attendance and graduation over the long term (Connell, Spencer, & Aber, 1994; Croninger & Lee, 2001). Agentic engagement is somewhat unique in that it not only represents a mechanism to achievement, but also a pathway by which students can influence the classroom environment and solicit greater motivational support from teachers (Reeve, 2013). This study suggests that the experience of interest during class time serves as a platform to set these pathways into motion each day.

Not surprisingly, not only did situational interest relate to students' engagement on any given day, but students and whole classes

who experienced greater cumulative in-class interest across the six-week instructional unit reported greater engagement of all forms aggregated across the six weeks. In fact, the relations between situational interest and engagement were stronger once aggregated over time, a finding that may point to the relative strength of individual versus situational interest for supporting learning-related outcomes over the long-run (Hidi & Renninger, 2006).

However, we did not find that the relations between interest during science class and all forms of engagement was uniform over the course of instruction. Rather, interest during science class predicted a greater increase since the last class session in working hard early in the instructional unit compared to later in the unit. These results provide evidence for our expectation that interest would play a greater role in guiding students' engagement when the external consequences (i.e. performing well on the end-of-unit exam or making a good course grade for the grading session) of such learning were more distant. As the consequences of learning (or not learning) approached, we suspect that extrinsic motivation, that is, a state of wanting to perform a specific activity in a given situation for the sake of some external outcome (e.g., Ryan & Deci, 2000), became a more powerful predictor of students' learning related thoughts and behavior, subtly "crowding out" the role of interest. It is important to note here that the interest-engagement links always remained positive across the instructional unit and the change in the relation over time was small. Future classroom research might extend the results of this study by explicitly measuring or intentionally manipulating sources of extrinsic motivation simultaneously with constructs assessed in the current study so that this dynamic can be investigated in more depth.

Time was not the only factor to influence the relations between daily interest and engagement. Students' ethnicity, the content of the course, and the course level also influenced relations between daily interest and engagement. In line with our predictions, we found that daily interest was linked with increases in daily cognitive engagement more so for Black, Hispanic, and other ethnic minorities compared to Caucasian and Asian student counterparts. We also found that the daily interest was linked with increases in working hard more strongly in non-biological science courses compared to biological science courses. Finally, we found that daily interest was linked with increases in agentic engagement more strongly in grade-typical classes compared to advanced classes. We expect that these findings are relatively specific to interest and engagement within the science domain, reflecting our hypothesis that daily situational interest within the classroom is a particularly important elicitor of various forms classroom engagement among those individuals who have traditionally demonstrated less personal interest in pursuing expertise within science domains (e.g., Blacks and Hispanic individuals) or in courses that may overall be of less personal interest to students (required introductory science courses relative to advanced or elective courses and physical science courses relative to biological science). Such findings are encouraging as they suggest that situational interest most strongly elicits the science engagement of those most in need of support.

In addition to examining the links between students' experience of situational interest in class and their daily engagement, we also explored our hypothesis that daily interest might relate to and shape teachers' behavior as perceived by students in the class, such that teachers would react to students' interest by being more motivationally supportive. Results of this investigation supported our hypotheses, suggesting that students' daily experience of interest during science class predicted perceptions that teachers provided more choice opportunities during the same class session. Specifically, on days in which students' experienced greater interest in science class, they also reported increases over and above the prior class day in their perceptions that their teachers provided choices. This evidence suggests that on days in which students feel

interested during class, they also perceive their teachers to be more motivationally supportive. Again, the relations between interest and perceived choice provision were stronger when aggregated over time, suggesting that students who cumulatively experienced greater interest in science class on average over the unit perceived that their teachers provided more choice opportunities on average over time.

The initial day level findings suggested that science teachers' might indeed be perceived as reacting to students' levels of interest, given our model in which the perceived teacher practice from the prior day was controlled so that changes in the practice from day to day as a function of interest could be modeled. Further, we thought that this model in which interest and perceived practice was measured on the same day was particularly appropriate in that it seems highly likely that teachers react and adjust their practice in the moment on a given day after appraising the emotional tone of students in the class. However, we also recognized that a stronger test of this hypothesis would be one in which the measurement of interest preceded perceptions of teachers' practice.

As such, we conducted a similar analysis after trading out daily in-class interest measured on the same day as the outcome, for interest in class measured on the class day prior to perceptions of science teacher's provision of choice. Not surprisingly, the effect of prior day interest on subsequent perceived teacher choice provision was weaker than that for same day interest. However, results suggested that students perceived their teachers to react to their interest in class by being more motivationally supportive. Specifically, prior day in-class interest predicted students' perceptions that teachers increased the extent to which they offered choices and encouraged students to work in their own way the following class day. It is worth noting that the size of the effects of prior day interest on subsequent perceived teacher choice provision was, overall, very small. However, we would argue that it is still meaningful as even small effects can lead to substantial gains when accumulated over time. Our analyses at the student level over a mere six weeks suggested that these effects do indeed grow stronger as they accumulate. Thus, it is not hard to imagine a science classroom in which good (high interest) days for students lead to more autonomy support in the future, which subsequently leads to better subsequent interest, engagement, and learning in a reciprocal snowballing effect that describes how students come to have a cumulatively positive experience in a class as a whole over the course of a school year. While such a pattern is likely important in any educational context, we believe it is particularly important within secondary science education where students are particularly likely to benefit from autonomy support.

That said, it is again important to note that the relation between situational interest during science class and perceptions that teachers provided choices was not uniform across the instructional unit or for both male and female students. Consistent with our hypotheses, interest during the prior science class predicted a greater subsequent day increase since the last class session in perceptions that teachers provided choice opportunities early in the instructional unit compared to later in the unit. We interpret this finding much like the change in the interest-engagement link over time. That is, we suspect that teachers become less reactive to students' emotional tone to direct their instruction as the external consequences of instruction and learning approach. This finding is consistent with research suggesting that the more teachers perceive pressures on them from school administration or circumstances, the less autonomous they are in their motivation for teaching, and the more they become controlling in their teaching (Pelletier & Sharp, 2009).

Consistent with our predictions, we also found that the link between interest and subsequent day perceptions of choice provision varied depending on the sex of the student. Namely, while interest during the prior science class predicted a greater subse-

quent day increase since the last class session in perceptions that teachers provided choice opportunities among male students, this relation was not apparent for female students. Results suggest teachers are particularly sensitive to fluctuations in interest of male students in science class. As previously introduced, we suggest that the difference in this interest-perceived teacher practice link relates to the widely reported finding that by adolescence, girls appear less interested in science compared to boys, and less likely to enroll in science courses and pursue science oriented careers (e.g., see Gardner, 1998). U.S. Census Bureau statistics for 1970–2010 suggest that women continue to pursue stereotypically female occupations with modest increases of women in STEM fields traditionally dominated by men. Given that such stereotypes are pervasive, as well as research suggesting that boys generally receive more attention when interacting with teachers compared to girls in the science classroom (Morse & Handley, 1985) and classrooms in general (e.g. Etaugh & Hughes, 1975; Leinhardt, Seewald, & Engel, 1979; Sadker, Sadker, & Zittleman, 2009), it is not surprising that science teachers are more reactive in terms of their motivational strategies to the interest of boys, those individuals for whom in-class interest may seemingly be most likely to lead to long-term investments in science. However, there may be alternative explanations for this finding that we want to mention, including the possibility that teachers are more reactive to the in-class interest of boys because they perceive boys to be more difficult to behaviorally and instructionally manage in the classroom (i.e. Myhill & Jones, 2006) or, given that we relied on student perceptions of teacher practice, that male students are differentially sensitive to changes in teachers' practice in response to their interest.

Finally, the diary design of our study afforded us with the opportunity to explore the trajectories of students' experience of interest and engagement during science class across an instructional unit. Results suggested that trajectories varied depending on the particular construct. Namely, in-class interest and all indicators of behavioral engagement declined across the instructional unit, while there was no change in cognitive or agentic engagement. These results are consistent with cross-sectional and traditional longitudinal educational research suggesting that students' science motivation decline across adolescence (e.g., Vedder-Weiss & Fortus, 2012) and student behavioral and emotional engagement in the classrooms in general decline markedly within secondary classrooms from the start to the end of the school year (Marks, 2000; Skinner, Furrer, Marchand, & Kindermann, 2008). This study highlights that the decline in science interest and engagement, though small, is evident even within a brief six-week instructional unit. In light of the known benefits of interest and engagement, the results of this investigation and others continue to highlight the need to consider how interest and engagement can be cultivated by the science classroom environment, perhaps in the reciprocal and self-sustaining fashion previously described.

4.2. Limitations and directions for future research

The current investigation has provided evidence that enhances our understanding of how daily interest in authentic high school science classrooms may function and relate to students' daily engagement and perceptions of the classroom climate, as well as the nature of such relations over time and across various individuals and course types. However, this investigation is not without many limitations. As such, it is imperative that future research replicate and extend the findings of the current investigation. In addition to the limitations and suggestions for future research already highlighted, one limitation of the current research is the reliance on student self-report. Relying exclusively on students' self-reports leaves open the possibility that response-bias and shared-method variance may be influencing the results. In particular, we believe

that it would be particularly advantageous to use observations to explore the links between students' interest and subsequent teacher behavior in order to validate that student experiences of interest change actual teacher behavior and not just students' perceptions of teacher behavior. While there are examples of researchers using observation to determine teachers' autonomy supporting or thwarting practice (e.g. De Meyer et al., 2014; Jang, Reeve, & Deci, 2010), we know of no field research in which individual components of autonomy relevant practice (i.e. choice provision, rationales related to the importance of activities, perspective-taking) were observed as separate coding categories as they naturally occur in authentic classrooms. We believe that a nuanced understanding of how interest and engagement influences teachers' choice provision, as well as other motivational support strategies, requires detailed coding at the individual teacher strategy level. Along these same lines, future research might explore teachers' motivational practices outside of choice provision, as a number of practices have been proposed to be autonomy-supportive (e.g. Reeve & Jang, 2006; Reeve et al., 2004).

While one of the strengths of the current investigation is the diary design which allowed us to control for prior levels of the outcome variable in order to model change from one day to the next, such a design should not be taken to imply causation. It remains possible, for example, that students may become interested because they have been more behaviorally, cognitively, or agentially engaged on a given day, though prior traditional longitudinal evidence has also suggested that emotional engagement generally proceeds behavioral engagement (Skinner et al., 2008). As such, our understanding of the reciprocal effects of interest, engagement, and teacher practice may be enhanced by classroom-based research in which constructs are measured repeatedly within a single class session and over days. Such designs are disruptive and often undesirable from teacher and student perspectives, making the use of observation and very short but reliable self-report assessments imperative.

4.3. Conclusions

This investigation adds to the growing body of research exploring the role of interest in student engagement in the classroom and perceptions of the classroom. Given the obvious importance of the classroom climate and behaviors like working hard, paying attention, and using cognitive strategies to better learn course content, we believe the effort to continue to gain a nuanced understanding of the role of interest in these processes remains an important goal of educational research. However, the results of this study suggest there is much to be optimistic about. Provided teachers can trigger the interest of students within their science classrooms, situational interest provides the foundation on which students, particularly those who are most in need of support within the science domain, become behaviorally, cognitively, and agentially engaged and elicit environmental support.

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Daily Autonomy Supporting or Thwarting and Students' Motivation and Engagement in the High School Science Classroom

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This diary study provided the first classroom-based empirical test of the relations between student perceptions of high school science teachers' various autonomy supporting and thwarting practices and students' motivation and engagement on a daily basis over the course of an instructional unit. Perceived autonomy supporting practices were hypothesized to predict autonomous motivation and engagement outcomes, while perceived autonomy thwarting practices were hypothesized to predict controlled motivation and disaffection outcomes. In line with this prediction, multilevel modeling results based on regular reports of 208 high school students in 41 science classes across 6 weeks suggested that 4 perceived daily supports (choice provision, consideration for student preferences and interests, rationales for importance, and question opportunities) and 1 daily thwart (use of uninteresting activities) predicted changes in daily autonomous motivation and engagement. In contrast, changes in students' daily controlled motivation and disaffection were predicted primarily by 3 perceived daily thwarts (controlling messages, suppression of student perspectives, and use of uninteresting activities). Results also suggested that practices interacted such that the perception of thwarts generally bolstered desirable daily relationships between perceived supports and students' motivation and the perception of supports generally mitigated undesirable daily relationships between thwarts and motivation. Supplemental exploratory results suggested that the effects of choice and suppression of student perspectives may be heterogeneous and depend on the outcome and/or the presence of other practices. Implications of the findings are discussed.

Educational Impact and Implications Statement

The results of a 6-week classroom-based diary study with 208 high school students in 41 science classes suggested that students' autonomous motivation and engagement increased (since the prior class day) on days when students perceived their teachers to support their autonomy by providing choices, considering their preferences and interests in course activities, communicating rationales for the importance of activities, providing opportunities to ask questions, or avoiding uninteresting activities. In contrast, controlled motivation and disaffection increased on days when students' perceived their teachers to thwart their autonomy by using controlling messages, suppressing student perspectives, or using uninteresting activities. Students' perceptions that teachers' used thwarting practices simultaneously with supportive practices bolstered the desirable relationship between perceived supports and motivation, and mitigated the undesirable relationship between thwarts and motivation. Results suggest the importance of focusing motivation interventions on training high school teachers to implement specific daily practices geared at supporting students' experience of autonomy and minimizing the use of specific thwarting practices to both promote autonomous motivation and engagement and reduce controlled motivation and disaffection. Results highlight the importance of targeting a profile of autonomy-relevant practices that teachers use each day when attempting to maximize student motivation and engagement.

Keywords: autonomy support, autonomy thwart, teaching practice, motivation, engagement

A distressing pattern consistently found in education research is that motivation and engagement decline across grades, with the lowest levels among high school students, and from the start to the

end of the school year within secondary classrooms (e.g., Eccles et al., 1993; Harter, 1981; Lepper, Corpus, & Iyengar, 2005; Skinner Furrer, Marchand, & Kindermann, 2008). Moreover, the steepest declines may occur for science, technology, engineering, and mathematics (STEM) fields (e.g., Gottfried, Fleming, & Gottfried, 2001; Gottfried, Marcoulides, Gottfried, & Oliver, 2009), as the percentage of students studying and earning degrees in nearly all STEM fields has remained stable or declined over time (Maltese & Tai, 2011; Organization for Economic Co-operation and Development, 2006). This decline is troubling given extensive evidence that motivation and engagement are central to learning and achievement (e.g., Archambault, Janosz, Fallu, & Pagani, 2009; Hughes, Luo, Kwok, & Loyd, 2008; Lepper et al., 2005; Murayama, Pekrun, Lichtenfeld, & vom Hofe, 2012; Willingham,

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Pollack, & Lewis, 2002). Moreover, the increasing demand for individuals with knowledge in STEM areas in the current global marketplace (see, e.g., Bureau of Labor Statistics, 2011) make addressing low motivation and engagement in science classrooms particularly important.

Given these circumstances, an important goal of educational and psychological research is to understand how to structure teacher practices and the classroom environment to support students' motivation and engagement and prevent declines especially common at the secondary level and in STEM areas. A substantial body of research grounded in self-determination theory (Ryan & Deci, 2000) has suggested that teachers who are perceived to engage in practices that are supportive of students' experiences of autonomy facilitate optimal functioning in the form of autonomous motivation and engagement (e.g., Assor, Kaplan, & Roth, 2002; Patall, Dent, Oyer, & Wynn, 2013; Reeve & Jang, 2006; Reeve, Jang, Carrell, Jeon, & Barch, 2004). In contrast, controlling teacher practices that thwart students' experiences of autonomy predict controlled motivation, which is driven by external consequences, and maladaptive functioning (e.g., Assor et al., 2002; De Meyer et al., 2014; Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015; Reeve & Jang, 2006). While autonomy supporting and thwarting is important across contexts, the increasing need for autonomy and independence as students enter adolescence (Eccles et al., 1993; Erikson, 1968) make understanding the effects of teachers' use of autonomy relevant strategies particularly important in the context of secondary school classrooms. Likewise, given that discovery and innovation, recognition of ambiguity, and learning from past discoveries and failure are all central values of science (e.g., Allchin, 1999; Bartos & Lederman, 2014; Kuhn, 1962), support for personal autonomy would seem to be particularly important to science education.

However, limitations in the research on students' experiences of autonomy relevant teaching persist. In particular, the individual practices thought to support or thwart autonomy have been given inadequate attention in research based in a classroom context (and in STEM classes in particular) beyond retrospective, single survey, and cross-sectional designs. Moreover, existing research has failed to investigate within academic classroom contexts the extent to which students' experiences of various individual autonomy supporting and thwarting practices predict distinct motivation and engagement outcomes and the extent to which students' perceptions of autonomy supporting and thwarting interact to affect motivation and engagement. The current study sought to address these gaps by investigating the links between high school science students' perceptions of several autonomy relevant teaching practices and their motivation and engagement in a diary study that made use of repeated daily student reports across a 6-week instructional unit. The two main goals of this investigation were: (a) to examine the relationships between students' perceptions of a set of teaching strategies routinely identified as autonomy supporting or thwarting with students' daily autonomous and controlled motivation, engagement, and disaffection in authentic high school science classrooms and (b) to explore the extent to which perceived supportive and thwarting practices interact to predict students' daily motivation and engagement. The chosen design in which perceived teacher practice and students' motivation and engagement was assessed repeatedly over class days provided an

opportunity to collect strong evidence regarding the predictive role of daily perceptions of teacher practice in explaining students' daily motivation and engagement in class.

Teacher Practices That Support or Thwart Autonomy

According to self-determination theory, autonomy, or the experience that one's behavior is volitional and self-endorsed, is central to adaptive functioning and well-being as one of three fundamental human needs, along with needs for competence and relatedness (e.g., Ryan & Deci, 2000). The experience of being controlled is the logical opposite of autonomy, reflecting the perception that behavior is coerced by an external force (e.g., by a teacher's directive or an offer of a reward), is done out of feelings of pressure, obligation, or guilt, or is done because of a lack of choice. Along these lines, research suggests that satisfying the need for autonomy is associated with engagement, well-being, and highly desirable internal forms of motivation (e.g., intrinsic motivation), while experiencing frustration of the need for autonomy is associated with poorer well-being and less desirable forms of motivation that are focused on acquiring rewards or avoiding undesirable consequences (e.g., Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Haerens et al., 2015; Patall et al., 2013; Reeve & Jang, 2006).

Teachers' practices and more proximally, student perceptions of teacher practice, predict students' autonomy satisfaction or frustration, and in turn, the nature of their motivation, engagement, well-being, and achievement (e.g., Assor, Kaplan, Kanat-Maymon, & Roth, 2005; Assor et al., 2002; Haerens et al., 2015; Jang, Kim, & Reeve, 2012; Patall, Cooper, & Wynn, 2010; Patall et al., 2013; Reeve & Jang, 2006; Reeve et al., 2004; Skinner & Belmont, 1993; Soenens, Sirens, Vansteenkiste, Dochy, & Goossens, 2012). Autonomy support in the classroom context reflects a motivational approach in which teachers identify, nurture, and develop students' inner motivational resources so that students perceive themselves as the initiator of their actions (Reeve, 2009). Autonomy supportive teachers are conceptualized as offering choices, encouraging students to work in their own way or at their own pace, and open and responsive to students' opinions and questions. Although such teachers attempt to structure course activities around students' interests whenever possible, they also provide meaningful rationales to explain the usefulness or importance of even "boring" course activities (see Reeve, 2009; Reeve & Jang, 2006; or Su & Reeve, 2011 for a review of autonomy supportive practices).

In contrast, controlling teachers thwart autonomy in that they are perceived to be dismissive of student perspectives and to pressure students to think, act, or feel in particular ways (Reeve, 2009). Relatively fewer studies have addressed practices thought to thwart autonomy or students' perceptions of controlling practices. However, explicitly controlling language (e.g., "you must" or "you should"), commands that pressure students to act in teacher sanctioned ways, rationales that emphasize the external consequences of compliance, suppression of students' questions and opinions, and the assignment of activities that appear meaningless or uninteresting are routinely included among practices expected to thwart students' experiences of autonomy (e.g., Assor et al., 2002, 2005; Reeve, 2009; Reeve & Jang, 2006).

Differential Associations for Autonomy Relevant Teacher Practices

Autonomy support and control have often been conceptualized as being on opposite ends of a continuum. However, more recently, theory and research has increasingly suggested that controlling behaviors cannot be equated with infrequent acts of autonomy support. Rather, research now suggests that students' perceptions of practices that thwart autonomy have a rather modest negative correlation with perceived practices that support autonomy and yield distinct effects (e.g., Bartholomew et al., 2011; Haerens et al., 2015; Jang et al., 2016). While contexts that support autonomy unlock internal motivational resources that allow an individual to thrive, contexts that thwart autonomy can lead to defensive reactions that promote externally focused motivation and ill-being (Deci & Ryan, 2000). Consistent with this, Bartholomew and colleagues (2011) found that perceptions of autonomy-supportive coaching was most closely related to athletes' daily experiences of need satisfaction, and in turn, daily psychological well-being, while perceptions of controlling coaching was most closely related to daily need thwarting, and in turn, daily psychological and physical ill-being. Using a retrospective survey, Assor and colleagues (2002) found that students' perceptions that teachers provided choices and fostered students' understanding of the relevance of course activities primarily predicted emotional, cognitive, and behavioral engagement, while perceptions that teachers intruded on students' behavior and suppressed student perspectives primarily predicted students' negative affect. Also in retrospective, cross-sectional research, Haerens and colleagues (2015) found that perceptions of physical education teachers' autonomy support were primarily related to autonomous motivation via need satisfaction, while perceptions of physical education teachers' controlling practice was primarily related to controlled motivation and amotivation via need frustration. Finally, Jang and colleagues (2016) found that Korean high school students' perceptions that teachers supported their autonomy predicted changes in need satisfaction that predicted changes in engagement over the course of a school semester, while perceived teacher control predicted changes in need frustration and subsequent disengagement.

Implicit in these findings and our discussion is the differentiated view of motivation and engagement outcomes that motivation scholars have come to accept. Self-determination theory differentiates more autonomous and more controlled forms of motivation. Intrinsic and identified forms of motivation represent more autonomous forms in which the regulation of actions is incited by the inherent satisfaction, interest, or enjoyment that a task brings (intrinsic) or one's personal value for tasks (identified). Introjected and extrinsic motivation represent more controlled or external forms of motivation in which action is driven by internally controlling consequences such as feelings of guilt, shame, or pride (introjected) or the desire to obtain rewards and avoid punishment from the environment (extrinsic; e.g., Ryan & Deci, 2000). Moreover, autonomous forms of motivation (intrinsic and identified) are particularly desirable in the classroom because research has routinely indicated that they are linked with a variety of desirable and adaptive outcomes, including creativity, academic engagement, deep conceptual learning strategies, and academic achievement (e.g., Corpus, McClintic-Gilbert, & Hayenga, 2009; Lepper, Cor-

pus, & Iyengar, 2005; Otis, Grouzet, & Pelletier, 2005; Walker, Greene, & Mansell, 2006). In contrast, more extrinsic forms of motivation (introjected and extrinsic) are often linked with negative outcomes, including maladaptive learning strategies and attitudes, anxiety, poorer ability to cope with challenges, poor academic achievement, and even school drop-out (e.g., Lepper et al., 2005; Ryan & Connell, 1989; Vansteenkiste, Zhou, Lens, & Soenens, 2005; Walker et al., 2006).

The contrast between engagement and disaffection represents a similar juxtaposition of more and less desirable functioning. Engagement is typically conceptualized as a motivational construct that has a behavioral dimension that includes effort, persistence, intensity, and perseverance in the face of obstacles, an emotional dimension that includes enthusiasm, enjoyment, fun, and other positive emotions, and a cognitive dimension that includes attention to and regulation of the learning and thinking process (e.g., Skinner, Kindermann, Connell, & Wellborn, 2009). The opposite of engagement is disaffection, disengagement, or helplessness. Disaffection is not merely low levels of engagement of the various types. Rather, it is often operationalized in its behavioral form as giving up, just going through the motions, passivity, and lack of initiation, and in its emotional form as boredom, apathy, frustration, discouragement, or dejection (e.g., Miceli & Castelfranchi, 2000; Skinner et al., 2009).

In line with this current conception of the nature of teachers' motivating style and students' classroom experience, the dual-process model within a self-determination theory framework (e.g., Jang, Kim, & Reeve, 2016) explicitly asserts this differentiated view of teacher practice, student motivation, and student engagement. That is, teachers' motivating practice reflects the distinct processes of both perceived autonomy support and perceived autonomy thwarting. Student motivation and engagement can likewise be differentiated into need satisfaction, autonomous motivation, and engagement on the one hand, and need frustration, controlled motivation, and disaffection on the other hand. Thus, the dual-process model acknowledges that while the autonomy supportive teacher practices are likely to explain students' need satisfaction, autonomous motivation, and engagement, autonomy thwarting teacher practices explain students' feelings of being controlled, frustrated, and disengaged.

All things considered, it would seem important to examine the extent to which perceptions of both autonomy supporting and thwarting practices differentially predict motivation and engagement outcomes, as each set of perceived practices are likely to differentially predict students' autonomous motivation and engagement versus controlled motivation and disaffection. However, despite the progress made in research focused on understanding autonomy relevant teaching behaviors, a number of limitations persist. Specifically, there is limited research in which perceptions of the specific practices that define both autonomy supportive and thwarting practices have been examined simultaneously within an authentic classroom environment to uncover differential links with students' motivation and engagement during class. Those studies that have explored this issue have generally relied on cross-sectional designs (e.g., Assor et al., 2002; Haerens et al., 2015; but see Jang et al., 2016 for a longitudinal example of the differentiated effects of perceived teacher autonomy support and control broadly defined rather than on specific practices within each category). Thus, current research is limited to the extent that a

single retrospective survey of students' experiences is limited for drawing conclusions about the predictive role of student perceptions of teachers' various daily practices in their daily motivation and engagement in the classroom. However, teachers' autonomy relevant practices in the classroom and students' perceptions of those practices is likely to vary from one class day to the next and even minor variation is likely to change a student's daily motivation and engagement relative to his or her own typical level, though research has yet to explore this possibility. It is important to note that questions regarding the extent to which perceptions of daily teacher practices predict students' daily functioning in the classroom are distinct from questions regarding the relationships between perceptions of teachers' average practice across a semester, school year, or other period of time and students' summative motivation and engagement. Moreover, the former can only be addressed by research that monitors perceptions of teacher practice and students' classroom functioning across multiple days.

With these conceptual and methodological considerations in mind, the current investigation utilized a 6-week diary study that included regular student reports to examine differential associations between perceived autonomy supporting and thwarting teacher practices and high school science students' autonomous motivation and engagement and controlled motivation and disaffection in the classroom. Prior research suggested that we should expect perceived practices routinely identified as supportive, such as providing choices, considering students' interest and preferences in classroom activities, giving rationales about importance or usefulness, and providing opportunities for and being responsive to questions, to be strong predictors of autonomous motivation and engagement. In contrast, perceived practices routinely identified as autonomy thwarting, such as controlling messages, suppression of student perspectives, and use of uninteresting activities, were expected to be strong predictors of controlled motivation and disaffection.

Reciprocal Effects Between Perceived Teacher Practice and Students' Motivation and Engagement

According to self-determination theory, one of the primary antecedents to students' daily motivation and engagement in the classroom is expected to be their perceptions of teachers' autonomy relevant practices (e.g., Cheon & Reeve, 2013; Jang, Kim, & Reeve, 2016). However, one limitation of prior research focused on autonomy relevant teacher practices is that it has infrequently considered the extent to which student motivation and engagement may also influence perceptions of teacher practice or even objective teacher practice. Although infrequently examined, some research has suggested that teachers' respond to students' engagement. For example, Skinner and Belmont (1993) revealed in path analyses that student behavioral engagement measured in the fall was associated with the teachers' autonomy supportive behavior with students during the subsequent spring. Pelletier, Seguin-Levesque, and Legault (2002) found that when teachers perceived their students to be autonomously motivated, they were more autonomy supportive in their teaching. Jang, Kim, and Reeve (2016) found that Korean high school students' disaffection (but not engagement) predicted increases in both students' perceptions of teacher control and decreases in perceptions of teacher autonomy support over the course of a semester.

With this prior cross-sectional and longitudinal research as a base, we predicted that science students' motivation and engagement would also predict their perceptions of teachers' autonomy relevant practice on a day-to-day basis. However, in line with the dual process model, we expected to observe a differential pattern of effects across various forms of motivation and engagement. Namely, we predicted that students' perceptions that teachers' engaged in autonomy supportive practices would increase on days when students experienced autonomous motivation and engagement. Likewise, we expected that students' controlled motivation and disaffection would predict an increase in perceptions that teachers engaged in thwarting practices.

Interactions Between Perceptions of Autonomy Supportive and Thwarting Practices

Given that relatively few studies have simultaneously examined both autonomy supportive and thwarting practices, the extent to which autonomy supportive and thwarting teaching practices may yield stronger or weaker effects depending on the extent to which they are perceived to be administered in combination is a related matter that has been left unaddressed in the literature. Self-determination theory and research generally suggest that autonomy support is most effective when a cluster of supportive practices is administered together (e.g., Deci, Eghrari, Patrick, & Leone, 1994; Patall et al., 2013). However, what happens to students' motivation and engagement in a real classroom where teachers are likely to use both supportive and thwarting practices to some extent? Research indicates that perceptions of autonomy supportive and thwarting practices are distinct dimensions of teaching that are only weakly correlated (e.g., Assor et al., 2002; Haerens et al., 2015). Thus, autonomy supportive and thwarting teaching practices are likely to vary in the extent to which they are perceived to co-occur, though we know nothing about their interactive effects on students' motivation and engagement. We would argue that this issue of interaction between perceived autonomy supporting and thwarting practice is likely to be particularly relevant to the science classroom, given the emphasis in science on both discovery and innovation, as well as using established rigorous methods, rules, and procedures (e.g., Allchin, 1999). The precarious balance between these core values in science might make it particularly likely for students to perceive science teachers as using both autonomy supportive and controlling practices during the same class.

With that in mind, our predictions about how students' perceptions of supportive teaching practices might interact with thwarting practices was relatively uncertain. One possibility is that the perceived presence of thwarting teaching practices might dampen any desirable effects of perceptions of supportive practice on autonomous motivation and engagement. That is, in the context of thwarting practices, students may experience autonomy support as ineffective or insincere, limiting its functional significance for enhancing autonomous motivation and engagement. Likewise, the perceptions of autonomy support may dampen undesirable effects of thwarting practices, allaying the association between perceived thwarting practices and students' controlled motivation and disaffection.

Alternatively, a contrast interactive pattern might emerge such that in the perceived presence of teachers' thwarting practices, perceived autonomy support may predict autonomous motivation and engagement even more strongly. That is, the co-occurrence

and contrast of autonomy supportive and thwarting teacher practices may lead students to more fully appreciate the value of supportive practices and experience them as even more motivationally supportive. Likewise, thwarting practices may seem even more controlling when they are perceived to co-occur with and can be contrasted against supportive practices, bolstering the undesirable association between thwarting practices and controlled motivation and disaffection. The present investigation allowed us to test these competing hypotheses.

The Present Investigation

The aim of the present study was to test a set of theory-based hypotheses regarding the association between daily student perceptions of autonomy relevant teaching with various forms of motivation and engagement, while addressing some of the limitations in prior research by using diary methods. Given self-determination theory's assumption that it is students' subjective experiences of teachers' practice, rather than some objective reality of teacher practice, that ultimately determines students' motivation and engagement, we focused on students' perceptions of autonomy relevant teaching in the current investigation. We hypothesized that daily student perceptions of supportive practices would positively predict daily autonomous motivation and engagement in the classroom, even after controlling for the outcome on the prior class session. In contrast, we expected that daily student perceptions of autonomy thwarting teaching would yield fewer or weaker associations with those adaptive outcomes. Rather, we expected thwarting practices to be the strongest positive predictors of daily controlled motivation and disaffection in the classroom. We also expected to observe reciprocal effects from students' daily motivation and engagement to perceptions of teacher practice mimicking the same differential patterns of effect. Given the various possibilities for the patterns of interaction between students' perceptions of autonomy supportive and thwarting teaching practices and the lack of theory and prior research to guide our predictions, we made no hypotheses regarding how autonomy supportive and thwarting teaching practices may interact in their prediction of students' motivation and engagement. Finally, to strengthen confidence in the findings, we explored these hypotheses after controlling for a variety of student and classroom characteristics (e.g., students' sex, ethnicity, free or reduced price lunch eligibility, age, and prior course grade, as well as classroom content difficulty, cohort, Title I status, and teacher years of experience), because prior research has suggested that these student and classroom factors may influence students' engagement and perceptions of the environment (e.g., Clotfelter, Ladd, & Vigdor, 2010; Eccles et al., 1993; Murdock, 1999; Solomon, Battistich, & Hom, 1996), particularly within the science domain (e.g., Patall, Vasquez, Steingut, Trimble, & Pituch, 2015; Sinatra, Heddy, & Lombardi, 2015).

Overall, we expected the current study to extend evidence related to autonomy relevant teaching by contextualizing the research within an authentic high school science classroom and providing an opportunity to examine the unique, reciprocal, and interactive daily effects involving perceptions of various autonomy supportive and thwarting practices and students' daily autonomous and controlled motivation, engagement, and disaffection in the classroom. Going beyond the existing research, the current design

allowed us to examine the extent to which daily variations in students' perceptions of teaching practice (or motivation and engagement) was associated with corresponding changes in students' motivation and engagement outcomes (or perceptions of teacher practice) above or below their personal baselines for engagement and motivation (or perceptions of teacher practice). We felt that this level of specificity in context, predictors, outcomes, and timing would provide the best foundation for understanding how students' experiences of teacher practice shape their motivation and engagement.

Method

Participants

There were 208 urban and suburban high school science students (13 to 18 years of age; 54% female; 68% ethnic minority; at least 43% eligible for free or reduced lunch) from 41 science classrooms across eight public high schools in the southwest region of the United States participated in this diary study. Student participants were asked to provide reports of their experiences after every science class during a 6-week instructional unit between January 2013 and May, 2014 (2,176 total reports across all students).

Every classroom was led by a different science teacher. The number of students participating in the study from each class ranged from three to six. Approximately 56% of students were enrolled in a grade-level biology, physics, or chemistry course and 44% were enrolled in an advanced biology or chemistry course or a specialty topic science course (anatomy, environmental systems, engineering, or aquatic science). Thirty-two percent of the students across these classes were White, while 42% were Hispanic/Latino, 10% were Black, 2% were Asian, and 14% were of mixed ethnicities or another ethnicity. Two students did not share their ethnicity. Forty-two percent of students were in the 9th grade, 24% were 10th graders, 17% were 11th graders, and 17% were 12th graders. The mean grade point average (GPA) at the start of the study was 2.92 ($SD = 0.96$; minimum = 0.82, maximum = 4.0) on a 4-point scale.

Regarding the representativeness of our sample, the urban district from which students were drawn serves a population of students in which 52% are economically disadvantaged, 67% are Hispanic or Black, and 26% are White. The suburban district from which students were drawn serves a population of students in which 22% are economically disadvantaged, 28% are Hispanic or Black, and 63% are White. Thus, a comparison of the racial and economic make-up of our student sample across both districts' student demographics suggests that we successfully recruited a student sample that was representative of the student populations being served at these eight schools.

Participation was voluntary and students under the age of 18 secured parental permission to participate. In recruiting students, the goal was to randomly select five student participants from each class among students who volunteered to participate. In the majority of classrooms (35 of 41), at least five students volunteered to participate and students were randomly selected in cases where more than five volunteers were available. In the majority of classes, approximately five to eight students volunteered to participate. Five students participated in each of 25 classes and six

students participated in each of 10 other classes. In some classes, less than five students volunteered. Four students participated in each of 5 classes and in one class just three students participated. Despite randomly selecting among volunteers in classes in which we were able, given that participation was contingent on volunteering and a limited number of students in each class volunteered, this sample should not be mistaken for a true random sample and should be considered a convenience sample. Students were paid \$5 for every survey completed and received a \$50 bonus for completing all reports for which they did not have an excused absence from class.

Teachers' years of experience ranged from 0 to 40 ($M = 10.40$, $SD = 9.85$). Teachers were 25 to 66 years of age ($M = 38.12$, $SD = 12.49$). The majority of teachers (30) were White and female (30). One teacher was Black, three were Asian, three were Hispanic/Latino and four were of mixed ethnicities or another ethnicity. Teachers received \$50 for their participation in the study and schools received \$100 for each participating teacher.

Procedure

Recruitment of participants for this study occurred in stages. Teachers were recruited in group information sessions after obtaining permission from the two school districts, as well as individual high school principals, vice principals, and science chairs at each of the eight schools. During the teacher information session, teachers were informed that the purpose of the study was to examine the relationship between students' experiences in the classroom and their motivation and engagement. The diary methods involved in the study were also explained to teachers. Participating teachers selected the course that would participate in the study and the instructional unit during which the study occurred in consultation with the research team. Teachers were encouraged to view participation in the study as an educational experience, because they would be provided information about students' motivation and engagement at the end of the study and all the information collected as part of the study was confidential. With that in mind, the research team encouraged teachers to select their most typical course for participation that suited the study best for scheduling reasons and contained a diverse group of students. The research team discouraged teachers from selecting a course because they felt it was the one in which they or their students would perform best (or worst). Across all schools, approximately 50% of recruited teachers expressed willingness to participate and approximately 40% actually participated in the study.

Student participants were recruited via in-person classroom visits in which the study was described and a parent information letter and consent documents in both English and Spanish were distributed. Students were asked to return signed consent documents in a sealed envelope to a box located at the main office of the school.

Upon recruitment and selection, participating students first met with a member of the research team to learn about their responsibilities as a participant, as well as to receive and set-up an Apple iPod touch used to complete surveys for the duration of the diary study. During this initial meeting, student participants practiced using the iPod by completing a short background survey regarding their age, grade level, sex, ethnicity, eligibility for free or reduced lunch at school based on U.S. government policy, school GPA, and course grade for the most recent instructional unit. In addition, this

initial meeting was used to establish the student's school and personal schedule and determine the ideal time for the student to receive and complete daily reports.

On every class day of the 6-week instructional unit, students were emailed during their first free period (i.e., noninstructional time) after the class session with a survey asking them to respond to questions about their teachers' practices and their experiences of motivation and engagement in class. All questionnaires were programmed using Qualtrics and completed by students online using the Apple iPod touch provided by the researchers. All classes met on a block schedule, approximately every other school day. The number of report opportunities varied depending on the class and number of class sessions that occurred in the particular 6-week instructional unit. The number of scheduled class sessions ranged between 11 and 17, with classes having between 8 and 17 opportunities to report on class experiences as a result of various disruptions to class sessions (Median = 14). Daily report surveys remained available for students to complete until the next class session began. The number of reports that student participants completed across the instructional unit ranged from 1 to 17 ($M = 10$, $SD = 3.77$; Mode = 10). Only one student completed just one report and this student's responses could not be used in the analyses.

This design of repeatedly sampling students' daily perceptions of the classroom environment and experiences of motivation and engagement during class over the course of a 6-week unit allowed us to confidently examine (given the many repeated reports) ongoing within-person covariation between daily perceptions of teacher practices and experiences of motivation and engagement. That is, repeatedly sampling of participants allowed us to explore whether, for example, daily variations in perceived practices were associated with corresponding variation in motivation and engagement above or below a student's personal baseline level. Given the intense nature of drawing repeated reports from student participants over a 6-week period, we necessarily limited the number of participating students in each classroom. Restricting the number of participants from each class naturally limited the conclusions we might draw about the perceptions of the classroom from the students in the class as a whole. However, our focus was on understanding within-person (daily) variability in perceived practice, motivation, and engagement rather than variability between students or classrooms of students.

Measures

Motivation. Students' daily motivation in science class was assessed with 12 items we adapted for our use in a daily diary design from the Academic Self-Regulation Questionnaire (Ryan & Connell, 1989). This measure assessed student motivation toward education in terms of why they worked on course work, participated in science class, and tried to do well on assignments for science class *that day*. Students indicated the extent to which they engaged in each activity for intrinsic ("because it was interesting and enjoyable"), identified ("because it was important and valuable to me"), introjected ("to avoid feeling guilty or anxious"), or extrinsic reasons ("because the situation forced me to"). Students rated the extent to which they agreed with each item on a 5-point Likert scale ranging from not at all *true* (1) to *extremely true* (5). The validity and reliability of the multiscale measure for cross-

sectional research has been established in previous studies (Ryan & Connell, 1989). However, given that we adapted and shortened the measures to use them in a diary design, we conducted factor and reliability analyses to confirm that these adapted measures were appropriate for our daily diary context.

To assess the factorial validity of daily measures of motivation, we conducted a multilevel confirmatory factor analysis (ML-CFA) with four factors at both the day and student levels in Mplus 6.12. Parameters were estimated using a maximum likelihood estimation procedure (i.e., MLR) that is robust to violations of both the assumptions of normality and independence of observations, and provides for optimal parameter estimates when data are missing at random. We examined both day- and student-level (by computing the mean across class days for each student) factor structures, as factor structures are not always identical at different levels of analysis. Given the complexity of modeling a three-level exploratory factor structure and because we had just 43 classes at Level 3, we used the TYPE = COMPLEX TWO LEVEL command in Mplus to adjust *SEs* and χ^2 tests of model fit, accounting for the clustering at the classroom level (Level 3). To obtain proper estimates at each level, we followed standard multilevel modeling practices and used group-mean centering for the items at both the day and student levels using the student as the group for the lowest level and the class as the group for the student level. A well-fitting model was defined by a comparative fit index (CFI) of approximately .95, root mean square error of approximation (RMSEA) around .05, square root mean square residual (SRMR) around .08, and factor loadings $> .40$ (Kline, 2010). Items were allowed to load only on their target factor (i.e., intrinsic, identified, introjected, or external) and factors were allowed to correlate.

Inspection of model fit indices (CFI $> .99$, RMSEA = .011, and a SRMR = .018 for the day level and .023 for the student level) indicated that the model fit the data well (Kline, 2010). Factor loadings (i.e., standardized regression coefficients) at both levels suggested that items loaded sufficiently ($> .65$) onto their respective factors. The correlation between intrinsic motivation and identified regulation factors was .58 and the correlation between introjected and external regulation factors was .51. The correlation between other pairs of factors ranged between $-.11$ and .28.

For the purposes of this study and given that our hypotheses distinguished primarily between more and less autonomous forms of motivation, we created a composite autonomous motivation variable by averaging daily intrinsic motivation and identified regulation scales (mean daily $\alpha = .92$) and a composite controlled motivation variable by averaging daily introjected and external regulation scales (mean daily $\alpha = .90$). This approach is consistent with the use of this scale in cross-sectional and experimental research (e.g., Sheldon, Ryan, Deci, & Kasser, 2004; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004).

Engagement. Students' daily engagement in science class was assessed with 20 items we adapted for our use in a daily diary design from the Engagement versus Disaffection with Learning Student Report (Furrer & Skinner, 2003; Skinner & Belmont, 1993; Skinner et al., 2009) and the Metacognitive Strategies Questionnaire (Wolters, 2004). The Engagement versus Disaffection with Learning Student Report contains four scales from which we selected items and adapted for the daily context: behavioral engagement (3 items; e.g., "I worked as hard as I can in science class

today"; "I paid attention today in science class"), emotional engagement (4 items, e.g., "I felt interested today in science class"; "I enjoyed science class today"), behavioral disaffection (3 items, e.g., "Today in science class I just did enough to get by"; "When I was in science class today, I was thinking about other things"), and emotional disaffection (6 items; e.g., "When I was in science class today, I felt bad"; "I felt unhappy in science class today"). Four items measuring learning strategies adapted from the Metacognitive Strategies Questionnaire were used to assess students' cognitive engagement in science class (e.g., "I tried to connect what I was learning in science class today with my own experiences"; "I tried to make different ideas fit together and make sense in science class today"). For all engagement items, students rated the extent to which they agreed with each item on a 5-point Likert scale ranging from *not at all true* (1) to *extremely true* (5). The validity and reliability of all engagement scales for cross-sectional research have been established in previous studies (Furrer & Skinner, 2003; Wolters, 2004). Again, given that we adapted and shortened the measures to use them in a diary design, we conducted factor and reliability analyses to confirm that these adapted measures were appropriate for our daily diary context.

We conducted a multilevel confirmatory factor analyses (ML-CFA) using MLR to examine the six factor structure at both day and student levels and the TYPE = COMPLEX TWO LEVEL syntax in Mplus to account for clustering at the classroom level. Again, items were group-mean centered for both the day and student levels using the student as the group for the lowest level and the class as the group for the student level. Items were allowed to load only on their target factor and factors were allowed to correlate. Inspection of fit indices for the model (CFI = .92, RMSEA = .03, and SRMR $< .04$ both for day and student levels) indicated that the model fit the data adequately (Kline, 2010). Factor loadings at both levels suggested that items loaded sufficiently ($> .40$) onto their respective factors.

Again, for the purposes of this study and given that our hypotheses distinguished primarily between engagement and disaffection, we created a composite engagement variable by averaging daily behavioral, emotional, and cognitive engagement scales (mean daily $\alpha = .89$) and a composite disaffection variable by averaging daily behavioral and emotional disaffection scales (mean daily $\alpha = .87$). Sizable correlations between factors supported this approach. The correlation between behavioral, emotional and cognitive engagement factors ranged between .42 and .66. The correlation between behavioral and emotional disaffection factors was .44. Moreover, using aggregated measures across types of engagement (and motivation) outcomes was an appealing approach given that it limited the number of statistical tests conducted and yielded excellent reliability characteristics.

Daily teacher practices. Students' perceptions of the extent to which their teachers used practices intended to support or thwart autonomy on a given class day was assessed with a measure designed explicitly for use in this diary study (see Appendix for final set of items) and based on prior measures used in cross-sectional research (Patall et al., 2013; as well as Assor et al., 2002, 2005; Connell, 1990; Katz, Kaplan, & Gueta, 2009; Reeve & Jang, 2006; Reeve et al., 2004; Reeve, 2006; Wellborn & Connell, 1987; Belmont, Skinner, Wellborn, & Connell, 1992). Twenty-six items assessed perceptions of five supportive daily practices and three thwarting daily practices hypothesized to be related to autonomy

need satisfaction and motivation based on prior research (e.g., Assor et al., 2002, 2005; Deci, Eghrari, Patrick, & Leone, 1994; Patall et al., 2013; Reeve, 2009; Reeve & Jang, 2006). Supportive practices included (a) provision of choices (3 items; e.g., “My teacher provided options for the kinds of assignments or activities I could do today”), (b) opportunities for students to work in their own way (3 items; e.g., “My teacher allowed me to choose how to do my work in the classroom today”), (c) consideration for student opinions, preferences, and interests (5 items; e.g., “My teacher structured class activities today around my interests”), (d) rationales regarding the usefulness and importance of course material (4 items; e.g., “My teacher explained how what we were learning today is important”), and (e) student question opportunities and responding (3 items; e.g., “My teacher acknowledged and responded to my questions in class today”). Thwarting teacher practices included (a) controlling messages (3 items; e.g., “My teacher was strict about me doing everything in his or her way today”), (b) suppression of student perspectives (3 items; e.g., “My teacher stopped me from expressing my opinions in class today”), and (c) uninteresting activities (2 items; e.g., “My teacher forced me to do uninteresting activities in class today”). Students rated the extent to which they agreed with each item on a 5-point Likert scale ranging from *not at all true* (1) to *extremely true* (5).

To assess the factorial validity of daily measures of perceived teacher practices, we conducted two multilevel exploratory factor analyses (Roesch et al., 2010) using the oblique geomin rotation and MLR in Mplus 6.12 to examine both day and student level factor structures. The first analysis included perceived supportive teacher practices and the second analysis included perceived thwarting teacher practices. These models varied in the number of factors specified at each level of the nested data structure (from 1 to 7 factors). Again, we used the TYPE = COMPLEX TWO LEVEL command in Mplus to account for the clustering at the classroom level and group-mean items for both the day and student levels using the student as the group for the lowest level and the class as the group for the student level. To determine the best-fitting model, we used a DCFI of .01 or greater as our model selection criterion (Cheung & Rensvold, 2002).

The results of ML-EFAs of these 26 items plus five additional items reflective of perceived teacher practices unrelated to this investigation supported a six factor structure for supports CFI = .98, RMSEA = .018, SRMR (day/student) = .007/.009 and a three factor structure for thwarts (CFI = .997, RMSEA = .012, SRMR (day/student) = .006/.003). All items loaded sufficiently (>.40) on the intended factor as expected with minimal cross-loadings, with the caveat that perceptions of provision of choice items and opportunities for students to work in their own way items loading on a single factor rather than two separate factors. Several items were retained only at the student level. These included one item assessing the provision of choice, two items assessing consideration for student interests and preferences, and one item related to teacher question opportunities and responding.

Supportive teacher practice factors were positively intercorrelated with small to medium correlations at the day (.14–.45) level. Likewise, thwarting teacher practice factors were positively intercorrelated with moderate correlations at the day level (.36–.46). In summary, perceived teacher practice variables were intercorrelated, but distinct (model fit deteriorated significantly if fewer or

more factors were extracted). Correlations between all perceived practices are reported in the results.

Scale scores for each perceived teacher practice were calculated by taking the mean of all items loading above .40 on each factor. When factor analyses suggested that a slightly different version of a scale should be used at day versus student levels, we computed multiple versions of the scale to be used at the appropriate level. However, for the purposes of this investigation, we used only day level scales, though results were nearly identical using either version of the scales. For perceived supportive practices, the mean daily alpha was .83 for the provision of choice scale (5 items), .87 for consideration for student interests and preferences (3 items), .86 for rational provision (4 items), and .80 for question opportunities (2 items). For perceived thwarting teacher practices, the mean daily alpha was .67 for the controlling messages scale (3 items), .81 for suppression of student perspectives (3 items), and .82 for use of uninteresting activities (2 items).

Multilevel Analyses

We tested our main hypotheses about the relationships between students' daily perceptions of teacher practices and their daily experiences of motivation and engagement with a series of three-level (day, student, and class) regressions where the intercept was allowed to vary randomly using the Mixed procedure in SPSS 21. In line with recommendations from experts on conducting intensive longitudinal designs (e.g., Bolger & Laurenceau, 2013), we used hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002) for our primary tests because it appropriately addressed nonindependence of observations and the hierarchically nested design of our data set in which lower level units (i.e., days) were nested within a second higher level unit (i.e., students) and students were nested within a third higher level unit (i.e., classrooms). HLM treats student and classroom as a random rather than a fixed effect, thereby permitting generalizations of the findings to a wider population.

For all multilevel models, at Level 1 (day level) we included time and the outcome reported on the previous day, in addition to daily perceived practice predictors (or daily motivation and engagement for our reciprocal models). We constructed the time variable by consecutively numbering each class session during the unit starting with zero. We opted to use class session as the time metric, as opposed to calendar days or school days elapsed, given Kim-Spoon and Grimm's (2016) recommendation to consider the dominant reasons for why changes in the outcome might occur when selecting a time metric. In our investigation, the dominant reason student motivation and engagement in science class was expected to vary is because of their experiences during science class sessions. The prior class session's value for the outcome was entered to control for possible carryover effects from one class day to the next (e.g., see Reis, Sheldon, Gable, Roscoe, & Ryan, 2000 for an example of this strategy). To minimize missing data, the most recent prior day of reporting was carried forward to the next available day of reporting for the purposes of creating lagged variables. Including the prior class session's outcome value as a predictor allowed us to predict day-to-day change in the outcome rather than sheer level (Cohen & Cohen, 1982) as a function of students' perceptions of teacher practices reported on the same class day as the outcome.

At Level 2 (student level), we included several control variables: student sex (0 = male, 1 = female), student ethnicity (0 = White or Asian, 1 = Black, Hispanic/Latino, or other ethnic minority), students' free or reduced price lunch eligibility (0 = not eligible, 1 = eligible), students' age, and students' course grade for the prior unit in all models. At Level 3 (class level), we included variables representing whether the class was advanced or grade typical (0 = grade typical, 1 = advanced), the cohort school year in which students participated in the study (0 = 2012–2013, 1 = 2013–2014), whether the classroom was in a school that had title I status or not (0 = no title I status, 1 = title I status), and teacher years of experience in all models.

To decompose within-student (day) effects from between-student effects, daily perceived practice predictors (or daily motivation and engagement predictors in reciprocal models) were student-mean centered (around each student's own average score). Time and the value of the outcome variable from the prior class session were grand-mean centered because they were simply control variables in these models, as were the nine other covariates. To treat missing data, we used a maximum likelihood estimation procedure with robust estimates of *SEs* (REML). Because adjacent residuals in repeated measures data may be correlated across measurement occasions, we specified an AR(1) correlated error structure (Bolger & Laurenceau, 2013).

Results

Preliminary Analyses

To gauge within-person variation from one class session to the next during the 6-week instructional unit compared with the variation across students and classrooms (over days), we computed variance partition coefficients (VPC; Goldstein, 2011) and intraclass correlation coefficients (ICC; Kreft & De Leeuw, 1998) for each perceived teacher practice and student self-reported engagement and motivation variable (see Table 1). VPCs suggested that between 39 and 56% of the variance in perceived teacher practices was at the day level, with a similar amount of variance at the student level and less variability at the classroom level. Similarly, VPCs suggested that between 32 and 40% of the variance in motivation and engagement was at the day level, with slightly more variance at the student level and more limited variability observed at the classroom level. Results suggested that there was a substantial proportion of daily variation in students' perceptions of their teachers' practices and their motivation and engagement over the course of the unit. Moreover, though variation at the class level was relatively small, it was still sufficiently large to warrant including a variance component at the class level (see Kreft & de Leeuw, 1998; Moerbeek, 2004).

Correlations Between Perceived Practices, Motivation, and Engagement

First, we computed correlations among the perceived daily teacher practices, engagement, and motivation variables (see Table 2). For these correlations, we group-mean centered variables using the student as the group to disentangle within-student from between-student relationships. As expected, all perceived daily

Table 1
Variance Partition Coefficients (VPC) and Intraclass Correlation Coefficients (ICC)

Variable	Day level	Student level		Class level
	VPC	VPC	ICC	VPC/ICC
Daily teacher practices				
Choice	.52	.40	.47	.08
Interests	.43	.43	.57	.14
Rationales	.39	.45	.61	.16
Questions	.56	.37	.44	.07
Controlling messages	.48	.48	.52	.04
Suppression	.40	.57	.60	.03
Uninteresting activities	.42	.53	.58	.05
Daily engagement and motivation				
Engagement	.34	.55	.66	.11
Disaffection	.40	.56	.60	.04
Autonomous motivation	.34	.52	.66	.15
Controlled motivation	.32	.62	.68	.05

Note. Level 1 (daily reports) $n = 2,026$ to 2,176 reports. Level 2 (students) $n = 208$. Level 3 (classes) $n = 41$. Calculation of the VPC and ICC is identical at the highest level of any model.

practices hypothesized to be supportive of autonomy were positively correlated. Likewise, all the perceived daily practices hypothesized to be thwarting of autonomy were positively correlated. Of note, correlations among practices were modest, ranging from .12 to .33. As for correlations between supporting and thwarting practices, correlations generally hovered close to zero, ranging from $-.18$ to .08. Taken together, the modest values among perceived practices correlations suggest that it would be informative to investigate the effects of the seven teacher practices separately.

In line with our hypotheses, the four supportive daily practices were significant and positively correlated with daily engagement and autonomous motivation in class, while correlations with daily disaffection and controlled motivation hovered close to zero. Likewise, the three thwarting daily practices were significant and positively correlated with daily disaffection and controlled motivation in class. Correlations with daily engagement and autonomous motivation hovered close to zero for daily controlling messages and suppression of student perspectives, but were significant and positive for daily use of uninteresting activities.

We also computed correlations between students' perceptions of practices, motivation, and engagement aggregated across the unit and various student and classroom characteristics (see Table 3). There were a number of instances in which student and classroom characteristics (sex, ethnicity, age, free or reduced price lunch eligibility, prior course grade, type of course, teacher years of experience, school title I status, and cohort) significantly correlated with perceived teacher practices, students' motivation, or students' engagement. As such, we opted to include these variables as covariates in subsequent multilevel models.

Daily Perceived Practices as Predictors of Daily Motivation and Engagement

Next, hypotheses about the extent to which students' daily perceptions of teacher practices predict their daily experiences

Table 2
Means, SDs, and Correlations Among Daily Variables

Variable	<i>M</i> (<i>SD</i>)	1	2	3	4	5	6	7	8	9	10
1. Choice	2.47 (.96)	—									
2. Interests	2.05 (1.03)	.33	—								
3. Rationales	2.86 (1.05)	.13	.17	—							
4. Questions	3.63 (1.06)	.18	.12	.22	—						
5. Controlling messages	2.41 (.91)	-.04	.04	.08	.07	—					
6. Suppression	1.55 (.83)	.01	.09	-.02	-.18	.25	—				
7. Uninteresting activities	1.97 (1.08)	-.04	-.07	-.03	-.13	.21	.26	—			
8. Engagement	3.05 (.84)	.18	.28	.31	.34	.06	-.04	-.21	—		
9. Disaffection	1.91 (.75)	-.01	-.05	-.05	-.09	.19	.26	.38	-.30	—	
10. Autonomous motivation	2.94 (1.07)	.15	.30	.26	.30	.04	-.03	-.22	.68	-.26	—
11. Controlled motivation	2.30 (1.02)	.02	.03	.03	.06	.25	.15	.22	.09	.27	.13

Note. $n = 1,998$ to $2,176$ reports. Correlations are computed with group-mean centered daily variables using student as the group. Italicized correlations are not significant. All other correlations (bolded) are $p < .05$.

of motivation and engagement were tested with four random intercept only three-level (day, student, and class) regressions that included all seven daily teacher practices. Results (see Table 4) largely confirmed our hypotheses that perceptions of daily autonomy supportive practices would primarily predict daily autonomous motivation and engagement, while perceptions of daily thwarting practices would primarily predict daily controlled motivation and disaffection, controlling for both time and the outcome on the prior class session, as well as a number of student and class characteristics. Specifically, all

four perceived daily supportive practices (provision of choices, consideration for student interests, rationales about importance or usefulness, and question opportunities) predicted an increase in daily engagement since the prior class session, and all perceived daily supportive practices but the provision of choice predicted an increase in daily autonomous motivation from the previous class session. One perceived daily thwarting practice, daily use of uninteresting activities, also predicted a decrease in autonomous motivation and engagement since the prior class session.

Table 3
Means, SDs, and Correlations Among Student Demographic Variables and Aggregated Daily Variables

Variable	<i>M</i> (<i>SD</i>)	Sex	Ethnicity	Age	Free lunch	Prior unit course grade	Advanced course	Cohort	Title I school	Teacher experience
Sex	.54 (.50)	—								
Ethnicity	.63 (.48)	.05	—							
Age	15.54 (1.26)	-.02	.10	—						
Free lunch	.43 (.50)	.02	.47	.009	—					
Prior unit course grade	82.21 (18.10)	-.05	-.16	.07	-.18	—				
Advanced class	.44 (.50)	-.04	.01	-.12	-.10	.06	—			
Cohort	.58 (.49)	.02	.06	.21	.16	.02	-.22	—		
Title I school	.46 (.50)	-.04	.37	.15	.43	-.01	.02	.22	—	
Teacher experience	10.45 (9.53)	.009	-.23	.18	-.23	-.03	-.13	.19	-.32	—
Aggregated daily student perceived teacher practices, motivation, and engagement										
Choice	2.47 (.70)	-.09	.11	.12	.23	-.04	-.01	.18	.18	-.15
Interests	2.03 (.81)	-.08	.11	.05	.23	-.05	-.07	.26	.26	-.11
Rationales	2.85 (.85)	-.14	.15	.05	.05	.03	.06	.14	.21	-.04
Questions	3.60 (.75)	-.01	-.13	.19	-.23	.28	.15	.08	-.05	.08
Controlling messages	2.41 (.68)	-.10	-.11	-.10	.07	-.07	.02	-.01	-.03	.01
Suppression	1.55 (.67)	-.07	.03	-.19	.12	-.16	-.07	.03	.02	-.05
Uninteresting activities	1.96 (.86)	-.05	-.24	-.18	-.06	-.13	-.06	-.06	-.21	.06
Engagement	3.04 (.70)	-.18	.09	.09	-.02	.13	.07	.07	.13	-.12
Disaffection	1.91 (.61)	.06	-.14	-.10	.03	-.16	-.08	.08	-.08	.03
Autonomous motivation	2.92 (.89)	-.12	.06	.08	-.06	.10	.06	.08	.09	-.08
Controlled motivation	2.28 (.85)	.06	-.19	-.15	-.19	-.01	.05	.05	-.23	.03

Note. $n = 199$ to 208 students. Perceived teacher practice, engagement, and motivation variables were aggregated across class sessions for individual students. For student sex, 0 = male and 1 = female. For ethnicity, 0 = White or Asian and 1 = Black, Hispanic/Latino, or other ethnic minority. For free lunch, 0 = not eligible for free/reduced price lunch and 1 = eligible for free/reduced price lunch. For class type, 0 = grade typical class and 1 = advanced class. For cohort, 0 = 2012–2013 school year and 1 = 2013–2014 school year. For Title I school, 0 = not Title I status and 1 = Title I status. Students' age and prior course grade were measured continuously. Teacher experience was measured continuously as the number of years teachers' had been professionally teaching. Italicized correlations are not significant. All other correlations (bolded) are $p < .05$.

Table 4

Multilevel Regressions With Student Perceptions of Daily Teacher Practices Predicting Daily Student Motivation and Engagement

Fixed effects	Engagement		Disaffection		Autonomous motivation		Controlled motivation	
	<i>b</i> (<i>SE</i>)	β	<i>b</i> (<i>SE</i>)	β	<i>b</i> (<i>SE</i>)	β	<i>b</i> (<i>SE</i>)	β
Class level								
Intercept	3.06 (.05)		1.92 (.04)		2.96 (.07)		2.32 (.05)	
Advanced class	.07 (.10)	.04	-.09 (.09)	-.06	.06 (.15)	.03	.01 (.09)	.005
Cohort	-.08 (.15)	-.04	-.10 (.13)	-.05	-.12 (.22)	-.05	-.09 (.14)	-.04
Title I	.10 (.13)	.06	.01 (.11)	.004	.11 (.18)	.05	-.20 (.12)	-.10
Teacher experience	-.01 (.01)	-.07	-.002 (.005)	-.04	-.01 (.01)	-.09	-.01 (.01)	-.07
Student level								
Sex	-.17 (.08)	-.10*	.07 (.08)	.04	-.15 (.11)	-.07	.09 (.09)	.04
Ethnicity	.11 (.10)	.06	-.24 (.09)	-.16***	.08 (.13)	.04	-.10 (.11)	-.05
Age	.04 (.04)	.05	-.03 (.03)	-.05	.05 (.06)	.06	-.04 (.04)	-.05
Free/reduced lunch	-.08 (.10)	-.05	.13 (.09)	.09	-.12 (.13)	-.05	-.13 (.11)	-.06
Prior unit course grade	.002 (.002)	.04	-.005 (.002)	-.11*	.001 (.003)	.02	-.001 (.003)	-.01
Day level								
Choice	.07 (.02)	.05***	.01 (.02)	.01	.03 (.02)	.02	.02 (.02)	.01
Interests	.14 (.02)	.11***	-.01 (.02)	-.01	.23 (.02)	.13***	.01 (.02)	.01
Rationales	.16 (.02)	.12***	-.01 (.02)	-.01	.14 (.02)	.08***	.01 (.02)	.01
Questions	.13 (.02)	.11***	-.05 (.02)	-.05***	.14 (.02)	.10***	.02 (.02)	.02
Controlling messages	.003 (.02)	.002	.06 (.02)	.05***	.001 (.02)	.0004	.15 (.02)	.08***
Suppression	.002 (.02)	.001	.10 (.03)	.07***	.03 (.03)	.01	.04 (.03)	.02
Uninteresting activities	-.11 (.02)	-.09***	.21 (.02)	.19***	-.16 (.02)	-.10***	.14 (.02)	.09***
Time	-.005 (.003)	-.03*	-.0002 (.003)	.002	-.009 (.003)	-.04**	.001 (.003)	.005
Lagged outcome	.16 (.02)	.17***	.15 (.02)	.15***	.17 (.02)	.17***	.29 (.02)	.29***
Random effects								
	Variance	<i>SE</i>	Variance	<i>SE</i>	Variance	<i>SE</i>	Variance	<i>SE</i>
Class (Level 3) intercept	.03	.03	.02	.02	.10	.05	.001	.02
Student (Level 2) intercept	.28***	.04	.22***	.04	.45***	.07	.36***	.06
Day (Level 1)								
Residual	.16***	.006	.19***	.007	.27***	.01	.24***	.009
Autocorrelation	.01	.05	-.02	.06	-.03	.05	-.06	.06
Model Fit Statistics								
AIC	2249.14		2507.40		3155.64		2926.11	
BIC	2270.73		2529.00		3177.24		2947.71	

Note. Level 1 (daily reports) $n = 1,652$ to 1,654 reports. Level 2 (students) $n = 190$. Level 3 (classes) $n = 41$. The “time” variable reflects the day of reporting across the 6 week instructional unit. The “lagged outcome” variable reflects the prior class session’s value for the outcome. For student sex, 0 = male and 1 = female. For student ethnicity, 0 = White or Asian and 1 = Black, Hispanic/Latino, or other ethnic minority. For free and reduced lunch status, 0 = not eligible for free/reduced lunch and 1 = eligible for free/reduced lunch. For advanced class, 0 = grade typical class and 1 = advanced class. For cohort, 0 = 2012–2013 school year and 1 = 2013–2014 school year. For Title I school, 0 = not Title I status and 1 = Title I status. b = unstandardized regression coefficient. β = standardized regression coefficient. Standardized estimates were computed using the following formula (Hox, 2010): $\beta = (b \cdot \text{sd}_x) / \text{sd}_y$. AIC = Akaike’s Information Criterion; BIC = Schwarz’s Bayesian Criterion.

* $p < .05$. ** $p < .01$. *** $p < .001$.

In contrast, student perceptions for most of the daily supportive practices did not predict either daily disaffection or controlled motivation. Rather, all three perceived daily thwarting practices (controlling messages, suppression of student perspectives, and use of uninteresting activities) predicted an increase in disaffection since the prior class session, and two of three, controlling messages and use of uninteresting activities, predicted an increase in daily controlled motivation. Only one perceived daily supportive practice, question opportunities, predicted a decrease in daily disaffection and none predicted a change from the previous class session in daily controlled motivation.

For the covariates, sex predicted engagement such that female students reported lower engagement across the 6 weeks than male students. Ethnicity and prior unit course grade negatively predicted disaffection. That is, Black and Hispanic students and students with higher prior grades reported experiencing less daily disaffection across the 6 weeks compared with their White or Asian and lower achieving counterparts.

Daily Motivation and Engagement as Predictors of Composite Perceived Practices

To explore the extent to which students’ daily experiences of motivation and engagement predicted perceptions of teacher practices we conducted two random intercept only three-level (day, student, and class) regressions. For this analysis, we created a composite autonomy supporting practices variable to serve as the outcome in one model by taking the mean of the four perceived supportive practices (mean daily $\alpha = .89$) and a composite autonomy thwarting practices variable for the outcome in the second model by taking the mean of the three perceived thwarting practices (mean daily $\alpha = .83$). For each multilevel model, at Level 1 (day level) we included time, daily autonomous motivation, controlled motivation, engagement, disaffection, and the outcome reported on the previous day. At Level 2 and 3 (student and class level), we included the same set of nine control variables as in previous models. As described previously, within-student (day)

effects were student-mean centered and covariates were grand mean centered.

Results (see Table 5) were consistent with our expectations. Students' daily autonomous motivation and engagement predicted greater perceptions that teachers' engaged in autonomy supportive practices the same day over and above perceptions of teacher autonomy support during the prior class session, time, and a variety of student and classroom characteristic covariates. Likewise, students' controlled motivation and disaffection predicted greater perceptions that teachers' engaged in autonomy thwarting practices over and above perceptions of thwarts during the prior class session, time, and a variety of student and classroom characteristic covariates. The size of these effects were similar to those observed for the effects of perceived daily practices on students' daily motivation and engagement. In addition, smaller effects emerged for students' daily disaffection on perceived daily autonomy supporting practices and students' daily autonomous motiva-

tion on perceived autonomy thwarting practices. Specifically, on days when students experienced greater disaffection, they perceived slightly greater autonomy support from their teachers that same day, even after accounting for their level of perceived autonomy support in the prior class session. Moreover, on days when students experienced greater daily autonomous motivation, they perceived slightly less autonomy thwarting practices that same day, controlling for their perceptions of autonomy thwarting during the prior class session. Results suggest that students' experiences of motivation and engagement reciprocally influence perceptions of teachers' practices, such that when students are motivated for autonomous reasons and remain behaviorally, emotionally, and cognitively engaged, teachers are perceived to respond in kind with practices that further support that motivation and engagement. Encouragingly, when students reported being particularly disengaged, they also perceived teachers as providing autonomy support, which may reverse such disengagement. How-

Table 5
Multilevel Regressions With Daily Student Motivation and Engagement Predicting Composite Perceived Teacher Practices

Fixed effects	Autonomy supports		Autonomy thwarts	
	<i>b</i> (<i>SE</i>)	β	<i>b</i> (<i>SE</i>)	β
Class level				
Intercept	2.77 (.05)		1.98 (.04)	
Advanced class	.05 (.09)	.03	-.02 (.08)	-.01
Cohort	-.19 (.13)	-.11	-.02 (.11)	-.01
Title I	.16 (.11)	.10	-.07 (.10)	-.05
Teacher experience	-.005 (.005)	-.06	-.001 (.005)	-.02
Student level				
Sex	-.06 (.07)	-.04	-.08 (.07)	-.05
Ethnicity	-.06 (.08)	-.04	-.17 (.09)	-.11
Age	.04 (.03)	.06	-.07 (.03)	-.11
Free/reduced lunch	.12 (.09)	.08	.14 (.09)	.09
Prior unit course grade	.00 (.002)	.00	-.004 (.002)	-.08
Day level				
Autonomous motivation	.13 (.02)	.10***	-.05 (.02)	-.04*
Controlled motivation	-.03 (.02)	-.02	.17 (.02)	.12***
Engagement	.32 (.03)	.19***	.04 (.03)	.02
Disaffection	.09 (.03)	.05**	.26 (.02)	.16***
Time	.006 (.003)	.04*	.005 (.002)	.03**
Lagged outcome	.20 (.02)	.19***	.24 (.02)	.24***
Random effects				
	Variance	<i>SE</i>	Variance	<i>SE</i>
Class (Level 3) intercept	.04	.02	.006	.01
Student (Level 2) intercept	.18***	.03	.21***	.03
Day (Level 1)				
Residual	.23***	.009	.16***	.006
Autocorrelation	-.06	.06	-.13**	.006
Model Fit Statistics				
AIC	3026.81		2361.10	
BIC	3048.81		2383.10	

Note. Level 1 (daily reports) $n = 1,826$ reports. Level 2 (students) $n = 191$. Level 3 (classes) $n = 41$. The "time" variable reflects the day of reporting across the 6 week instructional unit. The "lagged outcome" variable reflects the prior class session's value for the outcome. For student sex, 0 = male and 1 = female. For student ethnicity, 0 = White or Asian and 1 = Black, Hispanic/Latino, or other ethnic minority. For free and reduced lunch status, 0 = not eligible for free/reduced lunch and 1 = eligible for free/reduced lunch. For advanced class, 0 = grade typical class and 1 = advanced class. For cohort, 0 = 2012–2013 school year and 1 = 2013–2014 school year. For Title I school, 0 = not Title I status and 1 = Title I status. b = unstandardized regression coefficient. β = standardized regression coefficient. Standardized estimates were computed using the following formula (Hox, 2010): $\beta = (b \cdot \text{sd}_x) / \text{sd}_y$. AIC = Akaike's Information Criterion; BIC = Schwarz's Bayesian Criterion.

* $p < .05$. ** $p < .01$. *** $p < .001$.

ever, when students' motivation is controlled and they are disengaged in class, teachers are perceived to respond in kind with controlling strategies.

Interactions Between Composite Perceived Autonomy Supportive and Thwarting Practices

Finally, to address our research question regarding the interaction between perceptions of autonomy supporting and thwarting practices, we estimated four three-level random intercept only regressions that each included an interaction term between the two clusters of perceived daily practices. For this analysis, we again used the composite autonomy supporting practices variable and the composite autonomy thwarting practices variable. These models were similar to those previously described, except that these models each included only the two composite daily practice variables and their interaction, along with time, the lagged outcome covariate, and other student and classroom characteristic covariates. A model was estimated for each motivation and engagement outcome (engagement, disaffection, autonomous motivation, and controlled motivation).

There was a significant interaction between perceived daily autonomy supportive and thwarting practices for autonomous motivation, in addition to significant main effects of both (see Table 6). To get a better sense of this interaction, we conducted simple slope analyses that tested the relation between perceived daily supportive practice and autonomous motivation at 1 *SD* above and below the mean of thwarting practices. Likewise, we tested the relation between perceived daily thwarting practice and autonomous motivation at 1 *SD* above and below the mean of supportive practices. Simple slope analyses revealed that perceived daily supportive practice predicted an increase in autonomous motivation since the prior class session to a greater degree when daily thwarting practices were perceived to also be high (1 *SD* above the mean; $\beta = .20, p < .001$) compared with low (1 *SD* below the mean; $\beta = .15, p < .001$). Moreover, perceived daily thwarting practice predicted a decrease in autonomous motivation from the prior class session when daily supporting practices were perceived to be low (1 *SD* below the mean; $\beta = -.07, p < .001$), but not when daily supporting practices were perceived to be high (1 *SD* below the mean; $\beta = -.02, p = .28$). There were no interactions between perceived daily supporting and thwarting found for engagement, disaffection, or controlled motivation. Results suggest that the student perceptions of teachers' supporting their autonomy has a particularly strong relationship with their daily autonomous motivation when contrasted against thwarting practices perceived on the same day. Likewise, any undesirable effect of students' perceptions that their teachers are using autonomy thwarting practices on their daily autonomous motivation was mitigated when students also perceived their teachers to be engaging in supportive practices on the same day.

Discussion

The present investigation examined the role of various perceived autonomy relevant teaching strategies in students' daily autonomous motivation, controlled motivation, engagement, and disaffection in authentic high school science classes, as well as reciprocal relationships among these variables. We used a diary

Table 6
Multilevel Regressions With Composite Perceived Teacher Practices and Their Interaction Predicting Autonomous Motivation

Fixed effects	<i>b</i> (<i>SE</i>)	β
Class level		
Intercept	2.94 (.07)	
Advanced class	.08 (.14)	.04
Cohort	-.09 (.20)	-.04
Title I	.10 (.17)	.05
Teacher experience	-.01 (.01)	-.06
Student level		
Sex	-.14 (.10)	-.07
Ethnicity	.09 (.12)	.04
Age	.03 (.05)	.04
Free/reduced lunch	-.11 (.13)	-.05
Prior unit course grade	.001 (.003)	.02
Day level		
Daily supports	.36 (.03)	.17***
Daily thwarts	-.11 (.03)	-.05***
Supports $\times$ Thwarts	.13 (.05)	.04**
Time	-.01 (.003)	-.04***
Lagged outcome	.21 (.02)	.21***
Random effects		
	Variance	<i>SE</i>
Class (Level 3) intercept	.10	.05
Student (Level 2) intercept	.39***	.07
Day level (Level 1)		
Residual	.33***	.01
Autocorrelation	-.04	.06
Model Fit Statistics		
AIC	3729.49	
BIC	3751.48	

Note. Level 1 (daily reports) $n = 1,820$ reports. Level 2 (students) $n = 191$. Level 3 (classes) $n = 41$. The "time" variable reflects the day of reporting across the 6 week instructional unit. The "lagged outcome" variable reflects the prior class session's value for the outcome. For student sex, 0 = male and 1 = female. For student ethnicity, 0 = White or Asian and 1 = Black, Hispanic/Latino, or other ethnic minority. For free and reduced lunch eligibility, 0 = not eligible free/reduced lunch and 1 = eligible free/reduced lunch. For advanced class, 0 = grade typical class and 1 = advanced class. For cohort, 0 = 2012–2013 school year and 1 = 2013–2014 school year. For Title I school, 0 = not Title I status and 1 = Title I status. b = unstandardized regression coefficient. β = standardized regression coefficient. Standardized estimates were computed using the following formula (Hox, 2010): $\beta = (b \cdot sdx) / sdy$.

** $p < .01$. *** $p < .001$.

method to track students' daily perceptions of teacher practices and experiences during science class over a 6-week instructional unit. We also explored how perceived strategies routinely identified as autonomy supporting or thwarting interact and whether the presence of one type of perceived practice moderates the relation of the other with students' motivation and engagement during class.

Fit of Data to Theoretical Predictions

Overall, the patterns of results supported our hypotheses and were consistent with the dual process model within self-determination theory (Jang et al., 2016). We found the expected differentiated effects in which changes in autonomous motivation and engagement were predicted primarily by daily perceptions of

autonomy supportive teacher practices, while changes in controlled motivation and disaffection were predicted primarily by daily perceptions of thwarting practices. More specifically, daily student perceptions that teachers' considered their preferences and interests, provided rationales about the importance of usefulness of course activities, and provided opportunities for and responses to questions consistently predicted increases in both autonomous motivation and engagement since the prior class session, and perceived choice opportunities predicted increases in engagement. In contrast, perceptions of these daily supportive practices generally did not predict controlled motivation and disaffection, with the one exception being that daily perceptions that teachers provided question opportunities negatively predicted disaffection. Rather, student perceptions of thwarting practices consistently predicted controlled motivation and disaffection. Specifically, controlling messages and use of uninteresting activities predicted an increase in both controlled motivation and disaffection since the last class session and suppression of student perceptions predicted an increase in disaffection. Among these thwarting practices, only daily perceptions that teachers' used uninteresting activities appeared to be pervasively detrimental, predicting a decrease in both daily engagement and autonomous motivation, in addition to predicting an increase in controlled motivation and disaffection. However, both controlling message and suppression of students' perspectives were unrelated to engagement or autonomous motivation.

Regarding reciprocal effects, students' motivation and engagement also predicted changes in their perceptions of their teachers' autonomy relevant practice largely in the expected differentiated pattern. Namely, an increase in perceived autonomy support was predicted primarily by students' daily autonomous motivation and engagement, and to a lesser extent by daily disaffection. In contrast, an increase in perceived autonomy thwarting was predicted primarily by controlled motivation and disaffection, and negatively predicted by autonomous motivation to a lesser extent. One surprising finding regarding reciprocal effects was that students' disaffection predicted an increase in perceptions that teachers' engaged in autonomy supportive practices. This particular finding is somewhat inconsistent with prior traditional (nondaily diary) longitudinal evidence suggesting that disengagement predicts less autonomy support (e.g., Jang et al., 2016). Although surprising in the context of previous findings, we find this quite encouraging as it suggests that on days when students are actively disengaged during class, they perceive their teachers to react by increasing their support for autonomy during that same class session (presumably in an attempt to elicit engagement from students). We also note that we observed the expected relationship between students' autonomous motivation and engagement to perceived autonomy support on a *daily basis* even though some prior traditional longitudinal research examining reciprocal effects predicted by the dual process model (e.g., Jang et al., 2016) did not observe this relationship. Finally, it is also worth noting that the magnitude of effects in both directions were quite similar,¹ leading us to conclude that the students' experience of motivation and engagement may play an equally important role in the perceptions of the classroom environment as the classroom environment plays in students' experiences of motivation and engagement.

Taken together, evidence provided in this investigation is largely consistent with prior cross-sectional and longitudinal evidence and extends it by demonstrating the utility of the dual

process model for day-to-day reciprocal links between students' perceptions of their teachers' autonomy-relevant practice, motivation, and engagement (e.g., Assor et al., 2002; Haerens et al., 2015; Jang et al., 2016). That is, the pattern of results suggests that there are largely divergent pathways to various aspects of students' functioning in the classroom. Students are likely to experience heightened behavioral, emotional, and cognitive engagement, as well as internal forms of motivation that spring from interest, enjoyment, and value on days when they perceive their teachers to use autonomy supportive practices like rationales, activities that consider students' interests, and questions, and to some extent, choices. However, the absence of these daily practices does not generally lead to students' disaffection and controlled motivation in class. Rather, it is when students perceive teachers to use explicitly controlling practices—controlling messages, suppression of student perspectives, and activities that seem uninteresting or meaningless—that students become behaviorally and emotionally disengaged and pursue school tasks for more external reasons. Likewise, students' behavioral, affective, and cognitive experiences predict their perceptions of the classroom environment (and possibly teachers' actual behavior). On days when students experience autonomous motivation and engagement, their perceptions that teachers are supportive of their autonomy increase. In contrast, on days when students experience controlled motivation and engagement in class, they perceive their teachers to be more controlling.

Interactions Between Perceived Supports and Thwarts

With the basic pattern of relationships between perceived teacher practices and students' motivation and engagement established, it was also clear that the interaction between perceived autonomy supportive and thwarting practices was somewhat complex. Given that science emphasizes both discovery and using established, rigorous procedures, there is likely to be many opportunities for both supporting autonomy (e.g., "design your own experiment on something related to what we have been studying today that interests you") and controlling behavior (e.g., "this is how you *need* to conduct this experiment if you want it to work") in science courses. With that in mind, our results suggested that we may not need to be quite so worried about students' perceiving their teachers to engage in autonomy thwarting practices on a given day as long as they also perceive teachers to engage in autonomy supportive practices. We found that perceived supportive practices predicted a greater increase in autonomous motivation on days when thwarting practices were perceived to be high compared with low. Likewise, students' perceptions that their teachers used thwarting practices only predicted a decrease in autonomous motivation on days when they perceived supportive

¹ To explicitly compare the magnitude of effects across reciprocal effects, we conducted additional multilevel models including the aggregated perceived autonomy supporting practice and perceived autonomy thwarting practice as predictors of each form of motivation and engagement. Autonomy support predicted autonomous motivation and engagement most strongly ($\beta = .17$ and $.19$, $ps < .001$) and controlled motivation and disaffection to a lesser extent or not at all ($\beta = .03$ and $-.01$, $ps = .03$ and $.23$). Autonomy thwarting predicted controlled motivation and disaffection most strongly ($\beta = .15$ and $.23$, $ps < .001$) and autonomous motivation and engagement to a lesser extent ($\beta = -.04$ and $-.04$, $ps < .005$ and $.001$).

practices to be low, but not on days when they were perceived supports to be high.

We found this interaction only for autonomous motivation. As such, results about the differential effects of these predictors are limited in scope. Nonetheless, these results suggest that the perceived contrast between autonomy supports and thwarts may have the desirable effect of heightening the significance of autonomy support for enhancing students' autonomous motivation. That is, in comparison with a controlling strategy that a student might have recently perceived in class, autonomy supportive strategies are perceived to be particularly supportive of a student's interests, values, and drive to engage in some class activity for internal reasons. The combination of perceived autonomy supporting and thwarting may also have the converse desirable effect of students being less sensitive to perceived controlling practices as long as they are accompanied by supportive practices. Perhaps in the context of perceiving teachers to use practices that support autonomy, teachers controlling practices are experienced as providing structure and organization, rather than attempts to control behavior and thwart students' autonomy. Despite these findings, we would not encourage teachers to intentionally use controlling practices, particularly given our findings that perceived daily thwarts clearly predicted daily disaffection and we found no evidence that perceived supports could mitigate that association. Likewise, there was no evidence that perceived supports and thwarts interacted to influence engagement and only limited evidence of interaction for controlled motivation, which we discuss next in reference to perceived suppression of student perspectives.

The Conundrum of Choice and Suppression

Another surprising finding was that daily perceptions of choice opportunities predicted increases in daily engagement, but not autonomous motivation and similarly, daily perceptions that teachers' suppressed student perspectives predicted an increase in daily disaffection, but not controlled motivation. To better understand these null findings, we conducted a number of exploratory analyses (a) examining the effects of perceived practices after decomposing the daily motivation outcomes into their constituents and (b) examining interactions involving these two particular practices and each of the other practices.

First, these exploratory multilevel model analyses revealed that students' daily perceptions that teachers provided choices predicted intrinsic motivation ($\beta = .04, p = .02$), but had no relationship with identified motivation ($\beta = -.0004, p = .98$). This finding suggests that choice provision is an autonomy supportive practice that is particularly predictive of forms of motivation based in positive emotions (i.e., interest and enjoyment) rather than value. This is consistent with prior research suggesting that choice provision is most strongly related to intrinsic motivation and less strongly related to motivation focused on the importance or value of the activity (e.g., Patall, Cooper, & Wynn, 2010; Patall et al., 2013).

Second, an exploratory multilevel model analyses also revealed that perceived choice provision interacted with perceptions of a number of other practices that changed its daily relationship with autonomous motivation. Specifically, daily perceptions that teachers' provided choices interacted with three other practices, perceived daily question opportunities ($\beta = .06, p < .001$), control-

ling messages ($\beta = .04, p < .009$), and use of uninteresting activities ($\beta = .03, p < .03$). Simple slope analyses suggested that perceptions of greater daily choice provision predicted greater autonomous motivation when opportunities to ask questions, controlling messages, or use of uninteresting activities were also perceived to be high (1 *SD* above the mean; β s = .07, .05, and .04, p s < .001, .01, and .02), but not when they were perceived to be low (1 *SD* below the mean; β s = $-.04$, $-.02$, and $-.02$; p s = .06, .30, and .41). Results suggest that students' perception that their teachers provided choices on a given day is specifically related to autonomous motivation during class when bolstered by the presence of another supportive practice (daily question opportunities) or contrasted against a thwarting practice (daily controlling message and uninteresting activities) on the same day.

One way to interpret this finding is to first note that, at times, choices can be overwhelming rather than motivating for students (e.g., Iyengar & Lepper, 2000; Patall, Cooper, & Robinson, 2008; Schwartz & Ward, 2004). However, when accompanied by another support that also serves to provide some structure (question opportunities), the motivating function of choosing can be revealed. That is, when students are provided with choices but are not allowed to ask questions about those choices or the activity, the choice might seem more arbitrary and less important, or students may lack confidence to make the "right" choice without the necessary information. If, on the other hand, students are provided with the opportunity to ask questions about their choice and the task, choosing may be more likely to be experienced as strategic, personal, and effective. Controlling messages may also be experienced similarly as a form of structure that can support the motivational benefits of choosing when the two are provided in combination. It is worth noting that this interpretation is consistent with research suggesting that students' motivation thrives after choosing in contexts in which they feel competent, but deteriorates after choosing if they do not feel competent (i.e., Patall, Sylvester, & Han, 2014).

Theoretically, choice is presumed to enhance the experiences of autonomy by allowing individuals to express the self and act in accordance with their personal preferences and interests (e.g., Katz & Assor, 2007; Patall et al., 2008; Ryan & Deci, 2000). Accordingly, researchers have long noted the possibility that providing choices may be particularly useful in the context of boring rather than interesting tasks because there is more opportunity to improve the task by incorporating personal preferences and interests in the context of a motivationally deprived task (e.g., Patall et al., 2013, 2010; Sansone, Weir, Harpster, & Morgan, 1992; Tafarodi, Milne, & Smith, 1999). In contrast, when a task is already interesting and autonomy-supportive by its very nature, choosing becomes an unnecessary expenditure of decision-making effort that may even diminish autonomous motivation. In fact, recent laboratory-based experiments have demonstrated that college students reported enhanced interest, perceived competence, value, and liking for a reading comprehension task after choosing aspects of the task only when the task was boring, but not when it was interesting (e.g., Patall et al., 2013). This investigation is in line with those findings, suggesting that within the science classroom, perceiving the opportunity to make choices about learning tasks and classroom activities may enhance autonomous motivation most in the context of activities that are perceived to be particularly uninteresting.

A final exploratory multilevel analysis revealed that perceived suppression interacted with perceptions of other practices that changed its daily relationship with controlled motivation. Specifically, daily perceptions that teachers' suppressed student perspectives interacted with two other practices, perceived choice provision ($\beta = .10, p < .001$) and question opportunities ($\beta = -.04, p < .02$). Perceptions that teachers' suppressed student perspectives during the class session predicted students' greater controlled motivation when opportunities to ask questions during class were perceived to be low (1 *SD* below the mean; $\beta = .05, p < .02$), but not when they were perceived to be high (1 *SD* above the mean; $\beta = -.02, p = .37$). Perceptions that teachers' suppressed student perspectives during class also predicted greater controlled motivation when the provision of choice was perceived to be high during the class session (1 *SD* above the mean, $\beta = .09, p < .001$). However, when daily perceptions of choice provision were low (1 *SD* below the mean), perceived suppression during the class negatively predicted students' controlled motivation ($\beta = -.06, p < .003$). Results suggest that the relationship between daily suppression and students' controlled motivation depends on the perception of other practices during the same class session, with the perception of question opportunities mitigating the undesirable effect of perceived suppression increasing controlled motivation, and the perception of choice opportunities magnifying that effect. The latter finding again highlights the very mixed benefits and detriments of having choices. Choices can often be experienced as overwhelming by students. When combined with the perception that teachers will not allow students to express their opinions, preferences, and feelings, the experience of being controlled and behaving merely to obtain rewards or avoid undesirable consequences is likely to be particularly robust.

Limitations and Implications for Future Research

Given the potential practical implications of understanding the links between teachers' practices and students' motivation, engagement, and achievement, it would seem imperative that future research replicate and extend the findings of the current investigation. Strengths of the current investigation include the simultaneous focus on various perceived autonomy supportive and thwarting practices, the intensive longitudinal design that allowed us to examine the extent to which daily variations in students' perceptions of teacher practice was associated with corresponding fluctuations in daily motivation and engagement in the classroom, and the fact that the study was situated within a heterogeneous set of science classrooms with students of various social, economic, and cultural backgrounds. Despite the strengths of the current design, the correlational nature of the design cannot be taken to imply causation. Consequently, findings of this investigation should be corroborated with experimental designs in authentic classroom contexts that isolate the effects of various autonomy relevant practices and allow for the interactions among them to be explored to best understand the effects of teachers' autonomy relevant practice. Thus far, intervention research focused on autonomy relevant teacher practice has generally focused on autonomy support as a whole or only one specific practice isolated from others (e.g., choice provision).

The reliance on student self-reports in the current investigation presents another significant limitation that needs to be addressed in

future research. Although the focus on student perceptions of teachers' practice is reasonable given self-determination theory's assumption that it is students' subjective experiences that are the most powerful predictor of their motivation and engagement, relying exclusively on students' self-reports leaves open the possibility that response-bias and shared-method variance may influence the results. Accordingly, using independent observations of the classroom to explore the extent to which autonomy relevant teacher practice relates to students' motivation and engagement outcomes is an important next step in this scholarship, though we acknowledge that observations present their own unique set of limitations and biases. While there are examples of researchers using observation to determine teachers' autonomy supporting or thwarting practice (e.g., De Meyer et al., 2014; Reeve et al., 2004), we know of no research in which individual components of autonomy relevant practice were observed as separate coding categories and used as separate variables to predict outcomes. Given the complex dynamics that seem to play out between various autonomy relevant practices, we believe that a nuanced understanding of what makes for the best autonomy relevant teaching practice requires detailed coding at the individual teacher strategy level. This is likely to be particularly true for practices such as choice provision and suppression of student perspective, which this investigation highlighted as having particularly heterogeneous associations with other teaching practices and student outcomes.

In future research, we also encourage researchers to examine formally the extent to which need satisfaction and frustration mediates the daily relationships uncovered in this investigation. Though we selected the current set of perceived practices after reviewing previous research regarding practices that have been associated with students' perceived autonomy (e.g., Patall et al., 2013; Reeve & Jang, 2006), it is possible that various psychological processes mediate the relationships between perceived daily teaching practices and students' daily motivation and engagement. Moreover, we would be remiss if we did not point out that our list of autonomy supportive and thwarting practices is not comprehensive. Although we attempted to select the most central and promising strategies, motivation researchers have suggested a variety of additional practices, such as acknowledgment of negative affect, encouragement, perspective-taking, use of deadlines, and controlling rewards (e.g., Reeve, 2009; Reeve & Jang, 2006), that could be considered in future research focused on autonomy relevant teaching.

We also want to highlight that the nature of the design in the current investigation in which students were asked to provide reports multiple days a week for several weeks necessitated relying on a small sample of volunteers from each class. Likewise, teachers selected the participating class and were themselves volunteers. Though we attempted to recruit a diverse sample of teachers and adolescents (e.g., we randomly selected student participants among volunteers and approximately 40% of teachers across participating schools volunteered to participate), the voluntary and selective nature of the sample undoubtedly provides the opportunity for biased results that are idiosyncratic to the current sample. Future research should attempt to address this limitation with classes and samples that are randomly selected to the greatest extent possible.

Finally, although it was not the focus of this investigation, results also suggested that female students were less engaged in science class compared with male students. Given the continued

concern about engaging women in STEM (e.g., Bidwell, 2015), this finding highlights the need for future research to explore the benefits and detriments of autonomy relevant teaching practices in science domains particularly for female students and the contexts that might be most supportive of their motivation and engagement.

Conclusion

In conclusion, this investigation adds to the growing body of research exploring perceptions of autonomy relevant teaching and its reciprocal relations with adolescent students' motivation and engagement. This study goes beyond those previously conducted by using an intensive daily diary study to examine perceptions of various daily supportive and thwarting practices in an authentic academic classroom setting. Taken together, results suggested that students' perceptions of teachers' daily supportive and thwarting practices have distinct reciprocal relations with various aspects of students' motivation and engagement during class. While perceived supportive practices primarily predicted changes in daily autonomous motivation and engagement in class and vice versa, perceived thwarting practices primarily predicted students' daily controlled motivation and disaffection during class and vice versa. Moreover, the current investigation is the first to highlight that perceived supportive and thwarting practices interact and that the presence of both may yield benefits for students' motivation, though it is important to note that we found this interaction only for autonomous motivation. We hope that this investigation serves as a useful guide for future classroom-based theory and research focused on motivationally relevant instruction.

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(Appendix follows)

Appendix

Items from the Daily Perceived Teacher Practice Measure

Provision of Choice

My teacher allowed me to choose which questions or parts of an assignment to work on today.

My teacher provided options for the kinds of assignments or activities I could do today.

My teacher allowed me to choose how to do my work in the classroom today.

My teacher allowed me to choose how to use my time for studying and classwork today.

My teacher encouraged me to work in my own way today.

Consideration for Student Interests and Preferences

My teacher structured class activities today around my interests.

My teacher took my preferences into consideration for assignments today.

My teacher worked my interests into his or her lesson(s) today.

Rationales Identifying Usefulness, Importance, and Relevance of Activities

My teacher explained how what we were learning today is important.

My teacher demonstrated how what we were learning today is useful.

My teacher explained how the course assignments today were important.

My teacher talked about the connection between what we are studying in school today and real life.

Student Question Opportunities

My teacher provided opportunities for me to ask questions today.

My teacher acknowledged and responded to my questions in class today.

Controlling Messages

My teacher was strict about me doing everything in his or her way today.

The language my teacher used today included how I “should” or “ought” to do things.

My teacher told me to work on the assignments today because she or he said so.

Suppression of Student Perspectives and Controlling Activities

My teacher stopped me from expressing my opinions in class today.

My teacher stopped me from asking questions in class today.

My teacher prevented me from expressing complaints or talking about my negative feelings during class today.

Meaningless or Uninteresting Activities

My teacher forced me to study boring topics today.

My teacher forced me to do uninteresting activities in class today.

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Parental Autonomy Support and College Student Academic Outcomes

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Abstract According to self-determination theory, parental autonomy support enhances children's motivation and well-being. Past studies have documented an association between parental autonomy support and outcomes in the academic realm among younger children and adolescents. Using data from a sample of undergraduates attending a public university ($N = 492$), this proposition was tested by examining five measures of academic well-being and covitality among college students: school-related stress, school spillover, academic motivation, grade point average, and satisfaction with university. Results indicated that when parents of college-age students fostered autonomy—that is, when they encouraged their adult children to make their own decisions, select coursework, budget money, and take the initiative to deal with academic and interpersonal issues—daughters were more satisfied with university life. However, other forms of student well-being were not significantly associated with parental autonomy support, and the models were not significant among college men.

Keywords Academics · Autonomy support · College students · Parental autonomy support · Undergraduates

Introduction

Although the college years are often thought of as a time of newfound autonomy and less parental control over students (Arnett 2000), there is growing concern among university administrators that some parents intervene too frequently in their adult children's academic lives (Hunt 2008). This level of involvement and control—over-involvement—has been called “helicopter parenting,” and is associated with a host of negative outcomes including poor subjective and academic well-being (Schiffrin et al. 2012). If young adults are to actively face and solve their own problems, they must be provided with autonomy support (Grolnick et al. 1991)—an equally engaged form of parenting whereby mothers and fathers enable children to make decisions and choose their own direction (Chirkov and Ryan 2001). When parents support the development of autonomy, their children are in turn more motivated to learn, feel positively about school, and have higher levels of academic achievement because they are better positioned to independently navigate systems including higher education (Froiland 2011; Su and Reeve 2011).

These academic outcomes are consistent with self-determination theory, which is principally concerned with motivation, and through its achievement, human development and wellness (Deci and Ryan 2008). The theory argues that there are innate psychological needs underscoring motivation, including feelings of connection, competency, and autonomy (Deci and Ryan 2000, 2008). It is the emphasis on autonomy that resides at the core of self-determination theory and sets it apart theoretically (Joussem et al. 2008). Autonomy refers to the ability to make decisions and govern oneself; that is, to think and act without coercion (Collins 1990). In Chickering and Reisser's (1993) theory of college student development, both

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emotional and instrumental independence are recognized as emerging forms of autonomy central to maturation. When people feel autonomous in their choices and actions, they are likely to report greater subjective well-being (O'Donnell et al. 2013), and exhibit positive behavioral outcomes, including academic engagement (Grolnick et al. 1991). Despite the universality of autonomy as a psychological need, there is some evidence to suggest that its development takes a distinctly gendered path. For girls, closer emotional relationships and frequent communication with parents are associated with both quality of attachment and autonomy development (Schultheiss and Blustein 1994; Sorokou and Weissbrod 2005). Compared to sons, daughters become more autonomous while maintaining strong parental attachment (Taub 1997). Surrey (1991) explained this distinction by arguing that girls develop a sense of self in the context of important relationships.

Self-determination theory recognizes that our desire to feel connected, competent, and autonomous are not merely innate drives, but are developed and satisfied within social contexts and with interpersonal and institutional support (Deci and Ryan 2002). In other words, similar to the central premise of learned needs theory (McClelland 2010), motivation and its affiliated behaviors are also learned and facilitated (Deci and Ryan 2008). When parents encourage children to be self-initiating rather than merely compliant with external demands, they are engaging in *autonomy support* (Joussemet et al. 2004). Parents can provide autonomy support in a variety of ways: by recognizing a child's feelings and viewpoint; offering behavioral choices and encouraging children to take action; explaining the rationale behind behavioral requests; and limiting the use of controlling techniques (Koestner et al. 1984). Thus, autonomy support is consistent with high levels of parental involvement and structure (Grolnick 2003). Autonomy supportive parenting, when applied to homework and academics, includes listening empathically, helping children find the meaningful and interesting aspects of school work, and supporting educational development while avoiding use of extrinsic reward systems and threats (Froiland 2015). With college-age children, it involves providing encouragement and support so they can actively face and solve their own academic problems and move toward full independence (Chickering and Reisser 1993; Grolnick et al. 1991). Thus, it is particularly important for traditionally-aged college students. Though both young men and women benefit from parental autonomy support, daughters receive slightly more of this support than sons (Endendijk et al. 2016).

Empirical studies of autonomy support document a link between its provision and positive outcomes, including academic adjustment and achievement, regardless of gender. Children who receive autonomy support are more likely

to internalize rules and guidelines, as well as the importance of valuable but potentially uninteresting activities, such as studying or doing homework (Joussemet et al. 2004; Kochanska et al. 2001). Thus, they are more likely to be intrinsically motivated to learn, feel more positively about homework and school, and show greater academic adjustment (Froiland 2011; Froiland et al. 2012; Joussemet et al. 2005). Studies with adolescents have shown similar results, including associations between autonomy support and self-regulation, adjustment, and academic success (Guay et al. 2008; Vallerand et al. 1997), perhaps because these parents are more likely to adopt mastery-related achievement goals for their children (Mageau et al. 2016). Although the body of literature examining emerging adult and college-age children is not as extensive, parallel findings have been reported with college and post-graduate students who received autonomy support from significant adults in their lives, including parents (Inguglia et al. 2016). In general, academic achievement is higher among those whose parents show an optimal level of involvement in their children's education and encourage them to be self-motivating and directed (Froiland et al. 2013). To note, autonomy support is distinct from other indicators of family involvement linked to academic well-being among college students, such as positive relationships and social support (Budescu and Silverman 2016).

In contrast, the development of autonomy is most threatened by over-parenting—intensive guidance and involvement, which prohibits adolescent and young adult children from being self-directing (Schiffrrin et al. 2012). This form of control, which denies children's feelings and is associated with performance rather than mastery (Mageau et al. 2016), is referred to as “helicopter parenting” and is distinct from autonomy support (Reed et al. 2016; Schiffrrin et al. 2012). Although both represent forms of engaged parenting, helicopter parenting suggests high levels of parental control over children that limit self-mastery and motivation; in contrast, autonomy support reduces psychological control (Suldo and Huebner 2004). Indeed, studies indicate that children of helicopter parents show less self-motivation and perseverance and lower perceived autonomy (Padilla-Walker and Nelson 2012), as parents often step in and make decisions for them (LeMoyne and Buchanan 2011). They are also less able to manage their lives and cope with stress, and are prone to anxiety and depression (Hofer and Moore 2010; LeMoyne and Buchanan 2011). In the academic realm, over-controlling parents have children who show less motivation to learn and have lower overall academic achievement (Froiland 2011; Froiland and Oros 2014).

The research on over-parenting signals the influential role parents continue to play in the development of their young adult children. Though most college students want

more autonomy from parents (Grigsby 2009), they remain an important source of information and advice during the college years, particularly for daughters (Fraleay and Davis 1997; Wolf et al. 2009). In contrast to the outcomes of overparenting that have been documented, positive parenting and autonomy support are associated with a number of positive outcomes among college students. A meta-analysis by Mattanah et al. (2011) indicated that undergraduates who had a close and supportive relationship with their parent(s) reported better functioning across multiple domains, including academic motivation and competence, and lower levels of stress. Kenyon and Koerner (2009) reported that those who were both close to their parents but also functionally independent tended to have better mental health and well-being, and Wintre and Yaffe (2000) found that they adapted more easily to university life. As reported by Cutrona et al. (1994), those whose parents provided them with sufficient support were more likely to have the skills necessary to constructively face new and challenging situations. And in a study by Ratelle et al. (2013), when undergraduates perceived that their parents were supportive of their academic choices and decisions, they reported higher levels of happiness and satisfaction.

In summary, self-determination theory suggests that those who are able to adequately develop feelings of autonomy achieve more positive functioning and greater well-being, or “covitality”—a cumulative sense of well-being along emotional, cognitive, social, and behavioral dimensions (Renshaw and Bolognino 2016). Children and young adults develop autonomy, and well-being and covitality, through their parents’ provision of autonomy support. A number of studies document the relationship between parental autonomy support and positive emotional and behavioral outcomes, including those in the academic realm. Studies also document a gendered divide in its receipt, with young girls and women receiving more autonomy support from their parents (Endendijk et al. 2016). Yet little attention has been paid to the potential role that parental autonomy support may play once children reach postsecondary school, leading to calls for more research on self-determination and college student outcomes (Brockelman 2009). Forms of academic well-being represent aspects of covitality linked to college student persistence (Barry and Finney 2009)—a prominent issue for universities (Friedman and Mandel 2009). Furthermore, like parental autonomy support, undergraduate well-being appears to be gendered: women are more internally motivated when it comes to academics, and despite lower emotional well-being during college, they exhibit higher academic performance than men (Fischer et al. 2013; Sax and Weintraub 2014; Vecchione et al. 2014).

Five forms of well-being are considered here: school-related stress, school spillover, academic motivation, GPA,

and satisfaction with university. *School-related stress* is an emotional component of covitality representing the degree to which students feel pressured by competing demands associated with academic life. Evidence suggests that women undergraduates experience higher overall stress and school-related stress than men (Misra and McKean 2000; Pierceall and Keim 2007). Stressed students more often question their abilities, have a lower academic self-concept, poorer self-esteem, and are less satisfied with their grades and university life (D’Angelo and Wierzbicki 2003; Pryor et al. 2010). These impacts are felt institutionally, as stressed students are more likely to drop courses and leave the university (Daugherty and Lane 1999; Kadison and DiGeronimo 2004), having implications for student retention and graduation rates (Burrus et al. 2013). As noted, parental autonomy support has been linked to reduced stress and negative affect and greater resilience among students (Dawson and Pooley 2013; Niemiec et al. 2006; Ratelle et al. 2013).

School spillover, an affective and cognitive form of covitality, is the degree to which obligations in one domain ‘spill’ over into other aspects of life to create strain between roles (Bolger et al. 1989). An individual facing negative spillover finds the emotions, behaviors, or obligations from one role they hold overwhelm performance of another, leading to less time, energy, and/or ability to enact the second role (Bolger et al. 1989). The few studies that examine school spillover have shown that family relationships and experiences spill over to impact academics and the school lives of 9th graders (Flook and Fuligni 2008); undergraduate women face greater school spillover than men (Pedersen and Jodin 2016); employed college students who experience conflict between work and school demands have poorer psychological health (Park and Sprung 2013); and both undergraduate and graduate students experience difficulty balancing their work, family, and academic lives (Hammer et al. 1998). School spillover can negatively impact mental and behavioral health outcomes among college students (Pedersen et al. forthcoming), and lead to dissatisfaction with educational experiences (Hammer et al. 1998)—a critical factor in student attrition (Freeman et al. 2007).

Academic motivation is a cognitive form of covitality linked to student persistence (Hardre and Reeve 2003); it is the degree to which students feel invested in academic pursuits and their willingness to take part in learning (Brophy 2010), with research indicating that women undergraduates are more academically motivated than men (Baker 2003). Students who feel academically motivated are more likely to attend university by choice, and to derive pleasure and satisfaction from their involvement in educational activities (Fortier et al. 1995). The self-determination model posits that motivation is developed in response to

critical antecedents, among them the support children and adolescents receive for becoming autonomous (Deci and Ryan 1991). Because they are encouraged to make their own choices, undergraduates who receive high levels of parental autonomy support should be more personally invested in their academic choices and have greater academic motivation.

GPA is a widely used measure of academic achievement and well-being (Renshaw and Bolognino 2016). A behavioral form of covitality, when students are more autonomous, they exhibit higher academic performance as measured through grades (Fortier et al. 1995). With regard to gender, college women tend to achieve higher GPAs (Fischer et al. 2013). Friedman and Mandel (2011–2012) found that students' need for autonomy at the beginning of their college career predicted academic achievement (as measured by GPA) and retention at the end of the freshman year. Although self-determination theory predicts that parental autonomy support is related to student well-being, studies examining parental help and support among college students have produced inconsistent results. Smith and Zhang (2009) found that help provided by mothers and fathers was unrelated to college GPA, and in a later study, reported that although a number of significant bivariate correlations existed between forms of parental help and GPA, in regression analyses only mothers' help (operationalized as 'encouraged rigorous course work and academic achievement') was positively associated with student GPA (Zhang and Smith 2015). In contrast, Fulton and Turner (2008) reported that parents' autonomy granting predicted GPA for both college men and women. Despite mixed findings, self-determination theory posits that parental autonomy support represents an external asset that students may draw on to develop positive traits like academic motivation, and that fosters behavioral choices leading to success and achievement including academic performance.

The final form of covitality considered is *satisfaction with university*. Satisfaction is a strong predictor of both psychological wellness and adjustment (Jones et al. 2013), with empirical work demonstrating its importance to college student outcomes, most notably student retention and attrition (Freeman et al. 2007; Renshaw and Cohen 2014). Work in the tradition of self-determination theory shows that autonomous individuals have greater life satisfaction and happiness (Howell et al. 2011), perhaps because they feel a sense of ownership and accomplishment for their life experiences (Niemic et al. 2006). Empirical studies have documented that when parents offer concrete support and provide advice and suggestions, children have greater life satisfaction (Suldo and Huebner 2004). It is expected then that among undergraduates, parental autonomy support will be positively associated with satisfaction with

university, a domain specific measure of satisfaction and well-being.

Drawing these five aspects of covitality together, the goal of this paper is to empirically test theorized associations between parental autonomy support and academic well-being among college undergraduates. Based on evidence suggesting that parents provide greater autonomy support to daughters, and that forms of academic well-being are gendered, separate models are tested for men and women. The study makes two primary contributions. First, the paper identifies whether, consistent with the principles of self-determination theory, parental autonomy support has the potential to impact covitality into the undergraduate years, as it has been demonstrated among primary- and secondary-school enrolled children. We may expect that undergraduates who report higher levels of autonomy support from parents will also report greater academic well-being: lower levels of academic stress and school spillover, greater academic achievement as evidenced by higher GPAs, and higher levels of academic motivation and satisfaction with university. Because they traditionally receive more parental autonomy support, these relationships may be stronger for undergraduate women. Second, few studies in the self-determination and autonomy support literature have been done with undergraduates. To date, the literature focusing on parental autonomy support of young children and adolescents is rich, but less developed with college student and young adult populations.

Method

Participants

Data for this study were taken from a cluster sample of undergraduate students enrolled at a midsized comprehensive, doctoral granting Midwestern university. The university has an enrollment of approximately 15,000 students, just over three-quarters (77%) of them undergraduates. At the time of survey distribution, most of the student body was white (79%), and the largest minority populations were Hispanic (2.82%) and Black/African American (2.30%), and those reporting two or more races (2.71%).

Procedure

Students were invited to participate in the study on the basis of their enrollment in sampled courses. From a list of all spring semester offerings (excluding independent study, practicum, part-term, online, graduate, and professional courses), every 10th course was sampled for inclusion with a total beginning of term enrollment of 4851 students. The instructor of record for each of these 124 courses was

contacted via email with details about the study roughly two-thirds of the way through the semester. A week later, a follow-up email was sent in which the web link for the survey was provided. Instructors were asked to share the link with their students via email or the Blackboard course organization system, in order to minimize user error when students attempted to reach the survey. Although some instructors volunteered that they had shared the link with their students, this was not required and the actual number of students with whom instructors shared details of the study is not known. Official enrollment figures did not include those students who had withdrawn from courses during the term. Thus, a precise response rate cannot be calculated. The questionnaire was made available for one month, during which time 575 responses were obtained. Informed consent was obtained from all individual participants included in the study. The questionnaire included a variety of items related to college students' physical and mental health, stress, academics, and behavioral health choices. Data for the current study were limited to those students age 22 or younger who reported they were in contact with at least one parent ($N = 492$).

Measures

Dependent variables

School-related stress was measured using an index made up of three items identified as major sources of college student stress related to academic life (Howard et al. 2006; McGrath 2006). Respondents were asked, "how much stress does each of the following cause you on a regular basis?" The three items included (a) pressure to get good grades; (b) thinking about the future; and (c) having too many things to do for my classes. Response categories ranged from 1 = no stress, 3 = some stress, to 5 = very high stress. Students' scores were summed and averaged to create a final scale ranging from 1 to 5 ($\alpha = .79$). A factor analysis confirmed that these three items made up a single component with an eigenvalue of 2.10. All three variables had factor loadings above .80.

School spillover was measured using a nine-item scale (Pedersen and Jodin 2016). It was modeled on other indices measuring the carry-over of obligations from one domain into others (Kirchmeyer 1993), with a focus on aspects of life making up the daily lives of students. Academic stressors are the most widely cited among undergraduates (McGrath 2006), and so the spillover of academic experiences into other domains of life may be high relative to other potential forms of spillover. Respondents were asked, "how much do you think your academic life affects other areas of your life? Taking classes and doing school work influences my: (a) time and relationships with family;

(b) time and relationships with friends; (c) time and relationship with a romantic partner; (d) time and performance at work; (e) time for leisure and relaxation; (f) ability to get things done at home (e.g., laundry, grocery shopping); (g) ability to get enough rest or sleep; (h) ability to get enough exercise; and (i) ability to make or eat healthy meals." Responses ranged from 1 = strongly disagree to 5 = strongly agree. Students' scores on the individual items were summed and then averaged to conform to the original coding scheme of 1 to 5 ($\alpha = .85$). Construct validity of the nine-item scale was tested using confirmatory factor analysis. Analysis confirmed that the nine items made up a single component with an eigenvalue of 4.30. All of the items loaded with a coefficient of .60 or better.

To measure students' *academic motivation* a three-item index was created using items pertaining to work avoidance, as past research suggests that intrinsic motivation has multiple underlying dimensions and shows support for use of a composite measure (Fortier et al. 1995). This dimension of intrinsic motivation is consistent with the need to be competent and self-determining as outlined in self-determination theory (Deci and Ryan 1985). Students were asked to respond to the following statements: "(a) I am a procrastinator when it comes to school work; (b) I avoid doing homework/studying; and (c) I don't feel very motivated when it comes to school." Response categories ranged from 1 = strongly disagree to 4 = strongly agree, and the three items were then reverse coded. Students' scores on these items were summed and then averaged to create a scale ranging from 1 to 4 ($\alpha = .82$). Factor analysis confirmed the presence of a single component made up by these three items with an eigenvalue of 2.22 and factor loadings of .79 and higher.

GPA was measured using a scale ranging from 1 to 7, with high scores indicating higher grade point averages (1 = 0.00–1.00, 2 = 1.01–2.00, 3 = 2.01–2.50, 4 = 2.51–3.00, 5 = 3.01–3.50, 6 = 3.51–3.75, 7 = 3.76–4.00).

Satisfaction with university was a single item that asked, "how satisfied are you with your life at school?" Responses were marked from 1 = very dissatisfied to 4 = very satisfied. This represents one item from the Brief Multidimensional Students' Life Satisfaction Scale (Zullig et al. 2005), for which five life domains (family, school, friends, self, living environment) are rated to create a total life satisfaction score.

Independent variable

To measure *parental autonomy support* (Schiffrin et al. 2012), respondents were asked to indicate their level of agreement with each of the following six statements: "(a) My mother/father encourages me to discuss any academic problems I am having with my professor; (b) My mother/

father has given me tips about using my money wisely (e.g., how to shop for groceries economically, save money, etc.); (c) My mother/father encourages me to deal with any interpersonal problems between myself and my roommate or friends on my own; (d) My mother/father encourages me to make my own decisions and take responsibility for the choices I have made; (e) My mother/father encourages me to keep a budget and manage my own finances; and (f) My mother/father encourages me to choose my own classes.” Responses were marked on a scale ranging from 1 = strongly disagree to 6 = strongly agree. Factor analysis indicated that these nine items made up one component with an eigenvalue of 3.32, and factor loadings of .70 or higher. As with the other scales, students’ scores on the individual items were summed and then averaged in order to conform to the original coding scheme, ranging from 1 to 6. The alpha reliability coefficient for the index was .85.

Control variables

Three control variables were included in analyses: *age* (18, 19, 20, 21, 22, 23, 24, 25 or older), *class level* (1 = freshman, 2 = sophomore, 3 = junior, 4 = senior), and *generational status* (1 = continuing generation, 2 = first generation student). Empirical work has shown that while academic concerns are the most frequently cited source of stress, specific stressors vary by age and class level (McGrath 2006) as well as generational status (Wilbur and Roscigno 2016), and there is a developmental trend for undergraduate stress with freshmen and sophomores generally reporting higher levels than upperclassmen (Misra et al. 2000). Compared to continuing generation students, first generation students experience a greater number of stressful life events during the college years, they enter college with lower overall GPAs (Wilbur and Roscigno 2016), and though not less supportive, tend to have parents who are less knowledgeable about and involved in their academic decisions and lives (Hamilton 2016; Lareau 2011). Because they are less likely to be involved in activities that engage them academically and interpersonally (Hahs-Vaughn 2004), they may also be less satisfied with university life.

Data Analyses

Statistical modeling using SPSS software was used to test study hypotheses, with separate analyses conducted by gender. Univariate statistics were first generated, including *t* tests by gender for key study variables. Bivariate correlations were then estimated, followed by hierarchical regression models run for men and women undergraduates. In the first set of models, academic well-being measures were regressed on the control variables. In the second model,

parental autonomy support was added. In order to preserve cases in the sample, missing data were replaced by the mean, although similar results were also generated using both listwise and pairwise deletion of cases.

Results

Univariate statistics for the study variables are included in Tables 1 and 2. Full data were available for measures including sex, age, and class level (and additionally, GPA for men). Missing data for women ranged from 2% of cases for GPA, generational status, and parental autonomy support, to approximately 5% of cases for school-related stress, and 10–11% of cases for academic motivation, school spillover, and satisfaction with university. Among men, missing data ranged from approximately 4–15% for study variables, school spillover and satisfaction with university having the greatest number of missing cases. In the sample, 62% of respondents were women and 38% were men,

Table 1 Frequencies for non-continuous variables (*N* = 492)

Variable		Men (<i>n</i> = 185) %	Women (<i>n</i> = 307) %
Age	18	10.3	8.5
	19	30.8	35.8
	20	24.9	30.0
	21	20.5	14.3
	22	13.5	11.4
Class level	Freshman	21.6	23.8
	Sophomore	42.2	31.6
	Junior	20.5	24.1
	Senior	15.7	20.5
Generational status	Continuing generation	79.8	69.1
	First generation	20.2	30.9
GPA	0.00–1.00	0.0	0.0
	1.01–2.00	0.5	0.7
	2.01–2.50	6.5	4.0
	2.51–3.00	24.3	12.3
	3.01–3.50	27.6	28.6
	3.51–3.75	13.5	18.3
Satisfaction with university	3.76–4.00	27.6	36.2
	Dissatisfied	6.4	2.5
	Somewhat dissatisfied	15.3	12.3
	Somewhat satisfied	43.9	43.5
	Satisfied	34.4	41.7

somewhat different from the composition of students on the campus as a whole where 43% of undergraduates are women. About 55% of men and 66% of women respondents were 19 to 20 years old, and there was a relatively even distribution across class level with slightly more sophomore students. Thus, while the proportional distribution of the sample was similar to the population of undergraduates with regard to age, with students clustered in the younger age categories, the sample was slightly younger on average than the population of undergraduates ($Mean = 22\text{--}23$ years), and with slightly fewer senior level students. It should be noted again, that only students 22 years or younger were included in the analyses. Approximately one-fifth of men and one-third of women were first-generation college students. Undergraduate women ($Mean = 4.04$, $SD = 0.67$) reported receiving higher levels of parental autonomy support, on average, than men ($Mean = 3.86$, $SD = 0.68$) ($t = 2.85$, $df = 471$, $p < .005$).

With regard to academic well-being, significantly higher averages were found for women undergraduates for three of the five outcomes using independent samples t tests. Mean scores for school-related stress and school spillover were above the midpoint of the scales, and significant differences were found by gender. Women reported higher average

school-related stress ($Mean = 3.67$, $SD = 0.94$) and school spillover ($Mean = 3.62$, $SD = 0.67$) than did men (school-related stress: $Mean = 3.32$, $SD = 1.00$; school spillover: $Mean = 3.36$, $SD = 0.76$). Students rated themselves near the mid-point or slightly higher on academic motivation (Men: $Mean = 2.95$, $SD = 1.03$; Women: $Mean = 3.09$, $SD = 0.99$), and had relatively high GPAs. Roughly 83% of women had a 3.01 GPA or higher, as did 69% of men. The majority of both men (78.3%) and women (85.2%) reported being somewhat satisfied or satisfied with their life at university. The bivariate correlations are presented in Table 3, estimated separately by gender. Of the student well-being measures, parental autonomy support was significantly correlated with satisfaction with university for women ($r = .25^{***}$) but not men ($r = .12$). This correlation is positive, such that higher autonomy support was reported alongside greater satisfaction with university. None of the other measures of academic well-being was significantly correlated with parental autonomy support.

Table 4 includes multivariate findings for men, and Table 5 provides the models for women. Consistent with the bivariate correlations, none of the models achieved statistical significance among men. For women, the only statistically significant association between parental autonomy and student well-being was for satisfaction with university ($\beta = .22^{***}$). In this case, the regression model was significant, and the inclusion of the independent variable significantly added to the explained variance of the dependent variable (F change = 16.07 (1, 302), $p < .000$). Overall, the model explained 7% of the variance in the dependent variable, 5% of which was attributed to the addition of parental autonomy support. Because satisfaction with university was measured ordinally and there was evidence of a negative skew ($skewness = -.79$; $skewness/std. error$ of $skewness > 1.96$; $kurtosis/std. error$ of $kurtosis < 1.96$), these findings were confirmed using ordinal (PLUM)

Table 2 Descriptive statistics for continuous variables

	Range	Men Mean (SD)	Women Mean (SD)
Parental autonomy support	1–5	3.86 (0.68)	4.04 (0.67)**
School-related stress	1–5	3.32 (1.00)	3.67 (0.94)***
School spillover	1–5	3.36 (0.76)	3.62 (0.67)***
Academic motivation	1–5	2.95 (1.03)	3.09 (0.99)

Note. Independent samples t tests were conducted by sex; the larger of the means is denoted by * $p < .05$, ** $p < .01$, *** $p < .001$

Table 3 Bivariate correlations

	1	2	3	4	5	6	7	8	9
1: Age	*	.76***	.01	−.09	−.07	.05	.02	−.12*	.01
2: Class level	.69***	*	−.02	−.01	−.11	.05	.05	.01	.13*
3: Generational status	.21**	.09	*	.01	−.04	−.11	−.05	−.10	.00
4: Parental autonomy support	−.15*	.03	−.18**	*	−.06	−.01	.07	.09	.25***
5: School-related stress	−.12	−.07	−.07	.11	*	.42***	−.17**	−.03	−.31***
6: School spillover	.08	.17*	−.08	−.06	.34***	*	−.01	.04	−.02
7: Academic motivation	.01	−.05	.06	.04	−.11	−.24***	*	.35***	.27***
8: GPA	−.14*	−.03	.06	.02	−.22**	−.13	.35***	*	.25***
9: Satisfaction with university	.04	.06	−.02	.12	−.28***	−.19**	.27***	.30***	*

Note. Coefficients above the diagonal are for women students; those below the diagonal are for men students

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 4 Models regressing academic well-being on parental autonomy support and control variables for undergraduate men ($n = 185$)

	Academic motivation		GPA		School-related stress		School spillover		Satisfaction with university	
	<i>B</i>	(<i>SE B</i>) β	<i>B</i>	(<i>SE B</i>) β	<i>B</i>	(<i>SE B</i>) β	<i>B</i>	(<i>SE B</i>) β	<i>B</i>	(<i>SE B</i>) β
Age	.03 (.05)		-.16 (.06)		-.05 (.05)		-.02 (.04)		.00 (.04)	
	.06	.07	-.25**		-.11		-.05		.00	.04
Class level	-.08 (.08)		.16 (.11)		.01 (.08)		.14 (.06)		.05 (.07)	
	-.09	-.10	.14		.01		.20*		.06	.03
Generational status	.11 (.15)		.31 (.20)		-.11 (.15)		-.14 (.12)		-.04 (.13)	
	.05	.06	.10		-.05		-.08		-.02	-.01
Parental autonomy support		.08 (.10)		-.01 (.13)		.12 (.10)		-.10 (.07)		.14 (.08)
		.06		-.01		.09		-.09		.12
Adj. R^2	.00		.04		.00		.02		.00	
F	0.51		2.73		1.06		2.60		0.29	
Model sig	$p < .678$		$p < .045$		$p < .367$		$p < .054$		$p < .833$	
										$p < .455$

* $p < .05$, ** $p < .01$, *** $p < .001$ **Table 5** Models regressing academic well-being on parental autonomy support and control variables for undergraduate women ($n = 307$)

	Academic motivation		GPA		School-related stress		School spillover		Satisfaction with university	
	<i>B</i>	(<i>SE B</i>) β	<i>B</i>	(<i>SE B</i>) β	<i>B</i>	(<i>SE B</i>) β	<i>B</i>	(<i>SE B</i>) β	<i>B</i>	(<i>SE B</i>) β
Age	-.02 (.07)		-.31 (.09)		.02 (.07)		.02 (.05)		-.13 (.06)	
	-.03	-.01	-.29***		.03		.04		-.21*	
Class level	.05 (.08)		.25 (.10)		-.11 (.08)		.01 (.05)		.19 (.06)	
	.06	.05	.22*		-.13		.02		.28***	
Generational status	-.09 (.12)		-.24 (.15)		-.08 (.11)		-.14 (.08)		.01 (.09)	
	-.04	-.04	-.09		-.04		-.11		.01	
Parental autonomy support		.09 (.08)		.12 (.11)		-.08 (.08)		-.01 (.06)		.25 (.06)
		.06		.07		-.06		-.01		.22***
Adj. R^2	.00		.03		.00		.00		.02	
F	0.40		4.63		1.30		1.40		3.43	
Model sig	$p < .751$		$p < .004$		$p < .274$		$p < .243$		$p < .018$	
										$p < .000$

* $p < .05$, ** $p < .01$, *** $p < .001$

regression. Comparison of the final model against the baseline model indicated that the model fit was good ($\chi^2 = 36.76$, $df = 9$, $p < .000$) and the goodness of fit test confirmed that the observed data were consistent with the fitted model ($\chi^2 = 444.95$, $df = 453$, $p < .598$). Parental autonomy support remained significantly associated with women's satisfaction with university as evidenced by the Wald statistic ($Wald = 19.34$, $df = 1$, $p < .000$). The *pseudo* R^2 indicated that 13% of the variance in satisfaction with university was explained by the predictors in the model.

Discussion

This study examines the association between parental autonomy support and five aspects of college students' academic well-being, including school-related stress, school spillover, academic motivation, GPA, and satisfaction with university. Data were taken from a sample of undergraduates enrolled at a public liberal arts university in the Midwest ($N = 492$), with separate models estimated for men and women. Self-determination theory suggests that when parents encourage their children to be self-directing and motivated, to choose and implement courses of action of their own volition, they benefit in multiple ways. Empirical work has documented among school-age children and adolescents a relationship between parental autonomy support and academic motivation and performance (Froiland 2011; Su and Reeve 2011). Those whose parents have encouraged them to behave autonomously also exhibit lower levels of stress and better coping skills (Hofer and Moore 2010). With college students, research is less extensive but indicates similar benefits arising from autonomy support (Black and Deci 2000; Williams and Deci 1996). Yet, findings from the current study included only one significant association: women who reported higher levels of parental autonomy support also reported higher levels of satisfaction with university. No relationship was found among men, and no significant relationship existed between parental autonomy support and undergraduates' school-related stress, school spillover, GPA, or academic motivation.

Analyses showed that women undergraduates reported receiving significantly more parental autonomy support than men. Among men in this study, age was negatively associated with the perception of parental autonomy support. This suggests that as sons made their way through university, they received the most autonomy support from parents when they transitioned to college and perhaps 'aged out' of its receipt as their development was supported by new people in their lives. In contrast, daughters received a constant level of autonomy support throughout the university experience. The centrality of connectedness to

autonomy supportive behavior may predispose college women to higher levels: even though they do not communicate more frequently with their parents than college men, they are more likely to share experiences and ask parents for support and guidance (Stein et al. 2016). Indeed, women undergraduates receive more parental help than men, particularly from their mothers (Stein et al. 2016). In a study by Zhang and Smith (2015), women were provided more help with school-related problems and obstacles, information about how to be a successful student, and assistance with non-academic goal-related issues, behaviors similar to autonomy support. To the extent that college women face higher levels of school-related stress and spillover, perhaps they need more parental autonomy support and that is why they consistently receive it regardless of progress through college. This support may then allow them to effectively manage various forms of academic stress.

Among the women college students in this sample, parental autonomy support was significantly related to satisfaction with university. As previously noted, autonomy supportive parenting involves empathic listening, encouraging (young adult) children to find the meaningful and interesting aspects of school work, and providing encouragement and support so they can actively face and solve their own problems within the academic context (Froiland 2015; Grolnick et al. 1991). Those who receive it are more likely to develop an internal locus of control and motivation, and take ownership of their behaviors and choices while working to find solutions to their problems (Kwon et al. 2016). The sense of responsibility and control that come with the development of problem-solving and coping skills lead to a greater sense of direction (Bradley-Geist and Olson-Buchanan 2014; Thoits 2010), and less adrift, college women may feel greater satisfaction with life and their university experiences (DeWitz and Walsh 2002; Reed et al. 2016). Thus, the availability of parental autonomy support may signal the presence of positive coping skills that enhance feelings and experiences among undergraduate women, rather than a reduction in or the absence of negative feelings. Along these lines, the non-significant relationships between parental autonomy support and school-related stress and school spillover may not be at odds with the predictions of self-determination theory if students who receive parental autonomy support are better able to manage the school-related stress and spillover they feel. The measure of parental autonomy support used in the current study may be indicative of these positive coping skills, as it focuses on autonomy in decision making, engaging proactively in situations, and confronting problems directly as they arise.

Along these lines, Reed et al. (2016) suggested that parenting behaviors may be indirectly associated with college students' well-being via self-efficacy, a measure of

perceived competence that takes into account initiative, effort, and persistence. In their study, college students whose parents provided them with autonomy support reported higher levels of self-efficacy. In turn, self-efficacy was associated with lower levels of anxiety and depression (Reed et al. 2016). Similarly, Dawson and Pooley (2013) found a link between parental autonomy support and first year college students' resilience. When they have been the recipients of autonomy support, young children and adolescents are better able to cope with the challenges they face (Cutrona et al. 1994)—but the perceived challenges occur regardless of autonomy support. In contrast, those with controlling parents have a limited internal locus of control and reduced self-efficacy (Kwon et al. 2016; Reed et al. 2016), and are more likely to experience childhood anxiety and later anxiety-related disability when faced with stressors (Nanda et al. 2012). This interpretation is consistent with Astin's (1991) input-environment-outcome model of student change. The model highlights the significant role that parents and family background ("inputs") play, while also noting that the academic and social environment are considerable forces that shape student outcomes.

Existing literature can also be interpreted to suggest that the non-significant relationships between parental autonomy support and academic motivation and GPA are perhaps not surprising, nor in contradiction with the predictions of self-determination theory. Past work has documented a relationship between autonomy support and intrinsic motivation to learn among school-age children (Froiland et al. 2012), and similar patterns among adolescents including an association between autonomy support and self-regulation within academic contexts (Rivers et al. 2012; Vallerand et al. 1997). Thus, it may be the case that academic motivation and the drive for achievement are developed much earlier in life, during childhood and adolescence (Fulton and Turner 2008). Accordingly, by the time students reach the university an academic work ethic has long been instilled (or not), and may thus be less responsive to parents' autonomy support. It is not necessarily the case then that parental autonomy support does not matter to college students' academic motivation and their ability to achieve, but perhaps matters much earlier in their developmental years. The autonomy support that parents provide may also be targeted to help them develop in different aspects of their lives. For instance, whereas academic motivation and achievement may be learned earlier in life, budgeting and financial wellness may be new-found areas of responsibility for college students. The measure of autonomy support used in this analysis does include a single item to this end, though most of the items in the operationalization focus more distinctly on academics.

Limitations

This study points to an association between parental autonomy support and how satisfied women undergraduates are with university life. However, there are data and sample limitations that should be recognized. First, the use of cross-sectional data does not allow for a thorough time-ordered examination of autonomy support and students' academic development. As well, subjective reporting by students may provide a different perception of parental autonomy support than would be derived by asking parents about its provision. For instance, perhaps some forms of autonomy support occur 'behind the scenes,' and are not necessarily visible to students. In studies of perceived parental help, parents reported providing greater support to their college-age child than students reported receiving (Zhang and Smith 2015). In regard to the available measures, whether students came from families in which parents were married or divorced was not available. Although all students had contact with at least one parent, it was not possible to delineate between mothers and fathers, or if students were in contact with both parents. Another potential measurement issue is the operationalization of the satisfaction measure, which asked how satisfied students were with their lives at the university. This measure may tap into not just academics, but also feelings about other aspects of students' lives (e.g., relational, financial) that pertain to the university experience. Generalizability of the current findings is also limited due to homogeneity of the sample, derived from a single campus. For instance, there was little racial diversity among undergraduates, who originated primarily from two Midwestern states. Extending findings beyond the scope of this campus merits prudence.

The current study adds to the limited literature examining parental autonomy support during the period of emerging adulthood, with an eye to gender differences in both its receipt and its association with academic well-being. The study's findings, along with its limitations, suggest that there are gaps in our knowledge and greater attention is needed in identifying when and how this support shapes the lives and experiences of college students. Potential directions for this work include more specific attention paid to parental autonomy support, distinguishing between the support provided by mothers and fathers, and whether support varies across different family types or on the basis of student living arrangements (see Mattanah et al. 2011). Work by Ratelle et al. (2013) suggested that the autonomy support provided by significant others including friends and romantic partners is influential in shaping the well-being of college students, and is a promising direction for future studies. This may be important to consider in studies of covitality, including those addressing academic well-being (Mattanah et al. 2011). In terms of the indicators of

academic well-being examined here, it may be useful to rule out more direct predictors of school-related stress and school spillover. As well, there are other forms of academic and undergraduate well-being that may be more responsive to parental autonomy support—for instance, the ability to choose a course of study, or make a budget and spend or borrow wisely (financial well-being). There are more detailed measures that researchers may find useful, such as Renshaw and Bolognino's (2016) academic satisfaction scale. Past work also indicates that there may be an indirect relationship between parental autonomy support and academic well-being (e.g., via self-efficacy) and future studies could consider the potential role played by other aspects of self-determination.

Compliance with Ethical Standards

Conflict of Interest The author declares that she has no competing interests.

Ethical Approval In compliance with the Institutional Review Board of the supporting institution, human subjects review was completed and approval granted before this research was undertaken.

Informed Consent All study participants provided informed consent.

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Parental Autonomy Support and Career Well-Being: Mediating Effects of Perceived Academic Competence and Volitional Autonomy

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Abstract

Self-determination theory (SDT) was used to explain the relation of parental autonomy support for making their own decisions and career well-being (i.e., more academic major satisfaction and less subjective career distress). Perceived academic competence and perceived volitional autonomy were posited to mediate the relation of mother's and father's autonomy support and career well-being in 113 university students. Perceived academic competence mediated the relation of father's support and both indicators of career well-being. Perceived volitional autonomy mediated the relation of mother's support and both indicators of career well-being. A bootstrap procedure yielded significant mediation effects of mother's and father's autonomy support on career well-being. Results are discussed in terms of SDT and career well-being.

Keywords

parental autonomy support, career well-being, perceived volitional autonomy, perceived academic competence, self-determination theory

Disciplines

Biological Psychology | Industrial and Organizational Psychology | School Psychology

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Mediating Effects of Perceived Academic Competence and Volitional Autonomy

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Abstract

Self-Determination Theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000) was used to explain the relation of parental autonomy support for making their own decisions and career well-being (i.e., more academic major satisfaction and less subjective career distress). Perceived academic competence and perceived volitional autonomy were posited to mediate the relation of mother's and father's autonomy support and career well-being in 113 university students. Perceived academic competence mediated the relation of father's support and both indicators of career well-being. Perceived volitional autonomy mediated the relation of mother's support and both indicators of career well-being. A bootstrap procedure yielded significant mediation effects of mother's and father's autonomy support on career well-being. Results are discussed in terms of SDT and career well-being.

Keywords: parental autonomy support, career well-being, perceived volitional autonomy, perceived academic competence, self-determination theory

Parental Autonomy Support and Career Well-being:
Mediating Effects of Perceived Academic Competence and Perceived Volitional
Autonomy

Choosing an academic major is a fundamental, yet daunting, task for young adults in post-secondary institutions. Selecting a major is one of the most common challenges students experience in adjusting to college (e.g., Killam, 2014). Aside from academic pressures, students' ultimate decisions about which majors to pursue set them on journeys toward certain occupations and away from other occupations, resulting in added pressure around selecting a major for those who remain doubtful about their choices. Conversely, students who are satisfied with their majors and experience minimal subjective distress about the process of making a career choice experience considerable career well-being. Creed and Blume (2013) defined career well-being as the degree to which one is satisfied with his or her career choice, and the extent to which he or she experiences subjective distress related to career choice. In the present study, a similar definition was employed using both subjective career distress and academic major satisfaction. The more proximal variable of academic major satisfaction replaced career choice satisfaction in order to better reflect college students' present experiences of career well-being. Academic major satisfaction was defined as the satisfaction students feel about their academic major (e.g., McIlveen, Burton, & Beccaria, 2013). Subjective career distress in this study was defined as negative affect directed at the career planning process, (Larson, Toulouse, Ngumba, Fitzpatrick, & Heppner, 1994). It included helplessness, depression, stress, avoidance, and anxiety about the process as well as perceived obstacles, such as disapproval and insufficient finances (Larson et al., 1994). This affective component is often the most salient for many students seeking career counseling.

Students' career well-being may be enhanced by their perceived competence in the college environment. One critical domain of competence for university students is the academic environment. Perceptions of one's academic competence is important if students are to complete the requirements of their chosen academic majors, as those majors will lead them to their eventual careers only if they are academically successful.

Students' career well-being may also be related to how much they own the choices they are making in college. As they transition from high school to college, they are learning how to be autonomous decision makers in many areas of their lives including how much they study, what major they will choose, and what courses to complete. For them, this means that they are learning to take in feedback from parents about their decision making but ultimately they need to feel that the choices they are making are internally motivated.

Helicopter parenting defined as the over involvement of parents in their children's lives (Kenny, 1987) has been shown to have a detrimental effect on students' well-being (LeMoyne & Buchanan, 2011; Padilla-Walker & Nelson, 2012). Career counselors and college educators encourage parents to provide support but simultaneously communicate to their college age children that the choices their daughters and sons are making about their academic success and their educational majors are their own. The purpose of this study was to explain career well-being by examining students' perceptions of their parents' support for making their own decisions, students' perception of themselves as academically competent, and students' perception of themselves as free to make their own decisions.

Our theoretical grounding for this study was Self-Determination Theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000). Self-Determination Theory was employed for several reasons. First, it lays out a conceptual rationale for predicting career well-being. Second, it identifies a

positive developmentally appropriate role for parents to play in their children's decision making called parental autonomy support. Third, it places a students' perceived academic competence and their perceived autonomy in making their own choices as mediators between the parent's role and the students' career well-being. For all these reasons, SDT provided strong conceptual grounding for this investigation.

Self-Determination Theory

Self-Determination Theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000) is a theory of motivation that posits that individuals achieve a sense of well-being by meeting three psychological needs; namely competence (feeling efficacious), autonomy (need to freely choose to initiate, maintain, and regulate one's actions), and relatedness (need for meaningful relationships). Within vocational psychology, the outcome is specifically career well-being. For the purpose of this study, we focused on the two needs most relevant to career well-being, perceptions of academic competence and autonomy.

According to SDT, people's sense of competence is a fundamental need that must be met in order to experience well-being. For college students to be successful and thrive, they must perceive themselves as academically competent. The SDT literature has demonstrated that perceived academic competence positively relates to well-being (e.g., Nota, Soresi, Ferrari, & Wehmeyer, 2011; Ryan, Still, & Lynch, 1994). According to the theory, the need for competence is also positively related to a person's need for autonomy; in fact, both are posited to be necessary to experience well-being.

The need for autonomy in the context of SDT refers specifically to volitional autonomy, that is, to have the freedom to choose to act upon one's own interests and values, rather than independent functioning (Ryan & Deci, 2000; Soenens et al., 2007). The need for volitional

autonomy has been related to well-being (e.g., Lapaille et al., 2005; Nota et al., 2011; Sheikholeslami, 2011).

Considerable work has been done to conceptualize the need for autonomy along a continuum ranging from intrinsic motivation (i.e., acting because one is very interested in the behavior for its own sake) to extrinsic motivation. There are three types of extrinsic motivation, varying from identified regulation (internalization – acting because it is important to me; though my motivation for achieving the goal remains extrinsic to myself), to introjected regulation (acting because I am internalizing external sources, such as avoiding guilt), and finally to external regulation (acting because I will receive a reward or avoid a constraint; Ryan & Deci, 2000). Taking action as a result of intrinsic motivation or identified regulation meets the need for autonomy, whereas taking action as a result of introjected regulation or external regulation does not meet the need for autonomy

Cognitive Evaluation Theory, a subset of SDT, was developed to identify the social and environmental factors that can support or hinder one's perceived competence and volitional autonomy and (Deci & Ryan, 1985; Ryan & Deci, 2000). An essential environmental factor in a young adult's life is the extent to which parents are perceived as allowing their emerging adult daughters or sons to own their own competence and to allow them to be autonomous in their own decision-making in new environments. This is called parental autonomy support. This support is conceptualized as crucial to young adults internalizing their academic successes and seeing themselves as responsible for their own choices (Ryan & Deci, 2000).

Cognitive evaluation theory suggests that parental autonomy support should increase their children's views of themselves as academically competent. Several studies have provided evidence to support that claim (e.g., Guay, Ratelle, Larose, Vallerand, & Vitaro, 2013; Guay &

Vallerand, 1997; Ratelle et al., 2004; Ryan & Deci, 2000; Ryan, Stiller, & Lynch, 1994; Vallerand et al., 1997). Moreover, parental autonomy support is theoretically linked to increasing volitional autonomy in their children. This relation has also been supported in the broader SDT literature (e.g., Ratelle et al., 2004; Soenens et al., 2007). Finally, parental autonomy support should theoretically increase their young adult children's well-being. Several literature reviews have provided evidence that parental autonomy support relates to perceived competence and volitional autonomy and ultimately relates to young adults' overall functioning and well-being (e.g., Ryan & Deci, 2000; Ryan & Deci, 2006). For example, supportive parents tend to have children who are more intrinsically motivated in various domains of functioning, such as academic environments, sports, and music (e.g., Frederick & Ryan, 1995; Grolnick, Deci, & Ryan, 1997). Soenens and colleagues (2007) also indicated parental autonomy support significantly predicted greater global self-worth, fewer depressive symptoms, and increased social well-being in college students. These effects were fully mediated by perceived volitional autonomy.

Applying SDT to Explain Career Well-being

Self-Determination Theory offers vocational psychology a conceptual model integrating perceptions of competence and perceptions of volitional autonomy in explaining career well-being. Social psychology has a rich literature providing evidence that perceived competence and perceived volitional autonomy enhance well-being (see Ryan & Deci, 2000). For students pursuing a bachelor's degree, the developmental task before them is to choose academic majors that will act as segues to their ultimate career paths (Super, Savickas, & Super, 1996). Their career well-being depends, in part, on how satisfied they are with the majors they have selected and their affective states surrounding their academic majors and career choices. Subjective career

distress encompasses the latter; the affective distress involved in career indecision, such as disengagement, avoidance, procrastination, self-blame, and negativity (Larson, Toulouse et al., 1994).. It was used in the present study in tandem with academic major satisfaction in order to operationalize career well-being in undergraduate college students.

Self-Determination Theory has been applied to vocational psychology; though not directly to career well-being. Two studies were found to be relevant to the present study. Guay, Senécal, Gauthier, & Fernet (2003) used SDT to predict career indecision, finding an indirect effect of parental career decision autonomy support on career indecision through career decision-making self-efficacy and career decision-making autonomy. In the second study, Jadidian and Duffy (2012) did not utilize a SDT framework, but examined relations among perceived competence (i.e., career decision-making self-efficacy), perceived autonomy (i.e., work volition, defined as one's perception that he or she is able to make a choice despite obstacles), and academic major satisfaction. Work volition directly predicted academic major satisfaction and career decision making self-efficacy. Both studies provided support for SDT in that perceptions of autonomy and autonomy support significantly predicted important career outcomes. The focus of the present study was to contribute to the emerging convergence of SDT with vocational psychology by focusing directly on applying SDT to predict career well-being in college students. Figure 1 illustrates our proposed model.

Perceptions of mother and father autonomy support predicting career well-being.

Studies have found parental support are associated with greater career exploration and satisfaction with the college transition (Dietrich, Kracke, & Nurmi, 2011; Van Petegem, Beyers, Vansteenkiste, & Soenens, 2012), and less chronic career indecision (Guay, Ratelle, Senécal, Larose, & Deschênes, 2006; Guay et al., 2003). Other studies outside the career arena have

shown parental autonomy support of young adults' autonomy was related to: (a) students' psychosocial functioning through self-determination (e.g., Soenens et al., 2007) and adolescents' autonomous motivation levels (e.g., Liu et al., 2013). Finally, the lack of parental autonomy support through helicopter parenting has been shown to negatively relate to students' well-being (e.g., LeMoyne & Buchanan, 2011; Padilla-Walker & Nelson, 2012).

Perceived academic competence and volitional autonomy mediating the relation of mother's and father's support and career well-being. Perceived academic competence has typically been labeled "academic self-concept" or "academic self-efficacy" in the vocational psychology literature, and has been extensively studied in terms of how it affects academic retention (e.g., Gore, 2006; Robbins et al., 2004) and academic performance (e.g., Robbins et al., 2004). Fewer studies have examined how perceptions of academic competence relate to career well-being. One study provided evidence that perceived academic competence negatively related to subjective career distress and positively related to academic major satisfaction (Larson et al., 1994) but did not examine the potential mediation effects of perceived academic competence on the relation of parental autonomy support and career well-being. One related mediation study examined career indecision rather than career well-being and career decision-making self-efficacy (i.e., perceived career decision-making competence) rather than perceived academic competence (Guay et al., 2003). They found that career decision-making self-efficacy mediated the relation between parent career decision-making autonomy support and career indecision.

Perceived volitional autonomy as a mediator has been mostly unexamined in the career domain. Guay and colleagues (2003) provided indirect supportive evidence and showed that career decision-making autonomy mediated the relation between parental career decision-making autonomy support and career indecision. A second related study examined work volition which

could be considered part of perceived volitional autonomy and found that it, related positively to academic major satisfaction, one indicator of career well-being (Jadidian & Duffy, 2012).

In addition to the empirical evidence presented above, SDT applied to vocational psychology provides the theoretical rationale for the study. Perceived academic competence was posited as a fundamental need that contributes to career well-being (Ryan & Deci, 2000). Perceived volitional autonomy was posited to drive individuals to complete freely chosen actions that they anticipate will lead to improved overall functioning (Ryan & Deci, 2000). Moreover, according to the extension of SDT, Cognitive Evaluation Theory, perceived academic competence and volitional autonomy should mediate between environmental and social supports like parental autonomy support and career well-being. (Jadidian & Duffy, 2012).

Hypotheses

For the first set of hypotheses, we expected that perceived academic competence would mediate the relation between mother's autonomy support and father's autonomy support and career well-being, as operationalized by academic major satisfaction (positive relation) and subjective career distress (negative relation). For the second set of hypotheses, we expected that perceived volitional autonomy would mediate the relation between mother's and father's autonomy support and career well-being as defined by academic major satisfaction (positive relation) and by subjective career distress (negative relation).

Method

Participants

Students taking introductory psychology courses at a large Midwestern university originally participated in mass testing for course credit. These students were invited via email to participate in the present study for additional course credit. Of these individuals, 113 students

chose to participate. This sample was comprised of 74 females and 39 males including first-year (60%), second-year (19%), third-year (12%), and fourth-year (9%) students across 44 educational majors. The average age was 19.07 years old ($SD = 1.55$). About 89% of the sample identified as European-American, 3.5% identified as Asian/Pacific Islander, 3.5% identified as Latino, 1.8% identified as African American, and 2.2% as “other”. This percentage is representative of the ethnic diversity of the campus.

Procedure

Students initially completed questions from multiple university research studies using a web-based survey program, SONA (www.sona-systems.com). Approximately one month later, participants were invited via email to participate in an additional web-based survey, Qualtrics for the present study, for which they received course credit.

Measures

Mother’s and father’s autonomy support. The college version of the Perceptions of Parents autonomy support subscale is one of three subscales of the Perceptions of Parents Scale (Grolnick, Ryan, & Deci, 1991; Robbins, 1994), which includes two 21-item six-point Likert scales for each parent. The three subscales are autonomy support, involvement, and warmth; only the autonomy support scale was used in this study. The mother’s autonomy support subscale and the father’s autonomy support subscale each have nine items with higher scores reflecting more autonomy support (e.g., “My mother/father allows me to decide things for myself,”).

Participants’ perceptions of their mothers’ and fathers’ autonomy support were distinct, in that the correlation between the mother’s and father’s autonomy support subscales was .26. A decision was made to keep both parental autonomy support scales separate, which is consistent with previous research (e.g., Abad & Sheldon, 2008; Liu et. al., 2013). In the current sample,

internal consistency was .90 for the father's autonomy support subscale and .89 for the mother's autonomy support subscale. Abad and Sheldon (2008) found that the father's autonomy support subscale related significantly to happiness and life satisfaction. and colleagues (2006) provided evidence that both mother's and father's autonomy support subscales correlated significantly with life satisfaction, positive affect and negatively correlated with depression and negative affect.

Perceived academic competence. Perceived academic competence was operationalized by the academic self-efficacy subscale of the Coping with Career Indecision Scale (CCI; Larson, Toulouse, Ngumba, Fitzpatrick, & Heppner, 1994). The academic self-efficacy subscale was made up of four 6-point Likert items assessing participants' beliefs about their abilities to effectively engage in academic activities (e.g., "I am confident in my ability to succeed academically in the courses necessary to enter my chosen or potential career"). Higher scores indicate stronger perceptions of academic competence. For the purposes of this paper, academic self-efficacy and perceived academic competence are synonymous. Internal consistency for this subscale in this sample was .73. This value was comparable to the internal consistency reported by Larson and colleagues ($\alpha = .71$; 1994). Validity estimates provided by Larson and colleagues (1994) indicated academic self-efficacy is moderately positively related to grade point average, aptitude, and investigative interests, as well as career certainty and vocational identity and negatively related to career indecision. The subscale was unrelated to personality indices (Larson et al., 1994). It also appears stable over a two-week period ($r = .84$; Larson et al., 1994), and has been shown to differentiate among subtypes of undecided students (e.g., Larson, Heppner, Ham, & Dugan, 1988; Lee, 2005).

Perceived volitional autonomy. The perceived choice subscale of the Self-Determination Scale (SDS; Sheldon & Deci 1996), which contains five 5-point Likert items, operationalized the extent to which participants perceive that their actions and decisions are freely chosen and driven by their own interests labeled volitional autonomy in the present study.. Each item in the perceived choice subscale was comprised of two bipolar statements, and participants were asked to decide which is truer on a 5-point scale. On this scale, (1) indicated only statement A was true, (5) indicated only statement B was true, and (3) indicated both statements were equally true. Items assessed the degree to which participants felt they were making their own decisions as opposed to making decisions based on external factors (e.g., “I always feel like I choose the things to do” vs. “I sometimes feel that it’s not really me choosing the things I do”). Higher scores indicate more perceived volitional autonomy. Internal consistency for the 5-item scale used in the present study was .78, which is comparable to Silva and colleagues (2010) who reported an internal consistency estimate of .84. Silva and colleagues (2010) also showed that participants who completed an intervention aimed at weight reduction compared to those in a control group scored significantly higher on the SDS perceived choice subscale. Higher scores on this scale predicted higher levels of life satisfaction and mental health (e.g., Sheikholeslami, 2011), higher quality of life (e.g., Lachapelle et al., 2005; McDougall, Evans, & Baldwin, 2010, Nota, et al., 2011), lower depression severity (e.g., Zuroff et al, 2007), and higher self-efficacy in four domains of living (e.g., making decisions, completing tasks; Nota et al., 2011).

Academic major satisfaction. The Academic Major Satisfaction Scale (AMSS; Nauta, 2007) included six 6-point Likert items assessing the degree to which college students were satisfied with their academic majors (e.g., “I wish I were happier with my choice of an academic

major,” reverse-scored). Higher scores indicated greater satisfaction. Internal consistency was .93 in the present study which is comparable to previous findings reported by Nauta (2007) in which internal consistency values of .94 and .91 were reported. The AMSS has been shown to positively correlate with career choice satisfaction, career optimism, career adaptability, and generalized self-efficacy (McIlveen et al., 2013). It also has been shown to negatively correlate with career choice anxiety and generalized indecisiveness (Nauta, 2007), and positively correlate with an internal work locus of control (Jadidian & Duffy, 2012).

Subjective career distress. Subjective career distress was operationalized by the subjective career distress subscale of the CCI (Larson et al., 1994). The subjective career distress subscale was made up of 21 6-point Likert items assessing the degree to which an individual feels he or she is experiencing distress related to career decisions (e.g., “I often feel down or depressed about selecting a major or career”). Higher scores indicated more distress. Initial construct validity provided evidence that this factor was a significant predictor in separating students who were and were not decided about their major. Furthermore, a factor analysis by Larson and colleagues (1994) presented evidence that, within the CCI, the subjective career distress and academic self-efficacy subscales measured two distinct aspects of career indecision. Internal consistency for the present study was .91, Larson and colleagues (1994) reported an internal consistency of .90 and a two-week test-retest reliability of .86. Subjective career distress also has been shown to relate negatively to career certainty, vocational identity, and problem-solving appraisal, and to relate positively to career indecision (Larson et al., 1994). Subjective career distress also appears unrelated to indices of the Holland hexagon, personality indices, and aptitude (Larson et al., 1988; 1994).

Data Analysis

A mediation model was used to examine the mediation effects of perceived academic competence and perceived volitional autonomy on the relation between mother's and father's autonomy support and career well-being. Bootstrap tests using bias corrected 95% confidence intervals were used to test the significance of the mean indirect effects (Preacher & Hayes, 2008). The calculation was repeated with 1,000 samples to yield a parameter estimate for total and specific indirect effects. A confidence interval not containing 0 would mean that the mean indirect effect across those 1,000 samples was significant (Preacher & Hayes, 2008). Using a bootstrap analysis provides greater statistical power and does not assume multivariate normality in the sampling distribution (Preacher & Hayes, 2008). Moreover, the current sample is considered moderate in size and sufficient for both power and Type I error rates (e.g., Briggs, 2006; Williams & MacKinnon, 2008).

Results

Preliminary analyses. Table 1 presents the means, standard deviations, and correlations of the variables under examination. All predictor variables except father's autonomy support significantly positively correlated with academic major satisfaction with values ranging from .29 for mother's autonomy support to .38 for perceived volitional autonomy. All predictor variables were significantly negatively correlated with the subjective career distress, with values ranging from -.21 for father's autonomy support to -.45 for perceived volitional autonomy.

Main analyses. Mother's autonomy support and father's autonomy support were the two exogenous variables; academic major satisfaction and subjective career distress were the two criterion variables; perceived academic competence and perceived volitional autonomy were the two proposed mediators in the model. To address the two sets of mediation hypotheses, a macro SPSS (version 21) program developed by Preacher & Hayes (2008) was used to test the

mediation model and to generate the bootstrapping procedure to test the significance level of the mediation (indirect) effect. Figure 2 contains the standardized beta coefficients for the direct and indirect effects on the relation between mother's and father's autonomy support and career well-being (academic major satisfaction and subjective career distress) as mediated by perceived academic competence and perceived volitional autonomy. Table 2 presents the magnitude and statistical significance of the specific and total indirect effects of mother's and father's autonomy support on career well-being through perceived academic competence first and then through perceived volitional autonomy using the bootstrapping procedure. Table 2 is organized so that the first four specific mean indirect effects reported concern the first mediator, perceived academic competence; the last four specific mean indirect effects reported concern the second mediator, perceived volitional autonomy.

Perceived academic competence. Mother's autonomy support did not directly or indirectly significantly relate to academic major satisfaction through perceived academic competence as can be seen by the dotted lines in Figure 2. Table 2 presents the results of the bootstrapping procedure that determined the significance of the mediation. The specific mean indirect effect generated across 1000 samples was not significant as shown by the 95% bias-corrected confidence interval (*BC CI*) including 0. In short, perceived academic competence did not mediate the relation of mother's autonomy support and academic major satisfaction.

Mother's autonomy support also did not directly or indirectly significantly relate to subjective career distress through perceived academic competence as shown by Figure 2. Table 2 also shows the specific mean indirect effect of mother's autonomy support on subjective career distress generated from the bootstrapping procedure to be nonsignificant as 0 was included in the

BC CI. In short, perceived academic competence did not mediate the relation of mother's autonomy support and subjective career distress.

As can be seen by Figure 2, father's autonomy support indirectly positively related to academic major satisfaction through perceived academic competence. The specific mean indirect effect of father's autonomy support on academic major satisfaction through perceived academic competence was significant in the bootstrapping procedure as shown by the lack of 0 in the *BC CI* column in Table 2. Father's autonomy support also did not directly relate to academic major satisfaction. In short, perceived academic competence fully mediated the relation of father's autonomy support and academic major satisfaction.

Father's autonomy support also indirectly negatively related to subjective career distress through perceived academic competence as shown by Figure 2. Table 2 reporting the bootstrapping procedure showed that the specific mean indirect effect of father's autonomy support on subjective career distress through perceived academic competence was significant in that the *BC CI* did not include 0. Furthermore, father's autonomy support did not directly relate to subjective career distress as shown by Figure 2. In short, perceived academic competence fully mediated the relation of father's autonomy support and subjective career distress.

In summary, the first set of mediation hypotheses was partially supported. Specifically, perceived academic competence fully mediated the relation of father's autonomy support and both indicators of career well-being, namely academic major satisfaction and subjective career distress. However, perceived academic competence did not significantly mediate the relation of mother's autonomy support and either indicator of career well-being.

Perceived volitional autonomy. As shown in Figure 2, mother's autonomy support indirectly positively related to academic major satisfaction through perceived volitional

autonomy. Table 2 provides evidence from the bootstrapping procedure that the mean indirect effect of mother's autonomy support and academic major satisfaction through perceived volitional autonomy was significant as shown by the lack of 0 in the *BC CI*. In short, perceived volitional autonomy fully mediated the relation of mother's autonomy support and academic major satisfaction.

As shown in Figure 2, mother's autonomy support indirectly negatively significantly related to subjective career distress through perceived volitional autonomy. Table 2 also presents evidence from the bootstrapping procedure that the specific mean indirect effect of mother's autonomy support on subjective career distress through perceived volitional autonomy was significant as the *BC CI* did not include 0. In short, perceived volitional autonomy fully mediated the relation between mother's autonomy support and subjective career distress.

As shown in Figure 2, father's autonomy support did not directly or indirectly significantly relate to academic major satisfaction through perceived volitional autonomy. The mean indirect effect generated from the bootstrapping procedure also yielded null findings as shown by 0 being present in *the BC CI* column in Table 2. That is, perceived volitional autonomy did not significantly mediate the relation of father's autonomy support and academic major satisfaction.

Moreover, father's autonomy support did not directly or indirectly significantly relate to subjective career distress through perceived volitional autonomy as shown by Figure 2. The mean indirect effect of father's autonomy support on subjective career distress that was generated from the bootstrapping procedure also yielded null findings. In short, perceived volitional autonomy did not significantly mediate the relation of father's autonomy support and subjective career distress.

In summary, the second set of mediation hypotheses was partially supported. Perceived volitional autonomy fully mediated the relation of mother's autonomy support and both indicators of career well-being, namely academic major satisfaction and subjective career distress. Perceived volitional autonomy did not significantly mediate the relation of father's autonomy support and either academic major satisfaction or subjective career distress.

Discussion

College students, as young adults, are working through the developmental tasks of completing bachelor's degrees and selecting satisfying majors that will prepare them to enter the world of work. Self-Determination Theory gives conceptual clarity to two fundamental needs that must be achieved during this time of college student development: The need to perceive oneself as academically competent to complete the bachelor's degree requirements, and the need to perceive oneself as in charge of the choices he or she is making. SDT purports that the more these two needs are met, the more students will experience career well-being; namely, they will be more satisfied with their choices of major and they will experience less subjective career distress. In the present study, we found evidence supporting SDT's assertion that perceptions of competence and volitional autonomy was directly related to career well-being as shown by Figure 2.

Our findings also support the roles of perceived academic competence and perceived volitional autonomy as mediators between parental autonomy support and career well-being. College students need autonomy support from their parents in the form of reassurance and freedom to make their own decisions. Cognitive Evaluation Theory, an extension of SDT, purports this autonomy support will affect students' well-being directly and indirectly through perceived competence and perceived volitional autonomy (Ryan & Deci, 2000). In our study,

perceived academic competence fully mediated the relation of father's autonomy support and both indicators of career well-being, namely academic major satisfaction and subjective career distress. Moreover, perceived volitional autonomy fully mediated the relation of mother's autonomy support and both indicators of career well-being.

Although the relation of parental autonomy support and career well-being using SDT as a framework has not been explicitly studied in the vocational literature, there have been a few related findings that laid an empirical foundation for this study. These results extend Guay and colleagues (2003) SDT work that showed that parental career decision autonomy support indirectly related to career indecision through career decision-making self-efficacy and career decision-making autonomy. Moreover the results of this study are consistent with Jadidian and Duffy's (2012) findings that work volition directly predicted academic major satisfaction and career decision making self-efficacy.

We expected perceived academic competence and perceived volitional autonomy to mediate the relation of both parent's autonomy support and career well-being. However, in this sample perceived academic competence mediated the relation of father's autonomy support and career well-being while perceived volitional autonomy mediated the relation of mother's autonomy support and career well-being. These results are tentative and need to be replicated in future studies. If this differentiation of each parent's autonomy support is validated in the literature, it may be that students' sense of academic competence is more connected to their father's autonomy support while the student's sense of volitional autonomy is more connected to mother letting them go into the larger world to make their own career decisions. We speculated that students' academic confidence may be influenced by their fathers more than their mothers since they may perceive that their fathers' support is anchored in the message of them becoming

competent successful adults. We tentatively suspected that students' perceptions of making their own choices may be more related to the parent most likely to be the most engaged in their lives which is more likely to be the mother. That is, if mother can support them while clearly communicating that the choices are theirs to make, then we would expect them to experience more career well-being. Our findings are intriguing and need to be followed up to understand the potential unique mediating roles of perceived competence versus volitional autonomy for young adults as they transition from high school through college to adulthood.

The assumption that mother's autonomy support and father's autonomy support functions in the same way was not supported in this study and is consistent with their Pearson product moment correlation being a modest .24. It is also consistent with some prior studies that showed that mother's autonomy support and father's autonomy support correlated significantly but low enough ($r_s = .27$ and $.28$) to clearly indicate they are measuring two different constructs (Abad & Sheldon, 2008; Liu et. al., 2013).

The application of SDT to career well-being is relatively new. The variables anchored in SDT in this sample explained 21.4% of the variance in academic major satisfaction and 27.8% of the variance in subjective career distress as shown in Figure 2. According to Cohen (1992), the magnitude of these effect sizes can be categorized as medium (major satisfaction) and large (subjective career distress). This suggests that SDT does explain a meaningful amount of variation in career well-being and provides a useful framework to conceptualize contributors to career well-being.

The findings from this study provide potential paths for future researchers to follow. First, separating mother's autonomy support from father's autonomy support would be prudent in future studies to examine the unique role of each parent's support as their children transition to

adulthood and the world of work. These differentiated findings need to be replicated in order to determine their theoretical and practical implications regarding the differential roles of mother's autonomy support and father's autonomy support. Second, perceived competence besides academic competence could be examined such as job-seeking competence or competence in that first position after college. Third, female and male students' should be examined separately to determine if the gender of participant would moderate the relation of mother's and father's autonomy support and the needs of competence and volitional autonomy. Third, the need for relatedness embedded in SDT could be included in future studies. One parental support variable likely related to the need for relatedness would be parental involvement and warmth.

Limitations of this study include its lack of longitudinal or experimental design. The field may benefit from future longitudinal research. In addition, the present sample was predominantly European American. Samples including ethnicity and gender as a moderator would help identify particular subgroups that may produce different relations among the variables (e.g., Jadidian & Duffy, 2012). SDT has now been applied to career indecision and career well-being. Future studies may want to investigate additional vocational outcomes, such as job satisfaction or burnout.

Practical Implications

Results of the present study largely implicate counselors working with college students. College counselors may find it useful to conceptualize the variables in Figure 1 in order to work toward increasing students' career well-being. This study provides some empirical support for the use of assessments around students' senses of academic competence, as well as the extent to which they feel the choices they are making are their own. Perceived academic confidence (i.e., academic self-efficacy) can be increased through mastery, modeling, verbal persuasion, and

lowering academic anxiety (e.g., Lent, Brown, & Hackett, 1994). Encouraging administrators and professors to structure academic success experiences to increase in difficulty, for example, is a proven technique (Devereux & Wilson, 2008). The findings of this study may also compel counselors to attend to students' senses of volitional autonomy; that is, whether they feel in charge of the decisions they are making. Traditionally, vocational counselors are trained to ascertain students' interests and confidence; they are less accustomed to focusing on volitional autonomy.

Another variable in Figure 1 that may be of importance for college counselors is the role of mother's and father's autonomy support. Academic counselors have noted concern about "helicopter" parents who may struggle with supporting the autonomy of their children. Counselors may consider interventions targeting parents during college preregistration and orientation to help them conceptualize how autonomy support can potentially enhance their children's perceived competence, volitional autonomy, and ultimately career well-being. Students could also be counseled around how to ask parents to be supportive of their emerging autonomy. Parents can be assured their child still needs their warmth and involvement, but they need to be supported and respected in making autonomous choices about their lives and future career.

Conclusion

The current study extends the intersection of vocational psychology and SDT to explain career well-being. Students' fundamental needs of perceived academic competence and volitional autonomy explained their career well-being as expected by SDT. Moreover, parents' autonomy support as perceived by the students indirectly affected their career well-being through these two fundamental needs. Finally, mother's and father's autonomy support differed; father's

autonomy support was indirectly related to career well-being only through perceived academic competence while mother's autonomy support was indirectly related to career well-being only through perceived volitional autonomy.

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Table 1

Summary of Means, Standard Deviations and Intercorrelations for All Studied Variables

Measures	1	2	3	4	5	6
1. Mother's autonomy support	-					
2. Father's autonomy support	.24**	-				
3. Perceived academic competence	.15	.27**	-			
4. Perceived volitional autonomy	.28**	.20*	.30**	-		
5. Academic major satisfaction	.28**	.11	.33**	.35**	-	
6. Subjective career distress	-.27**	-.22*	-.39**	-.39**	-.67**	-
<i>M</i>	4.75	4.66	18.29	19.90	28.61	60.90
<i>SD</i>	.86	.92	3.41	3.20	6.25	16.99

Note. $N = 113$. Mother's and father's autonomy support = mother's autonomy support subscale and father's autonomy support subscale, scores range from 1 to 6 with higher scores indicating more support; Perceived academic competence = the Coping with Career Indecision (CCI) academic self-efficacy subscale, scores range from 4 to 24 with higher scores indicating more perceived competence; Perceived volitional autonomy = the Self Determination Scale (SDS) perceived choice subscale; scores range from 5 to 25 with higher scores indicating more autonomy; Academic major satisfaction = the Academic Major Satisfaction scale, scores range from 6 to 36 with higher scores indicating more satisfaction; Subjective career distress = the CCI subjective career distress subscale, scores range from 21 to 126 with higher scores indicating higher levels of distress. * $p < .05$. ** $p < .01$.

Table 2

Bootstrap Analysis of Magnitude and Statistical Significance of Indirect Effects of Mother's and Father's Support on Career Well-Being (Major Satisfaction and Subjective Career Distress) through Perceived Academic Competence and Perceived Volitional Autonomy

Indirect Effects			β and product	Mean Indirect Effect (b) ^a	SE of Mean ^a	95% BC CI Lower, Upper
1a. Mother's support	Academic comp.	Major satisfaction	(.08) X (.23) = .018	.02	.03	-.022, .105
1b. Mother's support	Academic comp.	Subj. career distress	(.08) X (-.22) = .018	-.02	.02	-.066, .019
1c. Father's support	Academic comp.	Major satisfaction	(.24) X (.23) = .055	.06	.05	.001, .213*
1d. Father's support	Academic comp.	Subj. career distress	(.24) X (-.22) = .053	-.04	.03	-.116, -.004*
2a. Mother's support	Volitional autonomy	Major satisfaction	(.25) X (.27) = .068	.08	.04	.020, .189*
2b. Mother's support	Volitional autonomy	Subj. career distress	(.25) X (-.34) = .085	-.08	.04	-.178, -.023*
2c. Father's support	Volitional autonomy	Major satisfaction	(.15) X (.27) = .041	.05	.04	-.010, .128
2d. Father's support	Volitional autonomy	Subj. career distress	(.15) X (-.34) = .051	-.04	.03	-.115, .015

Note. $N = 113$. Mother's support and Father's support = Mother's and Father's perceived autonomy support respectively. Academic comp. = Perceived academic competence;; *BC CI* = Bias-Corrected Confidence Interval. ^aThese values are based on the unstandardized path coefficients. *95% Confidence interval does not include zero and therefore is significant at $p < .05$.

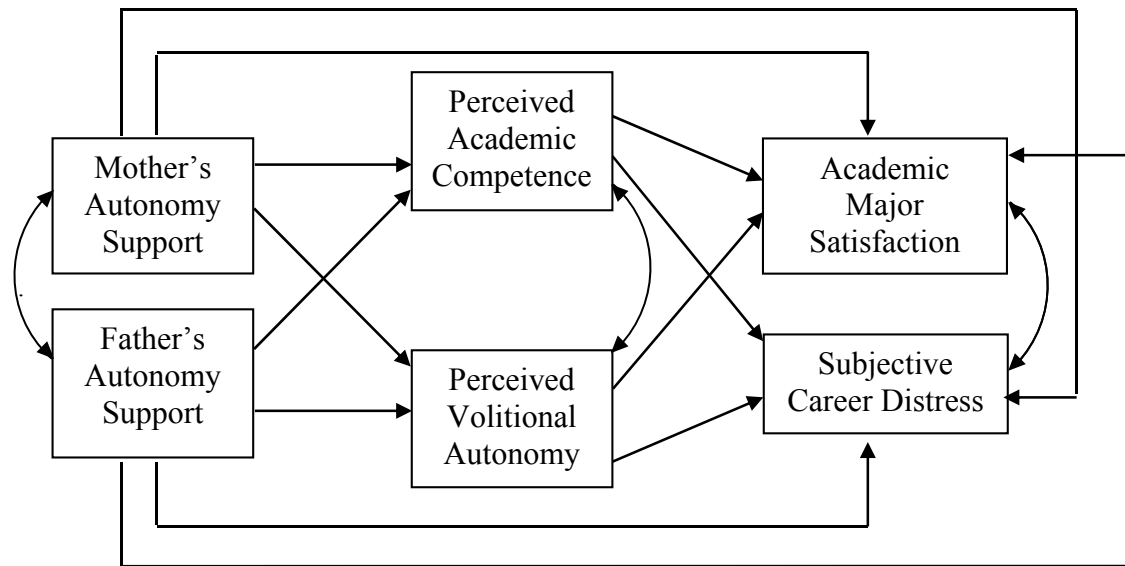


Figure 1. Hypothesized Mediation Model.

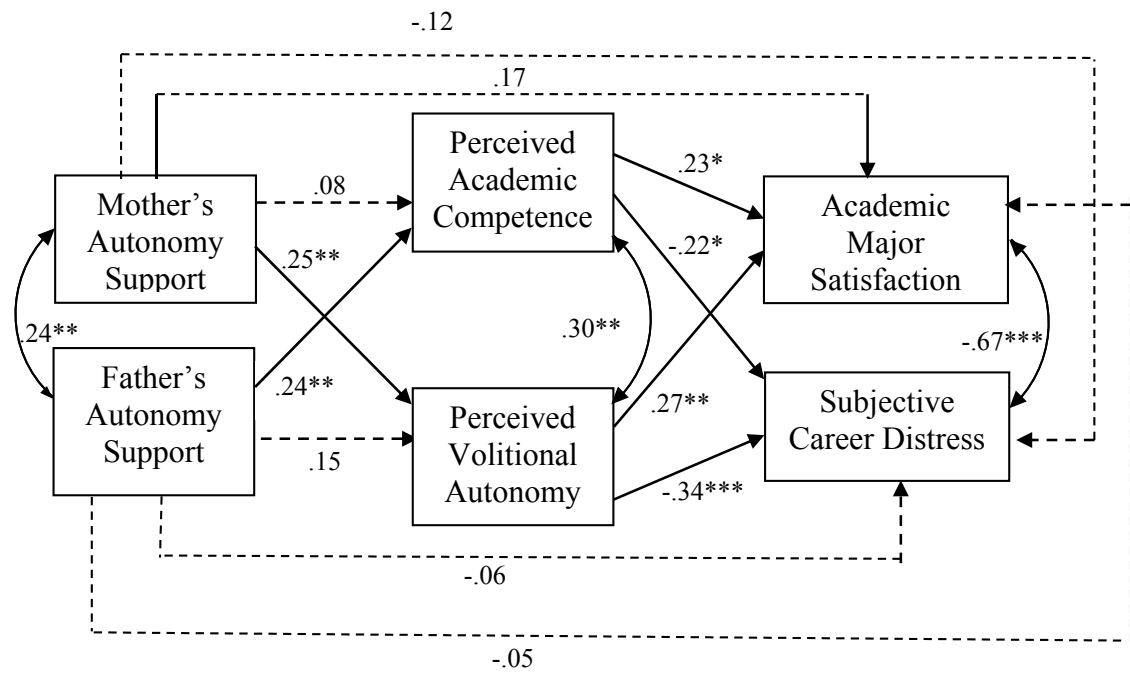


Figure 2. The Final Mediation Model.

Note. The R^2 for Academic Major Satisfaction was .214 and the R^2 for Subjective Career Distress was .278.

* $p < .05$. ** $p < .01$. *** $p < .001$.

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Adverse Family Influences on Emerging Adult Depressive Symptoms: A Stress Process Approach to Identifying Intervention Points

Kayla Reed · Anthony J. Ferraro · Mallory Lucier-Greer · Chelsea Barber

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Abstract The transition to college is often a stressful time where individuals are launching from the family. Despite awareness of this crucial transitional period, few studies have examined the enduring influence of the family environment on emerging adult mental health. We utilized a stress process framework to examine the impact of an adverse family environment, which accounts for multiple dimensions of family processes including perceptions of the childhood family environment, lack of parental support, and parental psychological control, on emerging adult depressive symptoms. The study explores a process model mediated by self-efficacy and moderated by social provisions, using latent variable structural equation modeling with a sample of 154 college students from a large southeastern, United States University. As hypothesized by the stress process model, an adverse family environment was related to higher levels of emerging adult depressive symptomology indirectly through self-efficacy, such that a more aversive family environment was related to lower levels of self-efficacy and lower levels of self-efficacy were related to more depressive symptoms. Results also indicate that the presence of social provisions can alleviate the strain of an adverse family environment on an individual's sense of self and mental health. Discussion of the importance of families and other forms of social support, during emerging adulthood, as well as implications for intervention timing and method are included.

Keywords Family · Emerging adult · Depressive symptoms · Self-efficacy · Social support

Introduction

The transition to college is a crucial, yet, critical and often stressful time (Pascarella and Terenzini 1991) where many emerging adults are leaving their families for the first time. National trends indicate that over 60 % of college freshman launch from their family home and relocate over 50 miles away with some (15 %) moving over 500 miles away from their families to attend college (Pryor et al. 2012). Although these emerging adults tend to reside independently, theoretical and empirical suggestions are that the family has an enduring influence on mental health, such that adverse family influences put emerging adults at greater risk for maladjustment even when living outside of the family home.

Individuals tend to overestimate their ability to adjust to college (academically, socially, and emotionally), putting them at greater risk for depression (Bigham et al. 2012; Beck et al. 2003; Gerdes and Mallinckrodt 1994; Larose and Boivin 1998). Emerging adults who undergo high levels of stress related to the college transition tend to also experience high levels of depression, and depression can escalate even further if stress related to the college transition is combined with family life stress (Dyson and Renk 2006). However, during the transition to college, the ability of emerging adults to maintain strong self-concepts can be predictive of mental health outcomes (Park et al. 2012). Similarly, perceptions of supportive, high quality, emotional and social networks can alleviate stress related to life events, like the transition to college (Brissette et al. 2002), and improve mental health (Azmitia et al. 2013). However, research regarding the effects of previous family experiences on current mental health of emerging adults, in conjunction with self-efficacy and social support, specifically during the transition to college, is limited.

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The stress process framework (Pearlin et al. 1981) posits that stressors manifest themselves in two distinct ways, as discrete life events and chronic stressors. Discrete life events can take the form of unexpected or normative events, and can range from very positive experiences (e.g., beginning college, getting a promotion) to more difficult or challenging experiences (e.g., getting a divorce, losing your job). The premise is that the event, regardless of its appraised value or meaning by the individual, can complicate circumstances and introduce stress (Pearlin and Lieberman 1979). Life events hold the potential to exacerbate pre-existing or dormant stressors and introduce new stressors. When entering college (a discrete life event characterized by changing circumstances, redefining of roles and relationships, and added responsibilities), individuals may be more susceptible to the influence of chronic stressors.

Chronic stressors can take many forms but are generally characterized by their relative persistence over time. These stressors erode self-concepts gradually, thereby leading to increased likelihood of adverse mental health outcomes. Herein, self-concepts are conceptualized as self-efficacy, with the overall model predicting that stressors will affect mental health outcomes through self-efficacy. When a stressor presents, especially in a salient domain of life (e.g., family), it is likely that the stressor will produce additional related stressors over time through the process of stress proliferation (Pearlin 1989). These stressors can cluster together and amplify the effects of stress on sense of self-concepts (e.g., self-efficacy) and mental health (e.g., depressive symptoms). This clustering or proliferation of stressors generally occurs in major social domains, such as the family, and when stressors present and proliferate a more severe impact is expected on the individual, their sense of self, and eventually their mental health (Pearlin et al. 2005). Resources in the form of social supports are also theoretically expected to affect the relationship between stressors and mental health outcomes, in that the presence of these resources can serve to hinder, alleviate, or otherwise minimize the relationship between stressors and self-efficacy and thus the relationship between stressors and mental health outcomes (Pearlin 1999; Pearlin et al. 1981). Herein a global sense of social support, or social provisions, is conceptualized to moderate the model.

Conceptually distinct from social provisions, yet of relatively similar relevance, family-of-origin experiences prior to and during the college transition are crucial to the socio-emotional development and adjustment during emerging adulthood, (e.g., Grolnick 2003). Prior research exploring parent–child relationships in adolescence has suggested that the quality of the parent–child relationship and other family relationships (including dimensions of perceived understanding and attention; Moon and Rao

2010) and parental behavior (such as perceived nurturance and rejection; MacPhee and Andrews 2006) serve as predictors of depression. The enduring influence of an adverse family environment on later adolescent depression is hypothesized to spill over into emerging adulthood, even when the individual is no longer in the home. The influence of various family characteristics, dynamics, and relationships on adolescents' mental health outcomes, and specifically depression, has been fairly well established. Specific aspects of family environment that have been linked to depression leading up to and during emerging adulthood, include the *childhood family environment* (Wickrama et al. 2008), *parental support* (Turner et al. 2001), and *parental psychological control* (Kakihara et al. 2010). These important aspects of the family are most often examined individually. No studies to date could be found that examine the family environment dynamically and measured as the combined effect of these factors as a single amalgamated source of stress on individual mental health.

Childhood family environment can be defined as a family milieu, comprised of dynamic characteristics and qualities of relationships between family members. The family environment is a particularly salient domain of influence for individual family members and can act as a source of great support and stability or as a source devastating stress, depending upon the nature of the environment and the relationships (Pearlin 1993). Family-of-origin adversity (e.g., negative life events surrounding family) and ineffective parenting (e.g., rejection) during early adolescence predict depression and difficulty in transitioning to adulthood (Wickrama et al. 2008). Adverse family environments predispose adolescents and emerging adults to perceived rejection and lower psychological adjustment (Turner et al. 2001). The foundations for constructing a social support network also begin at home; the quality of familial relationships during childhood can either prepare emerging adults to create healthy social connections or prevent them from developing positive social skills (Grolnick 2003).

Individuals that perceive a lack of parental support (social, financial, and academic) in the transition to college experience a sense of loneliness, which increases anxiety and depression (Mounts et al. 2006), whereas those who experience parental social support experience greater ease in adapting to their new environment (Holahan et al. 1994). A supportive family-of-origin, and specifically supportive parents, has been linked with lower levels of depression, anxiety, and loneliness (Turner et al. 2001). Those who experience low levels of parental support during mid to late-adolescence and emerging adulthood experience higher levels of depression over time, and those who experience depression during mid to late-adolescence report lower levels of parental support during emerging

adulthood (Needham 2008), indicating a chronic, cyclical relationship between parental support and depression.

In order to achieve healthy development during emerging adulthood, one must develop the ability to act autonomously and make competent decisions, independent of their parents (Grolnick 2003). Emerging adults who perceive their parents to be supportive of their autonomy, as opposed to parents exerting control over their decisions, experience greater ease during the adjustment to emerging adulthood (Chirkov and Ryan 2001). The quality of relationships within the family either helps or hinders emerging adults in developing a sense of autonomy (Grolnick 2003). From senior year of high school to the end of sophomore year of college some emerging adults experience a decline in both academic and emotional adjustment, influenced in part by the parent–child relationship. Those who were poorly adjusted at the end of their sophomore year tended to report that their parents restricted or failed to support their autonomy compared to well-adjusted emerging adults (Duchesne et al. 2007).

Living away from home and in college is an autonomous experience, where emerging adults must learn to function on their own without daily aid and reduced or diminished resources from their family. Even those who remain in the home after high school generally take on more independent roles, including work force participation. Emerging adults who experience little autonomy and have been unable to achieve autonomous mastery tend to experience higher levels of depression (Beck et al. 2003; Hasan and Power 2002). Adolescents who experience perceived parental rejection experience depressive symptoms in late-adolescence and emerging adulthood, with the relationship strongest for those who perceive their parents to use psychological control (Magaro and Weisz 2006).

Many studies find relatively low levels of parental psychological control in general during emerging adulthood (Luyckx et al. 2007; Urry et al. 2011). For emerging adults who do have psychologically controlling parents adverse consequences can include deteriorated active coping skills and/or more highly avoidant coping skills (Abaied and Emond 2013). Adolescents who feel over-controlled by their parents, specifically feeling restriction and coldness-rejection, experience more depressive symptoms (Kakihara et al. 2010). Schiffrin et al. (2014) not only found that controlling behaviors, such as helicopter parenting, which may prevent the development of autonomy, increase levels of depression, but that this relationship happens through a decreased sense of self competence, a variable closely related to self-efficacy.

Within the stress process framework, stressors are postulated to affect mental health through self-concepts (Pearlin et al. 1981). Although self-concepts can be

conceptualized in many ways, including constructs of self-esteem, mastery, and self-efficacy among others, the application of any of these concepts can be understood as protective or destructive mechanisms that relate to the actor's mental health outcomes. Having the ability to maintain self-concepts and a strong sense of self can act as internal coping resources in the effort to protect individuals from the impact of stressors (Thoits 2010). However, stressors, especially persistent clusters of stressors, which emerge from particularly salient domains, have the potential and are often hypothesized to deteriorate self-concepts over time (Pearlin 1989; Pearlin et al. 1981). Internal sources of coping, which protect the individual from the impact of stressors, are inseparably tied to the ability of the individual to maintain a sense of self-concepts in the presence of stressors. As such, self-concepts, which appraise the individual's self-abilities (e.g., mastery and self-efficacy), are concepts which are frequently understood and expressed in unison with otherwise separate constructs of internal coping resources (Pearlin 1999).

The impact of deteriorated sense of self-concepts is evident in the literature. Self-esteem is the strongest predictor of depression in early adolescents (MacPhee and Andrews 2006). Wei et al. (2005) findings indicate that emerging adults with lower levels of perceived self-efficacy experience depression at higher rates. How individuals are able to actively negotiate and cope with stressors can serve in large part to determine the ways in which the stressors will affect them (Pearlin and Lieberman 1979). Possessing self-concepts which promote the development of behaviors useful in problem-solving and coping, such as self-efficacy, may alleviate or buffer stress, whereas those who lack these concepts may have difficulty exercising personal agency over otherwise controllable sources of stress (Thoits 2006).

The presence of strong social supports are crucial as emerging adults maneuver the transition towards independence. Experiencing various forms of stress during this time is inevitable, yet, having adequate social supports can act as a stress-buffer against adverse outcomes (Cohen 2004). In times of primary school transition, adolescents were found to develop higher feelings of self-worth over time when receiving high levels of peer social support (Fenzel 2000), a mechanism that may also exist during the transition to college. Individuals can utilize social support as a coping mechanism, which can serve to reduce the effects of stressors on mental health outcomes. Theoretically, the dimensions of support quality (e.g., trust, concern, dependability) should act as more influential buffers than the extensiveness of the support network (Pearlin et al. 1981). Perceived peer support can protect against negative outcomes of stressors in addition

to decreasing the likelihood of sustaining poor mental health outcomes, such as depression. Emerging adults that perceive support from high quality peer networks are less vulnerable to stressors (Chao 2012) and experience overall high levels of well-being during the autonomy mastery process (Hefner and Eisenberg 2009; Sherman et al. 2006).

Taken together, familial, internal, and interpersonal factors have strong implications for the psychological health of emerging adults in their transition to college. Our current study advances the field in a number of ways: (1) we utilize a stress process framework to explore the impact of adverse family influences, and (2) we apply an innovative approach to conceptualizing the family environment. Using latent class analysis, we capture experiences of one's family-of-origin during childhood and current parental interactions (parental support and parental psychological control). By integrating these three influential aspects of the family, we are able to model a dynamic, multi-dimensional representation of the family. Due to the possible connection between living situation and self-efficacy among emerging adults experiencing the transition to college we controlled for participant living situation. Bozick (2007) found that first year college students who lived on campus demonstrated significantly greater persistence, an element conceptualized herein to comprise self-efficacy, than first year college students who lived with parents or family members. Furthermore, emerging adults' living situation during this transitional period has been found to relate to depressive symptomology, with some research indicating that college students living with their parents or guardians are more likely to experience suicidal thoughts than students living independently near campus (Eisenberg et al. 2007). By controlling for participant living situation we are able to further understand how the transition to college and the redefining of parent-child relationships impact college students. Finally, this work focuses on the development of leverage or intervention points to be used by service providers working with emerging adults. Our first hypothesis predicts that having an adverse family environment would be associated with higher levels of depressive symptoms. We predicted this relationship would be mediated by self-efficacy, such that high levels of adverse family environment would be related to poorer self-efficacy and poorer self-efficacy related to higher levels of depressive symptomology. Our second hypothesis suggests that high levels of social provisions would moderate this model, such that, higher social provisions will attenuate the relationships between adverse family environment, self-efficacy, and high depressive symptoms.

Method

Participants

Participants were students ($N = 154$) enrolled in an introductory family studies class at a southeastern, United States University. The course fulfills a university-wide liberal studies requirement needed to graduate, thus students from across disciplines were enrolled. The majority of the participants were female ($n = 122$; 79.2 %). Nearly three quarters of participants reported their race/ethnicity as Caucasian/White ($n = 111$; 72.1 %); fewer reported their racial/ethnic background as African American/Black ($n = 17$; 11.0 %), Hispanic/Latino ($n = 18$; 11.7 %), Asian American ($n = 2$; 1.3 %), Native American ($n = 2$; 1.3 %), or biracial ($n = 4$; 2.6 %). Almost half of the participants were in a committed, romantic relationship ($n = 67$; 43.5 %), and few lived with one or more of their parents ($n = 22$; 14.3 %).

Procedure

Students were offered a variety of active engagement projects to participate into earn supplemental class credit (approximately 1 % of the final grade). One of the active engagement projects was participating in this study on the well-being of emerging adults; other active engagement projects included, but were not limited to attending community events and gathering media clips related to class material. Students had a 1-week window to complete the online questionnaire. Approval was granted from the University's Institutional Review Board. Participants gave their consent to participate in the study. Participants were allowed to stop the survey at any time and/or skip any items in which they did not want to answer, although there was very little missing data (<3 %).

Measures

Adverse Family Environment

A latent variable comprised of the following three empirically-based factors was created and served as the primary predictor variable.

Adverse Childhood Family Environment The Childhood Family Environment Scale (DRRI; King et al. 2003; King et al. 2006) is a 15-item measure in which the participant indicates the degree to which he or she agrees or disagrees with a series of statements assessing the dynamics and qualities characterizing family members' relationships in their family-of-origin. Sample items included: "Family members felt uncomfortable with each other," and "Family

members yelled when they were angry with each other,” with responses ranging from 1 (*Almost none of the time*) to 5 (*Almost all of the time*). Higher scores indicate more conflict and interpersonal adversity in one’s childhood family environment (full sample: $M = 2.29$, $SD = .78$, $\alpha = .92$).

Parental Support The five-item Social Support Subscale from the Quality of Relationships Inventory (Pierce et al. 1991) was adapted to measure perceived parental emotional support. Sample items included: “To what extent can you turn to a parent (or parent figure) for advice about problems?” and “To what extent can you turn to a parent (or parent figure) to listen to you when you are very angry at someone else?” Responses ranged from 1 (*Not at all*) to 4 (*Very much*). Higher scores indicate more perceived support (full sample: $M = 3.35$, $SD = .78$, $\alpha = .93$).

Parental Psychological Control A five-item Monitoring Scale from Patterson and Stouthamer-Loeber (1984) was adapted to assess the perceived use of parental psychological control. Sample items included: “My parents (parent-figures) are people who would like to be able to tell me how to feel or think about things all the time” and “My parents (parent-figures) are people who bring up past mistakes when they criticize me,” with responses ranging from 1 (*Not at all*) to 4 (*Very much*). Higher scores indicate greater levels of parental psychological control (full sample: $M = 1.66$, $SD = .64$, $\alpha = .83$).

Self-Efficacy

The General Self-Efficacy Scale (GSES-12; Bosscher and Smit 1998; Sherer et al. 1982) was a 12-item measure used to assess an individual’s appraisal of his or her own abilities on dimensions of initiative, effort, and persistence; this variable served as the mediator. Sample items include: “Failure just makes me try harder,” and, “If I can’t do a job the first time, I keep trying until I can,” with responses ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Higher scores reflect greater self-efficacy (full sample: $M = 3.79$, $SD = .60$, $\alpha = .87$).

Depressive Symptoms

A ten-item abridged version of the CES-D (Radloff 1977; Irwin et al. 1999) was used to assess the participant’s current level of depressive symptoms and served as the study outcome variable. Participants were asked to indicate, referencing the prior week, how frequently they felt or behaved in a particular way. Sample items include: “I felt sad,” and “People were unfriendly.” Responses ranged from 1 (*Rarely or none of the time*) to 4 (*Most or all of the*

time). Higher scores indicate greater depressive symptomology (full sample: $M = 1.82$, $SD = .51$, $\alpha = .79$).

Social Provisions

Three subscales from the Social Provisions scale were utilized to examine perceived social connections (Reliable Alliance, Social Integration, and Attachment; Cutrona and Russell 1987). This Affectional Ties measure emphasizes an important aspect of social provisions, the role of close friendships, and it demonstrates greater reliability and predictive ability with adolescents and emerging adults compared to the full Social Provisions scale (Lucier-Greer et al. 2014; Motl et al. 2004). These three subscales (12-items) are used to assess various dimensions of the participant’s network of social relationships, including the presence of a reliable alliance, general social integration, and attachment to an important other. Sample items include: “There are people I can depend on to help me if I really need it,” and “I feel a strong emotional bond with at least one other person.” Responses ranged from 1 (*Strongly disagree*) to 4 (*Strongly agree*). Higher scores reflect more social provisions ($M = 3.48$, $SD = .50$, $\alpha = .91$). The measure was used as the moderating variable and dichotomized to reflect those who reported high levels of social provisions (e.g., the presence of important others to turn to, feeling socially integrated) and those who reported lower levels social provisions. This sample displayed overall relatively high levels of social provisions (median = 3.67). To provide a meaningful comparison with the sample available, we compared those who reported the highest social provisions (i.e., the top 40 % of the sample; $n = 67$; $M = 3.91$, $SD = .10$) to those who reported lower levels of social provisions (i.e., the bottom 40 % of the sample; $n = 63$; $M = 2.96$, $SD = .37$).

Current Living Situation

The status of one’s current living situation was controlled for in the model. Participants were asked to indicate with whom they currently live. Responses were categorized as “living with family” or “living outside the family home.” More than four-fifths of the sample lived outside the family home (85.7 %).

Data Analyses

A series of latent variable structural equation models were conducted using AMOS 21. To address hypothesis one, a mediation model was fitted such that adverse childhood environment was hypothesized to predict depressive symptoms through self-efficacy. The Sobel test was used to

test the significance of the mediation effect. Then, a moderated mediation model was fitted to explore if and how the model differs based on one's level of social provisions (high levels of social provisions versus lower levels of social provisions). For the moderated model, two models were simultaneously computed, a model in which structural parameters were constrained to be equal across the groups and the other where the parameters were allowed to vary freely. A non-significant Chi-square difference test would suggest that the equality constraints were consistent with the data and, thus, no difference exists between the social provision groups.

Full information likelihood estimations were used to simultaneously examine multiple relationships in the same model and account for missing data (<3 %). Three goodness-of-fit statistics were used: the χ^2/df ratio, CFI, and RMSEA. A χ^2/df ratio below or around 3.0 generally indicates acceptable model fit (Carmines and McIver 1981). When the CFI is close to or >.95, it is believed to indicate good model fit (Hu and Bentler 1999). RMSEA values below .05 represent close fit (MacCallum et al. 1996); values between .05 and .08 indicate fair fit (Browne and Cudeck 1993); and values between .08 and .10 suggest mediocre fit (MacCallum et al. 1996).

Results

Descriptive statistics and correlations for the observed variables are provided in Table 1. A measurement model was first fitted to examine the reliability and goodness-of-fit of the latent variable, adverse family environment. As noted in Table 1, the three indicators (adverse childhood family environment, parental support, and parental psychological control) were moderately and significantly correlated (ranging from .426 to .603) indicating related but distinct constructs. Factor loadings ranged from .688 to .748, indicating strong factor loadings.

Next the structural model, specifically a latent variable mediation model, was fitted to examine the impact of adverse family environment on self-efficacy and, subsequently, depressive symptoms. Model fit was fair (χ^2/df ratio = 1.92; CFI = .95; RMSEA = .07). Adverse family environment was significantly related to self-efficacy ($\beta = -.20$, $p = .026$), and self-efficacy was significantly related to depressive symptoms ($\beta = -.24$, $p = .001$). The control variable, current living situation, was included within the model, but was non-significant in predicting adverse family environment, self-efficacy, and depressive symptoms. The Sobel test was utilized to examine the statistical significance of the mediating effect. The post hoc analysis revealed that self-efficacy significantly mediated the path between adverse family environment and depressive symptoms ($z = 1.96$, $p = .050$).

Next, a moderated mediation model was fitted to see if the model fit similarly among emerging adults with high levels of social provisions and those with lower levels of social provisions. Overall model fit model was good (χ^2/df ratio = 1.68; CFI = .95; RMSEA = .04). Coefficients for the high social support and low social support group can be found in Fig. 1. To assess differences among those with high levels of social provisions and those with lower levels of social provisions, this analysis allowed for a concurrent comparison of two models. The first model constrained the structural paths of the SEM to be equal across groups ($\chi^2 = 28.57$, $df = 15$), and the second model allowed the paths to vary across family structure groups ($\chi^2 = 20.17$, $df = 12$). From the results of the $\Delta\chi^2$ test, there was an overall statistically significant difference in the model fit among the two groups [$\Delta\chi^2 = 8.40$, $\Delta df = 3$; $\chi^2_{critical}$ ($p = .05$, $df = 3$) = 7.82; $8.40 > 7.82$]. Further evaluation of each of the paths and the critical ratio for differences between parameters revealed that there was a significant difference in the relationship between adverse family environment and self-efficacy ($z = -2.09$); for those with high levels of social provisions, the path was non-

Table 1 Correlation matrix and descriptive statistics for study variables

	1	2	3	4	5	Scale range	α	Mean (SD) high support	Mean (SD) low support
1. Adverse childhood family environment	–	–.426**	.603***	.195	.079	1–5	.92	1.96 (.56)	2.63 (.78)
2. Parental support	–.516***	–	–.524***	–.208	.267	1–4	.93	3.61 (.64)	3.06 (.83)
3. Parental psychological control	.461***	–.464***	–	.232	–.003	1–4	.83	1.48 (.53)	1.86 (.71)
4. Self-efficacy	–.140	.202*	–.149	–	–.161	1–5	.87	3.98 (.55)	3.60 (.61)
5. Depressive symptoms	.407***	–.088	.260**	–.252**	–	1–4	.79	1.58 (.38)	2.10 (.53)

Correlations are presented for participants who reported high levels of social support ($n = 67$; presented above the diagonal) and those who reported lower levels of social support ($n = 63$; presented below the diagonal). Reliability statistics are presented for the full sample ($N = 154$)

* Correlation significant at .05 level; ** correlation significant at .01 level; *** correlation significant at .001 level

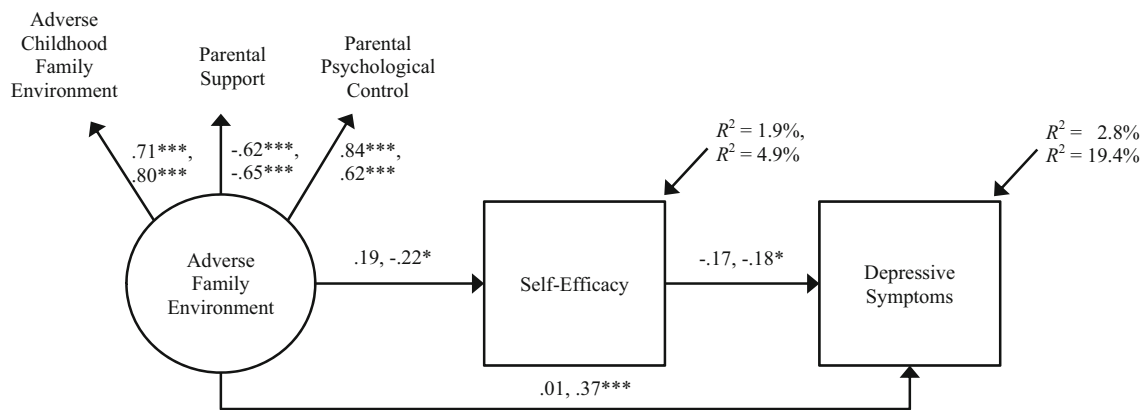


Fig. 1 A moderated mediation model illustrating the relationship between an adverse family environment and depressive symptoms among two groups emerging adults, those with high levels of social provisions and those with lower levels of social provisions. This model also controls for whether the emerging adult participants live

with their parents and the sex of the participants, although not illustrated. *Notes* * $p < .05$, *** $p < .001$. In the unconstrained model presented above, path coefficients are standardized and are listed for those with high levels of social provisions first and those with lower levels of social provisions second

significant ($\beta = .19$, $p = .122$), and for those with lower levels of social provisions, the path was significant ($\beta = -.22$, $p = .050$). There was also a significant difference in the path between adverse family environment and depressive symptoms ($z = 1.96$); for those with high levels of social provisions, the path was non-significant ($\beta = .01$, $p = .945$), and for those with lower levels of social provisions, the path was significant ($\beta = .37$, $p = .002$). Differences in the predictive nature of the model were also apparent across the two social provision groups. For those with high levels of social provisions, the model accounted for 1.9 % of the variance in self-efficacy and 2.8 % of the variance in depressive symptoms. For those with lower levels of social provisions, the model accounted for 4.9 % of the variance in self-efficacy and 19.4 % of the variance in depressive symptoms.

Discussion

The purpose of this study was to examine the enduring impact of an adverse family environment on emerging adult depressive symptomology through the deterioration of self-efficacy. In addition, the moderating effects of social provisions, conceptualized as representing social support, were examined. Our study adds to extant literature that explores the impact of parent–child relationships on adolescent and emerging adult depressive symptoms (Kakihara et al. 2010; MacPhee and Andrews 2006; Moon and Rao 2010; Turner et al. 2001; Wickrama et al. 2008) by conceptualizing multiple sources of environmental and family-related stress as a latent variable which considers one’s childhood family environment, parental support, and parental psychological support. By using this latent

variable, herein referred to as an adverse family environment, rather than isolating individual components of family life, we capture the dynamic nature of stress and stress proliferation specific to the family environment, in the context of experiencing the transition to college. This environment encompassed not just what it was like for individuals growing up within their family, but how those family dynamics perpetuated aspects of the parent–child relationship (lack of parental support and psychological control) over time into emerging adulthood and their current situation in the transition to college. As demonstrated, family environment has an enduring impact on emerging adults, resulting in higher rates of depressive symptoms among those with more adverse family environments. This finding suggests that not only are negative dynamics of parent–child relationships and family characteristics harmful to adolescents’ mental health (MacPhee and Andrews 2006; Moon and Rao 2010), but this link continues to have a detrimental impact into emerging adulthood, even when individuals are no longer in their family-of-origin environment.

The results also indicate that the relationship between an adverse family environment and emerging adult depressive symptoms is partially mediated by self-efficacy (according to Baron and Kenny 1986), providing support for the first hypothesis. Theoretically, the stress process framework holds that chronic stressors act to erode self-concepts which in turn deteriorate mental health (Pearlin et al. 1981). Previous studies have found the detrimental link of negative parent–child relationships (i.e., availability, involvement, and relational quality) to adolescent self-esteem (Bulanda and Majumdar 2009), with the current findings suggesting this relationship continues to impact individuals throughout emerging adulthood. An adverse

family environment, acting as a source of chronic stress, and amplified by the discrete life event of the transition to college, erodes self-efficacy, which increases vulnerability and diminishes one's ability to cope with these stressors. Although stressors can serve to deteriorate self-concepts, the presence of and ability to maintain self-concepts, such as self-efficacy, promotes the development of behaviors useful in problem-solving or coping strategies that may alleviate stressful environments (Thoits 2006). Being able to maintain self-concepts in the presence of stressors demonstrates an individual's internal abilities to cope with these sources of stress (Pearlin 1999). Previous studies have found low self-efficacy to be a predictor of adolescent and emerging adult depression (MacPhee and Andrews 2006; Wei et al. 2005) with the current study providing support for this notion. However, in addition, self-efficacy can act as a mechanism through which risk factors, such as having an adverse family environment, can negatively affect mental health outcomes. Recognizing the importance of self-efficacy in the relationship between an adverse family environment and emerging adult depressive symptomatology, provides practitioners a point of intervention in working with emerging adults that may be facing stressful family situations. Clinicians should assess for self-efficacy levels when creating treatment plans for emerging adults who present with depressive symptoms and express family-of-origin issues.

Although the findings indicate that the family environment can have an enduring impact on emerging adults' mental health, there are external resources (conceptualized as social provisions) that can mitigate this relationship. The moderating impact of social support indicates that having a support network can alleviate the deteriorating effect of an adverse family environment on self-efficacy and depressive symptoms. This finding extends the scope of prior research, which has found a link between social support and mental health outcomes for primary school transitions (Fenzel 2000), suggesting that this process operates similarly for emerging adults in the transition to college. The conceptualization of social provisions used in this study allowed for a broad understanding of social support in contrast to other studies that have looked at a specific area of support, such as peer (Chao 2012; Fenzel 2000) or sibling support (Sherman et al. 2006). Interestingly, researchers who have examined excessive parental support, through mechanisms such as over-involvement or helicopter parenting, have found that high levels of parental involvement increase levels of depression (Schiffrin et al. 2014; LeMoyne and Buchanan 2011), indicating the necessity to investigate the adequacy of support systems and the perceived helpfulness of that support. Examining support from particular relationships (e.g., romantic partner, peers) can provide limited information as appraisals of support from these particular

relationships may not translate to a global sense of social support. Although individuals may lack social support in certain areas or from certain relationships, if they feel a sense of overall support or the sense that they have someone to turn to, it may be enough to alleviate the negative impact of an adverse family environment, regardless of the source of that support. Comparing model fit of the highest social support group (top 40 % of the sample) to the lowest social support group (bottom 40 % of the sample) allowed us to explore the presence of adequate social support. Perceived adequacy of support has been found to be more important than the actual availability or amount of support; it is more important to feel that one receives the amount of support they need or desire (Henderson et al. 1981). In this way, comparing high and low social support groups allowed us to explore differences between those who felt their social support needs were completely met as compared to those who felt as though their social support needs were not adequately met. Although participant scores on the Social Provisions measure in the low social support group were relatively high, this is a common finding among college students, where the majority of students report receiving high social supports (Hefner and Eisenberg 2009). It appears that the mere presence of perceived social support is not enough to buffer the influence of chronic family stressors; rather individuals must feel that all of their needs are met in order for the suppression of stressors to occur. The benefits of being immersed within a strong supportive network may provide practitioners a central point of intervention when serving this population. Education related to the importance of creating a supportive network should be incorporated into clinical work with these individuals, in addition to providing them with local resources that may act as a support network. Clinicians should also assess for individual barriers that may keep these individuals from maintaining social connections. A lack of social provisions and meaningful connections should raise warning flags among service providers.

Although this study provides new insight in the study of emerging adulthood, there are factors to consider in interpreting these findings. First, caution is warranted in the interpretation of causality given the cross-sectional nature of the data. Although the study is not longitudinal, the nature the adverse family environment measure as compared to the measures of self-efficacy, social provisions, and depressive symptoms suggests an underlining proximal order. Regardless, future studies should consider longitudinal designs to capture the dynamic nature of the stress process and the effects of chronic stress on self-concepts and mental outcomes over time. Second, the predominantly female sample may have overestimated the relationship of social support on adjustment due to prior research that

suggests that social support is particularly important for female adjustment (Asberg et al. 2008). Future studies should consider using a more diverse sample, specifically examinations among groups with more challenging family environments and mental health problems, although incumbent with this suggestion, additional consideration must be given to elements of social and economic status. It would serve future researchers well to consider the structural factors that may affect pathways and associations between stress, self-concepts, and mental health outcomes. Also, although the relationship between adverse family environment and self-efficacy was not significant amongst the high social support group, the findings suggested a positive relationship between constructs. This indicates an emerging trend in how self-efficacy is established and maintained for those who perceive themselves as having social support needs met. Future studies should examine this relationship to identify mechanisms that may influence this relationship.

Third, the method of defining high and low social support in this study was acceptable to measure adequacy of social support, however the use of a quartile split may have produced a stronger moderating effect. Future research could compare groups with a strong, constant sense of social support to those who greatly lack social support. It may also be useful to consider three separate groups; those with constant social support, moderate social support, and no social support. Fourth, the measure of parental psychological control was intentionally selected so as to examine general control in the parent–child relationship, with the forethought that the transition to college presents a period of time where emerging adults are becoming more independent and autonomous. Future research may be served well to include a more specific measure that examines controlling parental behaviors specific to emerging adulthood, such as a helicopter parenting measure.

Finally, only the influence of positive social supports were examined without accounting for possible negative social influences, such as deviant peer relationships. Considering both positive and negative social influences may have provided further support for the moderating effects of these social influences. In addition, social support was conceptualized using only three subscales of the Social Provisions scale, which comprised Affectional Ties (Cutrona and Russell 1987; Motl et al. 2004). This measure is beneficial in its ability to capture a global view of social support, yet it does not evaluate individual sources of support (e.g., peer support, romantic relationship support, family support). However, the evaluation of social support in a global context, rather than isolating individual forms of support, allows one to gain understanding of the perceived existence and quality of the support network, in any form.

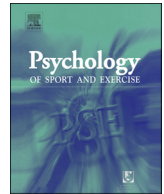
Future consideration should be given to other elements of social support, including the positive and negative elements of specific important relationships, although careful attention should be given to capturing a global sense of social support, especially when examining sources of stress from domains that inherently can be related to social support, specifically the family.

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Teachers become more autonomy supportive after they believe it is easy to do[☆]



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ABSTRACT

Objective: Several carefully designed autonomy-supportive intervention programs (ASIPs) have shown that PE teachers can learn how to become significantly more autonomy supportive toward students. The present study investigated why these ASIPs work. We hypothesized that ASIPs work to the extent they help PE teachers conceptually change their beliefs about how effective and how easy-to-implement autonomy-supportive teaching is.

Design: The design was both experimental and longitudinal.

Method: Forty-two full-time PE teachers (30 males, 12 females) from 42 different Korean secondary schools were randomly assigned into either an experimental (intervention) or control group, and we assessed three measures of autonomy-supportive teaching as dependent measures and the two beliefs about autonomy-supportive teaching as predictor variables at the beginning and end of a 17-week semester. **Results:** Teachers in the experimental group showed significant end-of-semester increases in all three measures of autonomy support (η^2_p ranged from .23 to .34) and in both beliefs about autonomy support (η^2_p ranged from .29 to .39). Most importantly, mediation analyses showed that it was intervention-induced changes in the easy-to-implement belief that fully explained the post-intervention increases in autonomy support.

Conclusion: We suggest that ASIPs work by helping teachers revise their belief about autonomy-supportive teaching from “it is hard and difficult” to “it is actually quite feasible and easy—once one knows how to do it.”

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According to self-determination theory (SDT), people possess inherent psychological needs that, when appreciated and supported by the social context, are fully capable of energizing their engagement, positive functioning, and well-being (Deci & Ryan, 1985; Ryan & Deci, 2000). The social context best appreciates and supports people's psychological needs through the provision of autonomy support (Deci, Schwartz, Sheinman, & Ryan, 1981; Reeve, 2009). When autonomy supportive, PE teachers, athletic coaches, and exercise instructors tend to (1) take the perspective of their students, athletes, and clients (e.g., conduct formative assessments to ask what they want, need, think, and prefer); (2) introduce

activities that vitalize and support (rather than neglect or frustrate) the psychological needs; (3) provide explanatory rationales for their requests; (4) communicate using informational (rather than pressuring) language; (5) acknowledge and accept expressions of negative affect; and (6) display patience (Assor, Kaplan, & Roth, 2002; Deci, Eghrari, Patrick, & Leone, 1994; Reeve, 2009, 2015a). These six acts of autonomy-supportive behavior are all positively intercorrelated, mutually supportive, and synergistic (Cheon, Reeve, Yu, & Jang, 2014; Deci et al., 1994). Collectively, they convey an interpersonal message of support and understanding (e.g., “I am your ally; I am here to support you and your strivings.”) that others generally find to be need supportive (Reeve, 2015b).

In the context of PE instruction, teacher-provided autonomy support benefits both students and teachers. As to student benefits, students taught by autonomy-supportive PE teachers, compared to those taught by non-autonomy-supportive PE teachers, experience higher-quality motivation (i.e., greater need satisfaction and greater autonomous motivation, lesser need frustration and lesser amotivation) and display numerous educational benefits, such as greater

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classroom engagement, conceptual learning, skill development, academic achievement, and psychological well-being (Assor et al., 2002; Chatzisarantis & Hagger, 2009; Cheon & Reeve, 2013, 2015; Cheon, Reeve, Lee, & Lee, 2015; Cheon, Reeve, & Moon, 2012; Vansteenkiste, Simons, Lens, Soenens, & Matos, 2005). Further, PE students' high-quality (autonomous) motivation has been linked to multiple indicators of their classroom and leisure time physical activity levels (e.g., accelerometers, pedometers, heart rate, self-report, raters' observations; Owen, Smith, Lubans, Ng, & Lonsdale, 2014). As to teacher benefits, PE teachers who participate in ASIP, compared to PE teachers in a no-intervention control group, report greater post-intervention teaching motivation (need satisfaction, autonomous motivation, and intrinsic goals), teaching skill (teaching efficacy), and teaching well-being (vitality, job satisfaction, lesser emotional and physical exhaustion) (Cheon et al., 2014). As SDT researchers became increasingly aware of the benefits of autonomy-supportive teaching, they began to design intervention programs to help PE teachers learn how to become more autonomy supportive during instruction.

1. Autonomy-supportive intervention programs (ASIPs)

An autonomy-supportive intervention program (ASIP) is a step-by-step plan of action to help teachers become more autonomy supportive toward students. When PE teachers participate in carefully-designed, theory-based (self-determination theory) ASIPs, they learn how to become more autonomy supportive (Aelterman, Vansteenkiste, Van den Berghe, De Meyer, & Haerens, 2014; Chatzisarantis & Hagger, 2009; Cheon & Reeve, 2013; Cheon et al., 2012, 2014; Edmunds, Ntoumanis, & Duda, 2008; Fenner, Straker, Davis, & Hagger, 2013; Moustaka, Vlachopoulos, Kabitsis, & Theodorakis, 2012; Reeve, Jang, Carrell, Jeon, & Barch, 2004; Tessier, Sarrazin, & Ntoumanis, 2008). Further, these intervention-enabled changes in teachers' autonomy-supportive motivating style tend to be more than just temporary or situationally-induced changes, because follow-up investigations show that these teachers continue to show a highly autonomy-supportive style one year later (Cheon & Reeve, 2013; Reeve et al., 2004). The conclusion from about a dozen carefully designed and implemented ASIPs is that these teacher-focused interventions produce large and enduring effect sizes (Reeve & Cheon, 2014).

Given the rather large supportive literature on the utility of ASIPs, we investigated the new question of, "Why do these interventions work?" Answering this question is important because doing so will enable a better and more sophisticated understanding of the antecedents of developing a more autonomy-supportive style, and it will also enable educators to design and implement enhanced professional developmental opportunities, including not only formal intervention programs but also teacher-focused workshops, in-service programs, and mentoring programs.

Many factors explain why teachers might (or might not) adopt a more autonomy-supportive style toward students, including the social context in which they teach (Taylor, Ntoumanis, & Smith, 2009), the characteristics of the students they teach (Pelletier, Séguin-Levesque, & Legault, 2002), administrative supports vs. pressures (Pelletier & Sharp, 2009), pre-service and in-service training experiences (Woolfolk & Hoy, 1990), the extent to which their own psychological needs are satisfied vs. thwarted during teaching (Taylor, Ntoumanis, & Standage, 2008), personality dispositions (Van den Berghe et al., 2013), the culture in which they live and teach (Downie, Koestner, ElGeledi, & Cree, 2004), and the beliefs they hold about autonomy-supportive teaching (Roth & Weinstock, 2013). Most of these influences are not very malleable and few can be addressed in an intervention program. The glaring exception is teachers' beliefs about autonomy-supportive teaching.

2. Beliefs about autonomy-supportive teaching

Previous research reveals that three specific beliefs underlie teachers' high vs. low tendency toward autonomy-supportive teaching (Aelterman et al., 2014; Reeve, 1998; Reeve et al., 2014; Roth & Weinstock, 2013). These three beliefs are that autonomy-supportive teaching is (a) an effective way to motivate and engage students ("effectiveness belief"), (b) relatively easy to implement during instruction ("easy-to-implement belief"), and (c) a culturally normative way to teach ("normative belief").

The effectiveness belief reflects the teacher's judgment that students benefit in terms of motivation, engagement, learning, and achievement when teachers offer autonomy-supportive teaching. The easy-to-implement belief reflects the teacher's judgment that autonomy-supportive teaching is easy (vs. difficult) to do during instruction, as teachers see it as a feasible (plausible), time-efficient, and practical (not just idealistic) way to motivate and engage students. The normative belief reflects the teacher's judgment that autonomy-supportive teaching is an accepted, expected, and commonplace way to motivate and engage students among one's peer teachers.

When an ASIP produces positive effects, it does so by helping teachers work through an accommodation process (i.e., conceptual change) about how they think about their motivating style toward students (Reeve, 1998). For instance, many teachers harbor a not-so-positive view of autonomy-supportive teaching (Turner, 2010; Turner, Warzon, & Christensen, 2011). For these teachers, conceptual change is difficult and not at all certain (Weinstein, Madison, & Kuklinski, 1995), largely because these teachers harbor pre-existing beliefs that oppose autonomy-supportive teaching (i.e., namely, that it is a generally ineffective, difficult-to-implement, and culturally non-normative approach to instruction; Reeve, 1998). We focused on teachers' beliefs about autonomy-supportive teaching because findings from the conceptual change literature show that teachers' willingness to adopt practically any new teaching practice is a function of their motivational beliefs (Pintrich, Marx, & Boyle, 1993) and their judgments of how useful and feasible the new teaching practice is believed to be (Posner, Strike, Hewson, & Gertzog, 1982).

To help teachers work through what may sometimes be a difficult conceptual change process, we designed the present ASIP to focus on the two pivotal teacher beliefs of (a) how effective (vs. ineffective) and (b) how easy-to-implement (vs. difficult-to-implement) autonomy-supportive teaching is believed to be (Reeve et al., 2014). That is, we designed the ASIP in the current study to produce a significant main effect to enable positive changes in teachers' beliefs about how effective and how easy-to-implement autonomy-supportive teaching is believed to be (once one knows how to do it).

We assessed both teacher beliefs at the beginning and end of the semester, and we examined the relations of both beliefs to teachers' autonomy-supportive teaching at the beginning of the semester and to changes in autonomy-supportive teaching at the end of the semester. We expected both beliefs to be significantly correlated with teachers' initial endorsement of autonomy-supportive teaching, because this result has been reported in the literature (Aelterman et al., 2014; Reeve et al., 2014). But the focus of the present study was on the contribution of ASIP-induced changes in these beliefs to an end-of-semester change in autonomy-supportive teaching. Specifically, we predicted that a carefully-designed ASIP would produce a large positive main effect to change both the effectiveness and the easy-to-implement beliefs, and also that the ASIP-induced changes in these two beliefs would answer and explain our driving research question, which as "Why do ASIPs work to help teachers become more autonomy supportive?"

3. Hypotheses

3.1. Hypotheses 1 and 2

Hypotheses 1 and 2 predicted that the ASIP would produce its intended effect of increasing autonomy-supportive teaching. Hypothesis 1 (H1) used students' ratings of their teachers: *Students of teachers who participate in ASIP, compared to students of teachers who were randomly assigned not to participate in the intervention, would report significantly greater autonomy-supportive teaching from their teachers.* Hypothesis 2 (H2) used teachers' self-ratings: *Teachers who participate in ASIP, compared to teachers who were randomly assigned not to participate in the intervention, would report significantly greater autonomy-supportive teaching.* H1 and H2 were not new predictions, as the main effect of ASIP on changes in teachers' autonomy support has been replicated repeatedly, as confirmed by the dozen or so prior ASIPs reviewed in the introduction. Still, the tests of H1 and H2 were important to the present study for two reasons: (1) to demonstrate that the version of ASIP implemented in the current study was able to produce a large, positive main (direct) effect on changes in autonomy-supportive teaching; and (2) to introduce the three different ways we measured teacher-reported autonomy support in the present study—namely, self-rated autonomy support, personal endorsement of autonomy-supportive teaching, and future intentions to use autonomy-supportive teaching in one's own classroom.

3.2. Hypothesis 3

Hypothesis 3 (H3) predicted that ASIP would increase teachers' beliefs that autonomy-supportive teaching was both effective and easy to do. H3 was that *teachers who participate in ASIP, compared to teachers who were randomly assigned not to participate in the intervention, would report significantly more positive post-intervention effectiveness and easy-to-implement beliefs.*

3.3. Hypothesis 4

Hypothesis 4 (H4) extended the first three hypotheses by predicting that the ASIP-induced changes in teachers' beliefs would fully mediate and explain the otherwise direct effect ASIP observed on changes in teachers' autonomy support. H4 was that *ASIP-induced changes in teachers' effectiveness and easy-to-implement beliefs would fully mediate the otherwise direct effect that ASIP was predicted to have on changes in autonomy-supportive teaching.*

4. Method

4.1. Participants

Teacher-participants were 42 full-time PE teachers (30 males, 12 females) who taught in one of 42 different public schools (26 middle schools, 16 high schools) around Seoul, South Korea. All teacher-participants were ethnic Korean, and all were certified teachers who daily taught 5 to 7 classes in physical education with class sizes that ranged from 33 to 40 students. Teachers averaged 8.0 years of teaching experience ($range = 1–35$ years) and were, on average, 35.2 years of age ($range = 25$ to 58). Each teacher taught the same national curriculum (designated by the Korean National and Educational Curriculum) that featured weekly activities devoted to sport-based physical activities such as softball, soccer, badminton, basketball, loop jumping, table tennis, and track and field. All 42 teacher-participants completed all aspects of the study, including participating in both waves of data collection and, for the teachers in the experimental group, all three parts of ASIP. Thus, the

teacher retention rate throughout the semester-long study was 100%. In appreciation for their participation, each teacher received a gratuity equivalent to \$50.

Student-participants were the 2380 students present in class on the day the student questionnaire was administered. Every student who was in class that day agreed to complete the student questionnaire. All of these students were ethnic Korean. The student sample consisted of the following: 1050 (44%) females and 1330 (56%) males; 1465 (62%) middle school and 915 (38%) high school students; and 1335 (56%) in the experimental group and 1045 (44%) in the control group.

4.2. Procedure

During the summer break, the Korean Ministry of Education (MOE) required all middle and high school PE teachers in the Seoul metropolitan area to participate in a week-long curriculum orientation. During this week, the research team was allowed to administer a brief battery of questionnaires to all 85 attending PE teachers and to invite them to participate in a research study on teachers' classroom instructional strategies. The questionnaire assessed demographic characteristics, the three measures of autonomy support, and three beliefs about autonomy support. As to the research study, teachers were told that their participation would involve, first, random assignment into either an experimental or control condition and, second, two waves of data collection. Most teachers expressed an interest in the study but, in Korea, teachers must first gain the consent and permission of their school principal. In the end, 42 out of the population of 85 PE teachers were willing and able to participate in the study. Importantly, the 42 participating teachers did not differ significantly from the 43 non-participating teachers on any demographic characteristic (i.e., gender, age, grade level taught), on any measure of autonomy support, or on any measure of the beliefs about autonomy support, all t 's < 1.29, ns .

The timeline for the experimental procedure appears in Fig. 1. The population of 85 PE teachers attended the MOE's curriculum orientation in early August. In the month between the curriculum orientation and the start of the academic semester, the sample of 42 participating teachers were identified and then randomly assigned into either the experimental ($n = 23$, 55%) or control ($n = 19$, 45%) group. Two weeks prior to the beginning of the semester, teachers in the experimental group participated in a two-part (morning and afternoon) 6-h ASIP. Part 3 of the ASIP was conducted in one of the three weeks after the midterm exam, which was either week 9 or 10 or 11 of the 17-week semester. Based on teachers' schedules and geographies, we arranged to have each teacher complete Part 3 by participating in one of four group discussions. Again, all 23 teachers in the experimental group (100%) were able to participate in Part 3. It was in week 9 that the students of all 42 participating teachers completed the student questionnaire during the first 5 min of one class.¹ Finally, in the last week of the semester (week 17), all 42 teacher-participants completed the same questionnaire assessing autonomy support and beliefs about autonomy support that they completed four months earlier during the curriculum orientation.

¹ The week 9 assessment of students' perceptions of their teachers' autonomy-supportive style was the only student data collected during the study. We did not collect a baseline measure of students' perceptions. This was because we assumed that random assignment to conditions would yield no significant differences in a beginning of the semester (i.e., baseline) assessment. We assessed the student ratings during week 9 because it takes about one month for students' perceptions of their teacher's motivating style to clarify and stabilize (Deci et al., 1981). The student response rate during this week 9 assessment was 100% (i.e., all students present in class that day volunteered to complete the brief questionnaire).

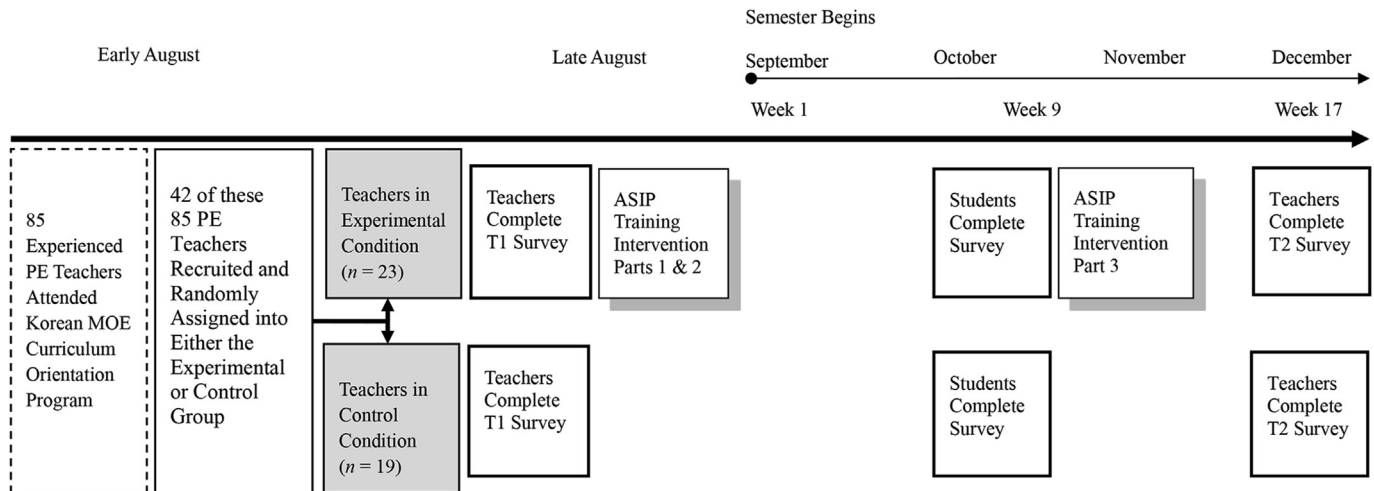


Fig. 1. Procedural timeline for the 2-part autonomy-supportive teacher training intervention and 2 waves of data collection.

All data collected and reported in this investigation are original. That is, while our research team has used a teacher-focused, experimentally-based, longitudinal research design in past publications (e.g., Cheon & Reeve, 2013), the present data are all unique to this particular investigation.

4.3. Autonomy-supportive intervention program (ASIP)

Participation in the autonomy-supportive intervention program (ASIP) constituted the study's independent variable. Part 1 of the ASIP was a 3-h workshop experience. It began with a media-rich PowerPoint presentation to discuss the nature of student motivation (what it is, where it comes from), the autonomy-supportive motivating style, and empirical evidence on the benefits of autonomy-supportive teaching. The two-fold goal was to introduce autonomy-supportive teaching and to support the teacher belief that it was an effective way to motivate and engage students during instruction.

Part 2 of the ASIP was a two-and-a-half-hour workshop experience. It began by introducing six specific acts of autonomy-supportive teaching (summarized later in Table 3) and then modeled their classroom enactment through "how to" examples offered in text, photographs, and video clips of previously-recorded Korean PE teachers skillfully displaying each autonomy-supportive act of instruction. Part 2 concluded with a group discussion to clarify how and when to enact autonomy-supportive instructional behaviors, to provide opportunities for practice and scaffolding, and to provide opportunities for peer-to-peer interpretations, tips, and suggestions. The two-fold goal was to introduce the six specific autonomy-supportive instructional behaviors and to support the teacher belief that each was easy-to-implement—once one knows how to do it.

Part 3 of the ASIP lasted for 2 h. It featured a peer-to-peer group discussion about teachers' early-semester classroom experiences with autonomy-supportive teaching. Teachers reported on what they said and did during instruction, and also on how their students reacted to autonomy-supportive teaching. The discussion led to peer-to-peer tips, suggestions, and clarifications.

4.4. Measures

4.4.1. Student measure

To report perceptions of their teacher's autonomy-supportive motivating style, students completed the Korean-translation (Cheon et al., 2012) of the 6-item short-version of the Learning

Climate Questionnaire (LCQ; Williams & Deci, 1996). The LCQ has been used successfully to assess autonomy-supportive teaching in previous studies (Cheon et al., 2012; Jang, Reeve, Ryan, & Kim, 2009), and it utilized a 7-point response scale (1 = *strongly disagree*, 7 = *strongly agree*). Sample items include, "I feel understood by my teacher" and "My teacher tries to understand how I see things before suggesting a new way to do things." Scores on the LCQ were internally consistent in the present study ($\alpha = .92$).

4.4.2. Teacher measures

At both T1 (prior to the beginning of the semester) and T2 (at week 17, or the end of the semester), teachers reported their extent of autonomy support using three different measures—namely, self-rated autonomy support, personal endorsement of autonomy-supportive teaching, and future intentions to use autonomy-supportive teaching in one's own classroom. In past research, teachers' autonomy-supportive motivating style has been assessed in three different ways (Aelterman et al., 2014; Su & Reeve, 2011): (1) trained raters score teachers' actual autonomy-supportive behavior during classroom instruction; (2) students report their perceptions of autonomy-supportive teaching (as in the paragraph above), and teachers' self-report. While raters' scoring of teachers' autonomy-supportive instructional behavior represents an objective way to assess autonomy support (Aelterman et al., 2014; Cheon & Reeve, 2013; Cheon et al., 2012), the collection of such a measure in the current study was, unfortunately, impractical because the 42 teacher-participants taught in 42 geographically diverse schools that would have required both pre- and a post-intervention ratings to accommodate the pre-intervention/post-intervention research design. For this logistical reason, we elected to utilize only the two remaining previously-validated ways of assessing autonomy support—namely, students' ratings and teacher's self-ratings.

To assess self-rated autonomy support, teachers completed the same Korean-translated version of the 6-item LCQ that their students completed. For the teachers, each item was adapted to be self-referenced, such that the student item "My teacher tries to understand how I see things before suggesting a new way to do things" was adapted to "I try to understand how students see things before I suggest a new way they might do things." The teacher version of the LCQ was internally consistent in the present study ($\alpha = .74$ at T1; $\alpha = .81$ at T2). Teachers' self-ratings correlated significantly with the classroom average of their students' ratings of them on the LCQ, $r(42) = .40$, $p = .008$. Incidentally, students' LCQ scores also correlated significantly with the other two T2 teacher

measures of autonomy support—namely, personal endorsement of autonomy-supportive teaching, $r(42) = .47$, $p = .002$, and future intentions to use autonomy-supportive teaching, $r(42) = .46$, $p = .002$.

To assess personal endorsement of autonomy-supportive teaching, future intentions to use autonomy-supportive teaching in one's own classroom, and the three beliefs about autonomy-supportive teaching, teachers completed the Teaching Scenarios measure (see Reeve et al., 2014, Table 1, page 96). The measure first presents a 263-word description of highly autonomy-supportive teaching that is then followed by 20 questions that referenced that teaching scenario. All 20 items utilized the same 7-point response scale (1 = *strongly disagree*, 7 = *strongly agree*), and the measure has been validated in six different languages, including Korean (Reeve et al., 2014). Four questions assessed personal endorsement of autonomy-supportive teaching in an internally consistent way ($\alpha = .89$ at T1; $\alpha = .94$ at T2): “This approach to teaching describes how I teach my students on a daily basis”; “This approach to teaching nicely describes what I do during class”; “This is an accurate and true description of what I do during my teaching”; and “I do *not* teach this way” (reverse scored). Four questions assessed future intentions to use autonomy-supportive teaching in one's own classroom in an internally consistent way ($\alpha = .86$ at T1; $\alpha = .89$ at T2): “I plan to teach my students this way in the future”; “In the future, I intend to motivate my students this way”; “This approach to teaching nicely describes the way I intend to motivate my students in the future”; and “I do *not* intend to motivate my future students in this way.”

Twelve questions assessed the three teacher beliefs about autonomy support. Four items assessed the effectiveness belief in an internally consistent way ($\alpha = .75$ at T1; $\alpha = .93$ at T2): “This approach to teaching is effective in terms of motivating and engaging students”; “In terms of performance and achievement, students benefit from this approach to teaching”; “I like and think positively of this approach to teaching”; and “This approach to teaching produces good and desirable results—it works!”. Four items assessed the easy-to-implement belief in an internally consistent way ($\alpha = .90$ at T1; $\alpha = .94$ at T2): “This approach to teaching is easy to do”; “Most teachers can do this; it is not asking too much from teachers”; “This approach to teaching is easy and simple (not hard and difficult) to do”; and “This approach to teaching is effortless and easily manageable.” Four items assessed the normative belief in an internally consistent way ($\alpha = .92$ at T1; $\alpha = .91$ at T2): “This approach to teaching describes what most teachers do”; “This approach to teaching is the norm—most of the

teachers I know teach this way”; “This approach to teaching is very typical—most of the teachers I know teach this way”; and “This approach to teaching is common for the teachers I know and work with.”

4.5. Statistical analyses and power analysis

In the test of H1, the dependent measure was students' perceptions of their teachers' autonomy-supportive teaching. Because the unit of analysis was the teacher, rather than the student, and because students' data (Level 1, $n = 2380$) were nested within teachers (Level 2, $n = 42$), we tested H1 by performing a multilevel analysis using hierarchical linear modeling (HLM, version 7; Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2011). Approximately one-fifth of the variance in students' ratings was attributable to between-teacher differences (Level 2 ICC = 22%), though the majority of the variance in students' ratings was attributable to between-student differences (Level 1 ICC = 78%).

In the test of H2, the three dependent measures were the three different teacher-ratings of their own autonomy-supportive teaching. To determine the effect of the ASIP on each dependent measure, we used a series of three regression-based repeated measures analyses (one regression for each measure) with experimental condition serving as the between-groups independent variable (0 = control, 1 = experimental) and time or wave serving as the within-groups repeated measure (a second independent variable). By using this analytic strategy, we were able to treat teachers' T1 scores as a baseline measure so that we could interpret teachers' T2 scores as a change from that baseline score. The hypothesis test was for a significant condition $\times$ time interaction to assess whether any observed changes in teachers' T2 scores depended on experimental condition.

In the test of H3, the three dependent measures were the three different teacher-ratings of their own beliefs about autonomy-supportive teaching. We used the same regression-based repeated measures analyses for the test of H3 as we used in the test of H2, and the hypothesis test was again for a significant condition $\times$ time interaction.

In the test of H4, we examined whether the ASIP direct effect on changes in teachers' T2 autonomy support was mediated by ASIP-induced changes in the T2 effectiveness and easy-to-implement beliefs. Because this was a mediation analysis, we used the INDI-RECT macro in SPSS to conduct bootstrapping analyses based on 1000 bootstrapping resamples (Preacher & Hayes, 2008). In all three analyses (one for each T2 measure of autonomy-supportive

Table 1
Descriptive statistics and correlation matrix for experimental condition and all 12 teacher measures.

Variable	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Experimental condition	.55	.50													
Time 1															
2. Self-Rated Autonomy Support	5.04	.67	.00	—											
3. Personal Endorsement of AST	4.42	.96	.28	.45**	—										
4. Future Intentions to Use AST	5.02	.80	-.11	.32*	.47**	—									
5. Effectiveness Belief	4.15	.90	.23	.31*	.38*	.12	—								
6. Easy-to-Implement Belief	5.12	.88	-.10	.39*	.38*	.67**	.27	—							
7. Normative Belief	3.71	1.15	-.04	.31*	.23	.07	.46**	.40**	—						
Time 2															
8. Self-Rated Autonomy Support	5.36	.78	.47**	.44**	.60**	.23	.35*	.22	.12	—					
9. Personal Endorsement of AST	4.60	1.15	.67**	.14	.68**	.07	.32*	.08	.02	.64**	—				
10. Future Intentions to Use AST	5.14	1.12	.55**	.02	.44**	.12	.13	.07	-.08	.44**	.83**	—			
11. Effectiveness Belief	4.48	1.25	.77**	.11	.31*	-.12	.41**	-.07	.09	.42**	.64**	.52**	—		
12. Easy-to-Implement Belief	5.35	1.10	.57**	-.07	.40**	.05	.22	.11	-.04	.47**	.81**	.88**	.50**	—	
13. Normative Belief	3.42	1.05	-.33*	.21	.23	.06	.08	.12	.49**	.04	.05	.05	-.09	.08	—

* $p < .05$. ** $p < .01$. $N = 42$.

Note. Experimental condition: 0, control; 1, experimental. AST = Autonomy-Supportive Teaching.

teaching), we used the six independent (predictor) variables of experimental condition, the corresponding T1 measure of autonomy-supportive teaching, the T1 and T2 effectiveness beliefs, and the T1 and T2 easy-to-implement beliefs. We did not include the T1 and T2 normative beliefs in these analyses because experimental condition did not predict changes in the normality belief (as reported below in the analyses for H3). Prior to these mediation analyses, we transformed all variables into standardized scores so that we could report and interpret the standardized statistics.

Before our hypothesis tests, we computed a power analysis for a 2-group repeated measures analysis (G*Power 3; Faul, Erdfelder, Lang, & Buchner, 2007). Using $p = .05$ and an expected effect size of $d = .70$, we calculated what sample size was needed to obtain a power = .95. The needed sample size was 29. Because the sample size for each analysis was 42, we determined that we had sufficient statistical power for each hypothesis test.

5. Results

5.1. Preliminary analyses

Missing data were rare (<1%), so we used the expectation-maximization (EM) algorithm for imputing missing values. We checked whether any of the assessed variables deviated from normality; all values for skewness and kurtosis were less than |.9|, indicating little deviation from normality. We also tested for possible associations among the demographic characteristics of gender, age, years of teaching experience, and grade level taught (middle vs. high school) and the baseline measures of teachers' autonomy support and beliefs about autonomy support. No demographic characteristic was significantly associated with any baseline measure.

5.2. Effect of ASIP on student-rated autonomy support (Hypothesis 1)

We first assessed the capacity of the ASIP to increase autonomy-supportive teaching by asking students to report their perceptions of autonomy-supportive teaching. Students of teachers who participated in ASIP rated the teacher higher on autonomy-supportive teaching than did students of teachers who did not participate in ASIP, $t(40) = 4.78, p < .001, d = 1.52$ (Ms, 5.18 vs. 4.52).

5.3. Effect of ASIP on teacher-rated autonomy support (Hypothesis 2)

At both T1 and T2, teachers reported their autonomy support in three ways—self-rated autonomy support, personal endorsement of autonomy-supportive teaching, and future intentions to use autonomy-supportive teaching in one's own classroom.

For *self-rated autonomy support*, the condition main effect was not significant, $F(1, 40) = 3.98, p = .053$, the time main effect was significant, $F(1, 40) = 7.17, p = .011$, and, most importantly, the condition $\times$ time interaction was significant, $F(1, 40) = 11.67, p < .001, \eta_p^2 = .23$. As illustrated in the left panel of Fig. 2, autonomy support increased significantly for teachers in the experimental group from T1 to T2 ($\Delta = +.66, t = 3.40, p = .001$), while it remained unchanged from T1 to T2 for teachers in the control group ($\Delta = -.07, t = .33, p = .740$).

For *personal endorsement of autonomy-supportive teaching*, the condition main effect was significant, $F(1, 40) = 16.29, p < .001$, the time main effect was not significant, $F(1, 40) = 1.40, p = .244$, and the condition $\times$ time interaction was significant, $F(1, 40) = 20.35, p < .001, \eta_p^2 = .34$. As illustrated in the center panel of Fig. 2, autonomy support increased significantly for teachers in the

experimental group from T1 to T2 ($\Delta = +.63, t = 2.38, p = .021$), while it remained unchanged from T1 to T2 for teachers in the control group ($\Delta = -.37, t = 1.27, p = .213$).

For *future intentions to use autonomy-supportive teaching in one's own classroom*, the condition main effect was significant, $F(1, 40) = 6.09, p = .018$, the time main effect was not significant, $F(1, 40) = .10, p = .761$, and the condition $\times$ time interaction was significant, $F(1, 40) = 16.25, p < .001, \eta_p^2 = .29$. As illustrated in the right panel of Fig. 2, autonomy support increased significantly for teachers in the experimental group from T1 to T2 ($\Delta = +.75, t = 2.93, p = .005$), while it decreased significantly from T1 to T2 for teachers in the control group ($\Delta = -.65, t = 2.21, p = .034$).

5.4. Effect of ASIP on beliefs about autonomy support (Hypothesis 3)

At both T1 and T2, teachers reported their three beliefs about autonomy support—the effectiveness belief, the easy-to-implement belief, and the normative belief.

For the *effectiveness belief*, the condition main effect was significant, $F(1, 40) = 28.79, p < .001$, the time main effect was not significant, $F(1, 40) = 3.10, p = .086$, and the important condition $\times$ time interaction was significant, $F(1, 40) = 25.32, p < .001, \eta_p^2 = .39$. As illustrated in the left panel of Fig. 3, the effectiveness belief increased significantly for teachers in the experimental group from T1 to T2 ($\Delta = +1.01, t = 3.74, p = .001$), while it remained unchanged from T1 to T2 for teachers in the control group ($\Delta = -.50, t = 1.98, p = .056$).

For the *easy-to-implement belief*, the condition main effect was significant, $F(1, 40) = 6.00, p = .019$, the time main effect was not significant, $F(1, 40) = .82, p = .372$, and the condition $\times$ time interaction was significant, $F(1, 40) = 16.41, p < .001, \eta_p^2 = .29$. As illustrated in the right panel of Fig. 3, the easy-to-implement belief increased significantly for teachers in the experimental group from T1 to T2 ($\Delta = +.87, t = 3.49, p = .001$), while it remained unchanged from T1 to T2 for teachers in the control group ($\Delta = -.55, t = 1.78, p = .084$).

For the *normative belief*, the condition main effect was not significant, $F(1, 40) = 1.75, p = .194$, the time main effect was not significant, $F(1, 40) = 2.37, p = .132$, and the condition $\times$ time interaction was not significant, $F(1, 40) = 2.87, p = .098, \eta_p^2 = .07$.

5.5. Mediation analyses (Hypothesis 4)

The descriptive statistics and intercorrelations among experimental condition and the 12 teacher-reported dependent measures appear in Table 1. The mediation hypothesis was that both the T2 effectiveness belief and the T2 easy-to-implement belief, controlling for the T1 effectiveness belief, the T1 easy-to-implement belief, experimental condition, and the corresponding T1 measure of autonomy support, would both uniquely predict each T2 measure of autonomy support.

For *self-rated autonomy support*, the overall 6-term model significantly predicted T2 autonomy support, $F(6, 35) = 5.91, p < .001$ ($R^2 = .50$). The T2 easy-to-implement belief significantly predicted T2 autonomy support, $\beta = .334, t = 2.18, p = .036$, while the T2 effectiveness belief did not, $\beta = -.086, t = .42, p = .675$. Without these two beliefs in the model the direct effect of ASIP on T2 autonomy support was significant, $\beta = .907, t = 3.54, p = .001$, but with these two beliefs in the model this same direct effect was no longer significant, $\beta = .326, t = 1.62, p = .114$, suggesting mediation. The bias-corrected confidence interval for the indirect path from the T2 easy-to-implement belief to T2 autonomy support did not include zero [.023, .851], confirming the presence of mediation, while the bias-corrected confidence interval for the

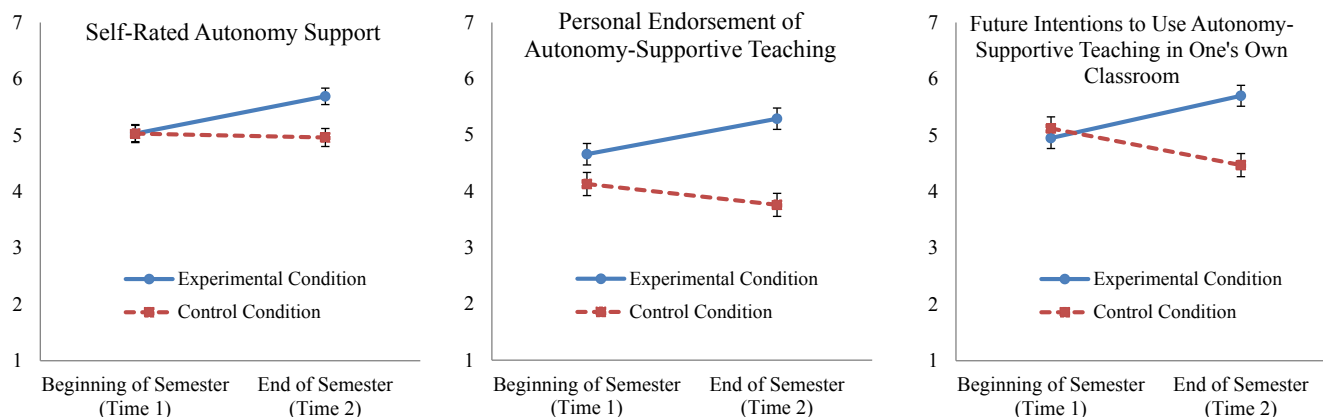


Fig. 2. Means and standard errors (vertical bars) of the three teacher-reported measures of autonomy-supportive teaching broken down by experimental condition and time of assessment.

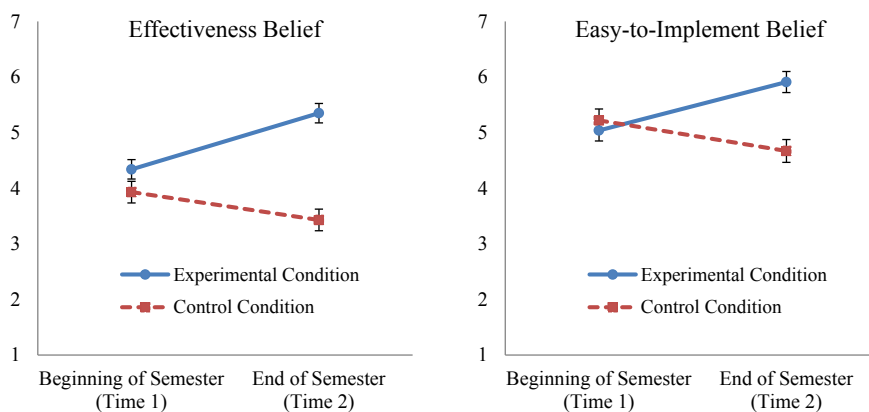


Fig. 3. Means and standard errors (vertical bars) of the teacher-reported effectiveness and easy-to-implement beliefs broken down by experimental condition and time of assessment.

indirect path from the T2 effectiveness belief to T2 autonomy support did include zero $[-.734, .564]$, confirming the absence of mediation. The overall results from the bootstrapping analysis to predict T2 changes in self-rated autonomy support appear in the left column of Table 2, while the corresponding path model appears in Fig. 4.²

For *personal endorsement of autonomy-supportive teaching*, the overall 6-term model significantly predicted T2 autonomy support, $F(6, 35) = 41.88, p < .001 (R^2 = .88)$. The T2 easy-to-implement belief significantly predicted T2 autonomy support, $\beta = .497, t = 6.52, p = .001$, while the T2 effectiveness belief did not, $\beta = .127,$

$t = 1.27, p = .212$. Without these two beliefs in the model the direct effect of ASIP on T2 autonomy support was significant, $\beta = .993, t = 5.26, p = .001$, but with these two beliefs in the model this same direct effect was no longer significant, $\beta = .157, t = 1.57, p = .125$, suggesting mediation. The bias-corrected confidence interval for the indirect path from the T2 easy-to-implement belief to T2 autonomy support did not include zero $[.245, .888]$, confirming mediation, while the bias-corrected confidence interval for the indirect path from the T2 effectiveness belief to T2 autonomy support did include zero $[-.083, .531]$, confirming non-mediation. The overall results from the bootstrapping analysis to predict T2 changes in personal endorsement of autonomy-supportive teaching appear in the center column of Table 2, while the corresponding path model appears in Fig. 5.

For *future intentions to use autonomy-supportive teaching in one's own classroom*, the overall 6-term model significantly predicted T2 autonomy support, $F(6, 35) = 26.54, p < .001 (R^2 = .82)$. The T2 easy-to-implement belief significantly predicted T2 autonomy support, $\beta = .849, t = 9.38, p = .001$, while the T2 effectiveness belief did not, $\beta = .197, t = 1.62, p = .115$. Without these two beliefs in the model the direct effect of ASIP on T2 autonomy support was significant, $\beta = 1.147, t = 4.10, p = .001$, but with these two beliefs in the model this same direct effect was no longer significant, $\beta = -.096, t = .40, p = .693$, suggesting mediation. The bias-corrected confidence interval for the indirect path from the T2 easy-to-implement belief to T2 autonomy support did not include zero $[.545, 1.670]$, confirming mediation, while the bias-corrected

² For purposes of clarity, we do not report in Figs. 4–6 the paths from the T1 easy-to-implement and effectiveness beliefs to the T2 measure of autonomy support, so we report those statistics here and in Table 2. For Fig. 4, the path from the T1 ease-of-implementation belief to T2 self-rated autonomy support was not significant ($\beta = .017, t = .13, p = .899$), but it is important to include this path in the interpretation of the model because it confirms that it was *changes* in the easy-to-implement belief (not the T2 easy-to-implement belief per se) that predicted changes in self-rated autonomy support. The path from the T1 effectiveness belief was also not significant ($\beta = .104, t = .73, p = .468$). For Fig. 5, the path from the T1 easy-to-implement belief to T2 changes in personal endorsement of autonomy-supportive teaching was not significant ($\beta = -.119, t = 1.76, p = .089$). The path from T1 effectiveness belief was also not significant ($\beta = -.009, t = .13, p = .895$). For Fig. 6, the path from the T1 easy-to-implement belief to T2 changes in future intentions to use autonomy-supportive teaching was not significant ($\beta = -.096, t = .95, p = .350$). The path from T1 effectiveness belief was also not significant ($\beta = -.120, t = 1.43, p = .162$).

Table 2

Results from the bootstrapping analyses for each of the three measures of autonomy support.

Predictor Variable	Self-rated autonomy support					Personal endorsement of autonomy-supportive teaching					Future intentions to use autonomy-supportive teaching in one's own classroom				
	B	SE B	β	t	p	B	SE B	β	t	p	B	SE B	β	t	p
Experimental condition	.505	.311	.326	1.62	.114	.358	.228	.157	1.57	.125	-.108	.270	-.096	.40	.693
Motivation style measure ¹ , T1	.498	.159	.427	3.13	.003	.527	.086	.442	6.09	.000	.242	.136	.172	1.78	.084
Effectiveness belief, T1	.090	.123	.104	.73	.468	-.012	.090	-.009	.13	.895	-.150	.105	-.120	1.43	.162
Effectiveness belief, T2	-.054	.127	-.086	.42	.675	.117	.092	.128	1.27	.212	.177	.109	.197	1.62	.115
Easy-to-implement belief, T1	.016	.123	.017	.13	.899	-.156	.089	-.119	1.76	.089	-.122	.129	-.096	.95	.350
Easy-to-implement belief, T2	.237	.109	.333	2.18	.036	.520	.080	.497	6.52	.000	.865	.092	.849	9.38	.000
F(6, 35)	5.91, $p < .001$.					41.88, $p < .001$.					26.54, $p < .001$.				
R ²	.50					.88					.82				

confidence interval for the indirect path from the T2 effectiveness belief to T2 autonomy support did include zero $[-.107, .783]$, confirming non-mediation. The overall results from the bootstrapping analysis to predict T2 changes in future intentions appear in the right column of Table 2, while the corresponding path model appears in Fig. 6.

6. Discussion

The plan behind the present investigation was to conduct a theory-based, carefully-designed, and previously-validated ASIP to observe intervention-induced changes in teachers' autonomy support and in their beliefs about autonomy support and then use these data to explain why teachers were or were not willing or able to capitalize on the professional developmental opportunity to meaningfully upgrade the quality of their classroom motivating style. As expected, participation in ASIP did help teachers become more autonomy supportive, as confirmed both by students' ratings (H1) and by teachers' self-reports (H2). Also as expected, participation in ASIP did help teachers accept and internalize that autonomy-supportive teaching was more effective and easier-to-

implement than these teachers believed prior to the ASIP experience (H3).

While ASIP increased teachers' beliefs that autonomy support was both effective and easy-to-implement (Fig. 3), it was only changes in the easy-to-implement belief that explained changes in teachers' autonomy support (Figs. 4–6). From this finding (H4), we conclude that when it comes to designing and implementing interventions that have the capacity to help teachers meaningfully upgrade the quality of their classroom motivating style, changing teachers' easy-to-implement belief (e.g., “Oh, this is easier than I thought it would be.”) is a functional necessity while changing teachers' effectiveness belief (e.g., “Oh, this is more effective than I thought it would be.”) is either a prerequisite (to changes in the easy-to-implement belief) or a mere luxury.

Because changes in the easy-to-implement belief were a functional necessity during the ASIP experience, we provide in Table 3 a sample instructional script from our ASIP for each of the six recommended autonomy-supportive instructional behaviors. In the ASIP, each of these six instructional behaviors was introduced, explained, modeled, practiced, and discussed. We encouraged teachers to try each sample script in their own classroom and

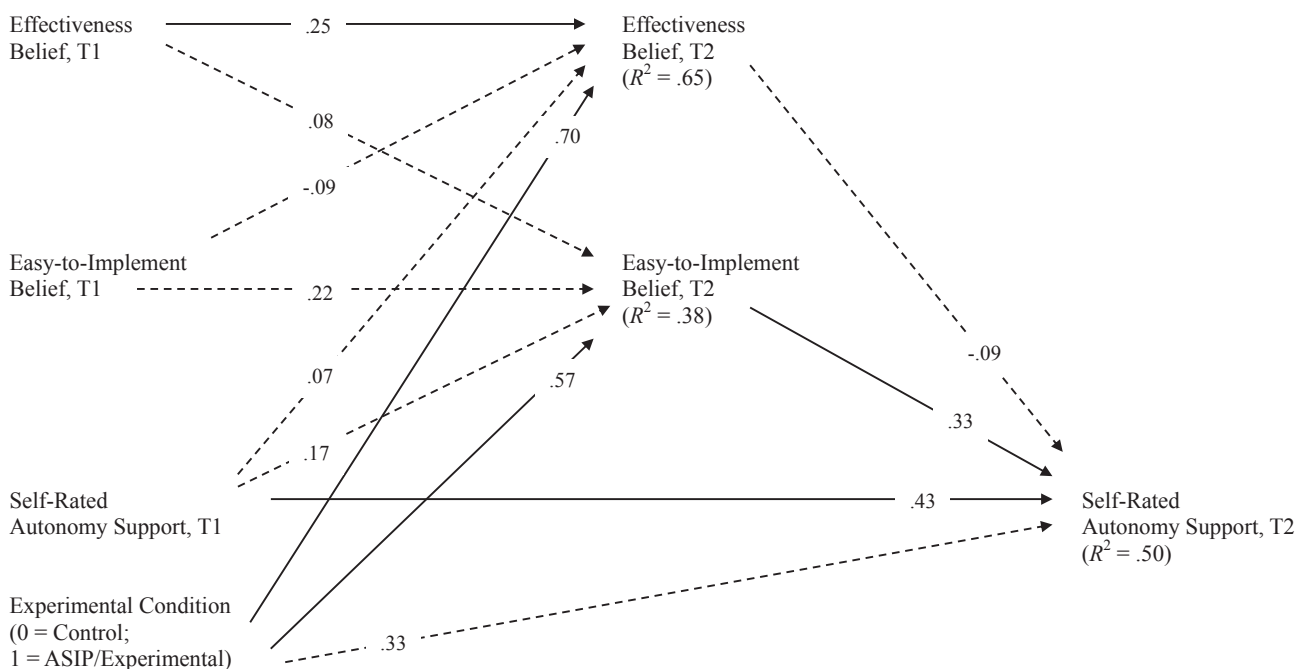


Fig. 4. Test of the hypothesized beliefs mediation model to predict teachers' self-rated autonomy support. Note. Solid lines represent statistically significant paths, $p < .05$, while dashed lines represent non-significant paths. Numbers with each path are standardized beta coefficients. All variables are observed variables. Correlations among the T1 and T2 variables are reported in Table 1.

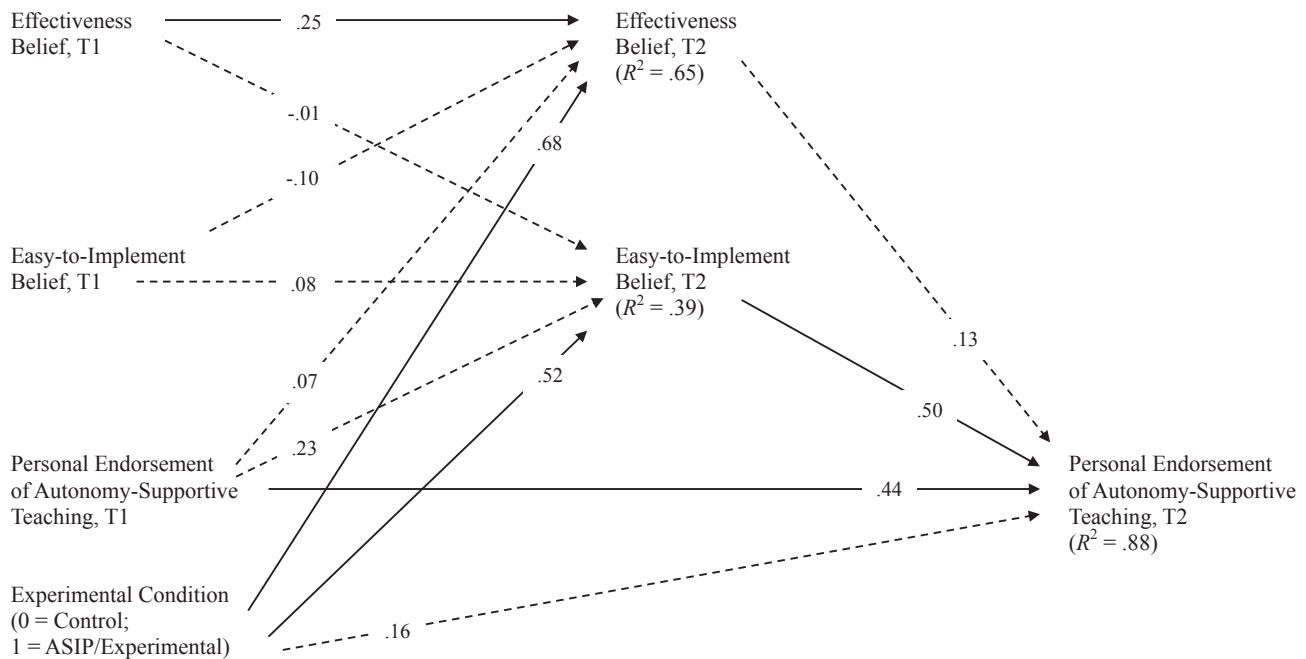


Fig. 5. Test of the hypothesized beliefs mediation model to predict teachers' personal endorsement of autonomy-supportive teaching. *Note.* Solid lines represent statistically significant paths, $p < .05$, while dashed lines represent non-significant paths. Numbers with each path are standardized beta coefficients. All variables are observed variables. Correlations among the T1 and T2 variables are reported in Table 1.

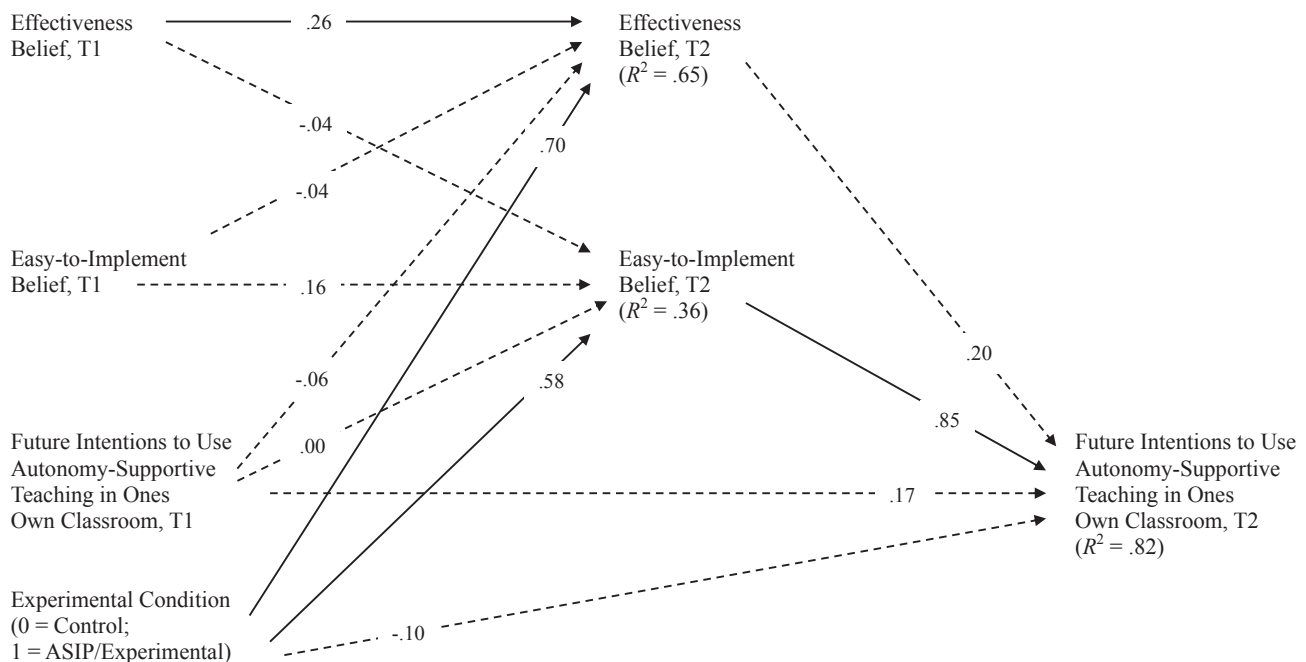


Fig. 6. Test of the hypothesized beliefs mediation model to predict teachers' future intentions to use autonomy-supportive teaching in their own classrooms. *Note.* Solid lines represent statistically significant paths, $p < .05$, while dashed lines represent non-significant paths. Numbers with each path are standardized beta coefficients. All variables are observed variables. Correlations among the T1 and T2 variables are reported in Table 1.

gradually, over the course of the semester, seek to refine them into more personalized ways of motivating and engaging their particular students in the context of their particular teaching situation.

While the findings clearly highlight the importance of changes in the easy-to-implement belief, changes in the effectiveness belief might still be important to the professional development effort to improve one's motivating style. It is worth noting that changes in

teachers' effectiveness belief would have explained substantial variance in changes in teachers' T2 autonomy support across all three measures had it been the only teacher belief under consideration (the only mediator entered into the mediation analyses). But when both the easy-to-implement and effectiveness beliefs were entered together, changes in the effectiveness belief were overwhelmed by the predictive power of changes in the easy-to-

Table 3

Illustrative scripts for each of the six recommended instructional behaviors to help PE teachers learn the “how to” of autonomy-supportive teaching.

Autonomy-supportive instructional behavior	Sample instructional script
Take the students' perspective	Conduct various formative assessments, such as starting a class (or activity) by soliciting students' input into the forthcoming lesson and then integrating those suggestions into the lesson plan, and also by ending a class by asking students to complete an anonymous “Any suggestions?” comment card.
Offer activities to vitalize the psychological needs	For autonomy, give students some say in what they will do and how they will do it, asking “What would you like to do?” For competence, offer students a “Can you do this?” optimal challenge to strive for, such as a difficult goal, a model to emulate, or a standard of excellence to pursue. For relatedness, offer students an opportunity to engage in peer-to-peer interaction, such as a cooperative learning activity.
Provide explanatory rationales	Introduce engagement requests, procedures, rules, and limits as follows: (1) Request, (2) Rationale, such as “Let's work today to change our disrespectful language into more respectful language, because we want a classroom that is welcoming, safe, and supportive for everyone.”
Communicate using informational language	When a student misbehaves or performs poorly, ask if he or she agrees with your perception (e.g., “It seem that you are having trouble with this activity; am I right about that?”), ask him or her to diagnose the cause of the misbehavior or poor performance (e.g., “Do you know why that might be?”), and ask if he or she would like your help in generating new-and-improved prosocial or performance-enhancing coping behaviors.
Acknowledge and accept expressions of negative affect	Acknowledge the negative affect: “I see that everyone looks bored and unenthusiastic about today's stretching exercises.” Accept the negative affect as valid: “Yes, we have practiced this same routine many times before, haven't we?” Welcome suggestions to eliminate the cause of the negative affect: “Okay, so what might we do differently; any suggestions?”
Display patience	Watch, listen, be responsive to students' initiatives, communicate your willingness to help, and do so after being asked, signaled, or invited. Avoid rushing in to intervene or fix the problem, as in “Here, do it this way—like I showed you.”

implement belief. Thus, it seems that changes in the effectiveness belief are potentially important and predictive but that changes in the easy-to-implement belief are more important and more explanatory.

We did not design the ASIP to produce a significant main effect on the normative belief, as the normative belief more reflects the cultural context in which one teaches, which is something that we considered to be outside the purview of an ASIP, at least in its present form. Accordingly, teachers' participation in ASIP did not produce a significant increase in the belief that autonomy-supportive teaching was culturally normative. This is because a normative belief arises out of and reflects the descriptive norm that guides people's (i.e., teachers') thinking and acting, and normative beliefs are particularly difficult to change (Cialdini, 2007; Cialdini, Kallgren, & Reno, 1991). What drives a change in normative beliefs tends to be social approval versus social disapproval (Cialdini, 2003; Goldstein, Cialdini, & Griskevicius, 2008).

6.1. Implications for future ASIPs

While research on the motivational climate provided by PE teachers has a long and broad representation in the literature (e.g., TARGET studies; Braithwaite, Spray, & Warburton, 2011), ASIP-specific studies are relatively new. The pioneering ASIPs were either experience-based or theory- and evidence-based. As to an experience-based intervention, Richard deCharms (1976) guided a group of elementary-school teachers toward a more autonomy-supportive motivating style by offering them a series of 21 experience-based activities, such as “The Origin-Pawn Game” and “The Blindfold Game” that afforded teachers with first-hand, role-reversal experiences of feeling high (origin) or low (pawn) autonomy support during a learning activity (e.g., assembling tinker toys, being led by a sighted guide). Later, Reeve (1998) guided a group of preservice teachers toward a more autonomy-supportive style by offering informational booklets that provided conceptual definitions and a theoretical framework (theory-based) as well as an overview of published research findings on the benefits of autonomy-supportive teaching (evidence-based). In retrospect, these early ASIPs yielded relatively modest effect sizes ($d's < 1$). Contemporary ASIPs have trended more toward emphasizing

“how-to” skills and offering concrete take-it-to-the-classroom recommendations (as per Table 3), and they utilized the input and collaboration of the participating teachers in the development and design of the intervention (Aelterman et al., 2013). These more skill-based interventions have yielded relatively large effect sizes ($d's > 1$) and sometimes they have yielded very large effect sizes ($d > 2$; Cheon & Reeve, 2015).

Teachers' beliefs about autonomy support were not assessed in these past ASIP intervention studies, but it seems reasonable in hindsight to infer that the early ASIPs largely strengthened teachers' effectiveness beliefs while contemporary ASIPs largely strengthened both the effectiveness and easy-to-implement beliefs. This trend toward a more skill-based, how-to intervention design helps teachers experience conceptual change away from believing that “autonomy-supportive teaching sounds nice and probably works in theory, but it also sounds naïve and unrealistically difficult, impractical and time-consuming, given my students and my classroom demands” toward believing that “autonomy-supportive teaching sounds feasible and easy to do, practical, and time-saving, even with my students and my classroom demands.”

6.2. Limitations

We identify two key methodological limitations. The first limitation was that data were subjective self-reports, rather than objective behaviors. This concern applies to both the students' and the teachers' data. As to the students' data, we assessed only perceptions of autonomy-supportive teaching, though these data did nevertheless show that students perceived a real change in their teachers' classroom autonomy support. We also did not assess ASIP-induced student outcomes or benefits. Past studies have collected student outcome data such as objectively-scored classroom engagement (Reeve et al., 2004), classroom grades (Cheon et al., 2012), and performance achievements (e.g., medals won in a sports competition; Cheon et al., 2015). These objectively-scored dependent measures enhance the methodological strength of any ASIP investigation, but they address the question of whether the ASIP works, rather than why it works. In the present study, we borrowed heavily from the ASIP literature to assume that our ASIP would work (i.e., increase autonomy-supportive teaching), an

assumption that allowed us to focus on answering the new question of why ASIP worked. As to the teachers' data, our study was limited by a mono-method of assessing only self-reported mediators and outcomes. So, future research will need to confirm that changes in teachers' beliefs about autonomy support predict changes in their actual day-to-day classroom instruction.

The second limitation is that our research design might have created a self-fulfilling expectancy effect in the minds of our teacher-participants. That is, perhaps changes in the two teacher beliefs occurred simply because we told teachers that autonomy-supportive teaching was effective and easy-to-do. This alternative interpretation may apply to the effectiveness belief, because we did tell teachers explicitly in Part 1 of ASIP that autonomy-supportive teaching was effective. But this alternative interpretation does not seem to apply to the ease-of-implementation belief, because we did not tell teachers during ASIP that autonomy-supportive teaching was easy to do. Instead, how easy vs. difficult autonomy-supportive teaching is to do is something that needs to be discovered and realized by the teacher himself or herself over weeks and perhaps months of actual classroom experience. Just as a swimming instructor cannot tell a student that the backstroke is easy to do, we do not think we can tell teachers that autonomy-supportive teaching is easy to do. Instead, we can show teachers how to implement autonomy-supportive instruction, and teachers will then learn through experience and feedback that these acts of instruction really are easy, practical, time-efficient, and situationally-appropriate things to do. Hence, the fruits of our 8-h ASIP experience are not likely explained by mere expectancy effects, at least not in regard to the critical ease-of-implementation belief.

7. Conclusion

Teachers used our ASIP as a professional developmental opportunity to learn how to become more autonomy supportive toward their students. The ASIP helped teachers conceptually change their belief that autonomy-supportive teaching was too difficult to a revised belief that it was actually easy and quite feasible—once you knew how to do it. Perhaps future interventions might be structured in ways to better support constructive changes in PE teachers' easy-to-implement belief and, in doing so, catalyze their professional development.

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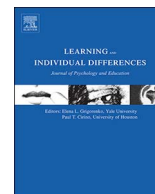
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Personality-based antecedents of teachers' autonomy-supportive and controlling motivating styles[☆]

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ABSTRACT

We sought to identify teachers' personality-based antecedents that tend them toward an autonomy-supportive or controlling motivating style. We assessed both aspects of teachers' motivating styles at the beginning of the semester (T1, Time 1) and again after all teachers had completed a semester-long intervention (T2) to learn how to become more autonomy supportive and less controlling. At the start of the semester, 42 full-time elementary-grade teachers (25 females, 17 males) completed a packet of questionnaires to self-report their core traits (the big five) and eight surface traits (e.g., causality orientations, authoritarianism) that we hypothesized would predict one motivating style or the other, while their 633 students self-reported their autonomous motivation. Regression-based analyses revealed four findings: (1) High levels of openness to experience and agreeableness both individually predicted teachers' T1 autonomy-supportive motivating style; (2) high levels of control causality orientation and authoritarianism both individually predicted T1 controlling motivating style; (3) high levels of autonomy causality orientation and personal growth initiative both individually predicted a post-intervention change in T2 autonomy-supportive motivating style; and (4) high level of control causality orientation predicted a post-intervention change in T2 controlling motivating style. These findings suggest a robust relation between personality and teachers' motivating styles.

1. Introduction

Motivating style is the interpersonal tone and face-to-face behavior teachers routinely use to engage their students in the learning activities they provide (Reeve, 2009, 2016). In a self-determination theory (SDT) analysis (Ryan & Deci, 2017), motivating style was first conceptualized as a single construct in which a teacher's style could be placed on a bipolar continuum with a highly autonomy-supportive style on one end and a highly controlling style on the other (Deci, Schwartz, Sheinman, & Ryan, 1981). Recent empirical findings, however, now suggest that the autonomy-supportive and controlling styles exist as two separate dimensions (Bartholomew, Ntoumanis, Ryan, Bosch, & Thogersen-Ntoumani, 2011; Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015). This is because it was discovered that (1) the two styles were only modestly negatively correlated, (2) a low level in one motivating style did not imply or lead to a high level in the other style; (3) autonomy support strongly predicted students' need satisfaction and adaptive functioning (e.g., engagement, prosocial behavior) but only weakly predicted their (low) need frustration and maladaptive

functioning (e.g., disengagement, antisocial behavior), and (4) teacher control strongly predicted students' need frustration and maladaptive functioning but only weakly predicted (low) need satisfaction and adaptive functioning (Bartholomew et al., 2011; Cheon, Reeve, & Song, 2016; De Meyer et al., 2014; Gunnell, Crocker, Wilson, Mack, & Zumbo, 2013; Haerens et al., 2015). The conclusion reached was that these are two distinct and somewhat independent processes with autonomy support vitalizing the “brighter” side of students' motivation and functioning and teacher control galvanizing the “darker” side of students' motivation and functioning (Bartholomew et al., 2011).

Autonomy support is the delivery of instruction through an interpersonal tone of support and understanding that appreciates, vitalizes, and supports students' psychological needs for autonomy, competence, and relatedness (Reeve, 2016). This tone is communicated to students through supportive prosody (i.e., higher pitch, slow speech rate, mild voice quality; Zougkou, Weinstein, & Paulmann, 2017) and acts of instruction such as taking the students' perspective, creating opportunities for their input and initiative, offering learning activities in need-satisfying ways, providing rationales for requests, and acknowledging

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and accepting expressions of negative affect as okay and understandable (Reeve, 2009). Teacher-provided autonomy support is associated with students' high-quality motivation (need satisfaction, autonomous motivation), effective classroom functioning (engagement, conceptual learning), and positive educational outcomes (high achievement, well-being) and is therefore considered to be the adaptive aspect of a teacher's motivating style (Assor, Kaplan, & Roth, 2002; Cheon & Reeve, 2015; Gunnell et al., 2013; Jang, Kim, & Reeve, 2016).

Teacher control is the delivery of instruction through an interpersonal tone of pressure that insists students think, feel, and behave in teacher-prescribed ways (Reeve, 2016). This tone generally frustrates students' psychological needs for autonomy, competence, and relatedness (Cheon et al., 2016). It is communicated through pressure-laden prosody (i.e., low pitch, loud tone, fast speech rate, harsh voice quality; Zougkou et al., 2017) and acts of instruction such as suppressing students' input and voice, offering contingent rewards, uttering pressuring and compliance-inducing language (e.g., “you must”, “you have to”), uttering directives without explanations, asserting power or dominance (e.g., yelling, intimidating), and countering and trying to change students' complaints and expressions of negative affect into something acceptable to the teacher (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010; Reeve, 2009). Teacher-provided control is associated with students' low-quality motivation (need frustration, amotivation, controlled motivation), ineffective classroom functioning (disengagement, superficial learning), and negative educational outcomes (antisocial behavior, ill-being) and is therefore considered to be the maladaptive aspect of a teacher's motivating style (Assor et al., 2002; Assor, Kaplan, Kanat-Maymon, & Roth, 2005; Haerens et al., 2015; Hein, Koka, & Hagger, 2015).

1.1. Personality perspective on the antecedents to teachers' motivating styles

Many social-contextual factors explain why teachers tend to orient themselves toward either an autonomy-supportive or a controlling motivating style during instruction, including school-based factors such as time constraints, emphases on summative grading, and administrative pressure to adopt prescribed teaching methods (Pelletier & Sharp, 2009; Taylor, Ntoumanis, & Smith, 2009), teachers' perceptions of their students' classroom motivation (i.e., autonomous vs. controlled motivation; Pelletier, Seguin-Levesque, & Legault, 2002), and even the nation in which they live and teach (Downie, Koestner, ElGeledi, & Cree, 2004; Reeve et al., 2014). But little is known about the possible personality-based antecedents of teachers' classroom motivating styles. Recognizing this, we undertook the present investigation with the goal of identifying which personality-based antecedents might tend teachers toward an autonomy-supportive style and which other personality-based antecedents might tend teachers toward a controlling style.

Following several personality theorists (McCrae et al., 2000; McAdams & Pals, 2006), we make the distinction between dispositional traits and characteristic adaptations. Dispositional traits represent endogenous (genetically-based) and stable “core traits” that follow intrinsic paths of expression and development and are essentially independent of environmental influences (Asendorpf & van Aken, 2003). The “Big Five” dispositions of extraversion, neuroticism, openness to experience, agreeableness, and conscientiousness exemplify core traits. Characteristic adaptations represent malleable and experienced-based “surface traits” that are shaped by context and personal strivings and have been internalized as self-regulatory orientations in response to persisting social-contextual influences (Vansteenkiste, Niemiec, & Soenens, 2010). The inclusion of surface traits adds a developmental perspective to explain teachers' motivating styles that are not necessarily captured by core traits (Olesen, 2011).

Like so many aspects of effective teaching, motivating style is an acquired skill. Intervention research, for instance, shows that teachers' motivating styles are malleable and can change with guidance, experience, and deliberate practice (Cheon et al., 2016; Cheon & Reeve,

2015; Cheon, Reeve, & Moon, 2012; Tessier, Sarrazin, & Ntoumanis, 2010). Core traits may predict such skill-based patterns of behavior, as in the case of openness to experience predicting communication skills (Sims, 2017) and conscientiousness predicting academic skills (Kappe & van der Flier, 2012). Nevertheless, we see motivating styles as more closely aligned with teachers' surface traits, such as those beliefs, orientations, and regulatory styles teachers acquire by adapting to their experiences. Specifically, as explained in the next section, we focus on the three surface traits of an autonomy causality orientation, personal growth strivings, and the transformational leadership style as possible personality-based antecedents of the autonomy-supportive motivating style, and we focus on the five surface traits of a control causality orientation, the transactional leadership style, authoritarianism, closed-mindedness, and discomfort with ambiguity as possible personality-based antecedents of the controlling motivating style. Additionally, we further investigated the predictive power of core traits (the Big Five) and a number of demographic variables (e.g., years of teaching experience).

1.2. Hypothesized personality-based antecedents of the autonomy-supportive motivating style

We sought to explain both who is characteristically autonomy supportive and who is most able to benefit from an intervention experience to learn how to become more autonomy supportive. As such, the study assessed teachers' beginning of the semester (i.e., pre-intervention, or Time 1) autonomy-supportive motivating style and also teachers' end of the semester (i.e., post-intervention, or Time 2) changes in the autonomy-supportive style.

Teachers who are autonomy supportive and teachers who learn how to become more autonomy supportive with training are likely to be those who possess individual differences that orient them favorably to enacting autonomy-supportive attitudes and behaviors, such as empathy and perspective taking, believing that the primary drivers of motivation are personal interests and preferences, and strivings to improve oneself. A high level of dispositional agreeableness, for instance, might predict an autonomy-supportive style because it reflects a tendency toward warm, reciprocal interactions with others that features a good deal of listening and understanding (McAdams, Jackson, & Kirshnit, 1984). Openness to experience has also been associated with an autonomous style (Olesen, 2011; Olesen, Thomsen, Schnieper, & Tonnesvang, 2010). Mostly, however, we focused on the following three surface traits as our hypothesized personality-based antecedents of an autonomy-supportive style: autonomy causality orientation, personal growth initiative, and transformational leadership.

A causality orientation is one's understanding of what typically energizes and directs (i.e., motivates) one's own behavior, and people tend to have, more or less, some level of both an autonomy causality orientation and a control causality orientation (Deci & Ryan, 1985; Ryan & Deci, 2017). An *autonomy causality orientation* characterizes the degree to which the person sees the environment as a source of information. Individuals with a high autonomy causality orientation are “interest-taking”, as they find or create opportunities in the environment for the expression and engagement of their personal needs, interests, and values (Deci & Ryan, 1985; Ryan & Deci, 2017). The presence of need-satisfying, interesting, and valued environmental opportunities therefore explains why they act. Because autonomy-supportive teaching builds instruction around mobilizing students' inner motivational resources (e.g., needs, interests, and values), we expected that the autonomy causality orientation would predict the autonomy-supportive motivating style with the logic being that teachers would likely try to motivate their students by using the same sources of motivation that motivate them.

Personal growth initiative characterizes a person's active and intentional involvement in changing as a person; it is one's strivings for self-improvement and personal growth (Robitschek et al., 2012). Because

we viewed an intervention to learn how to become more autonomy supportive to be a growth-oriented professional developmental opportunity for teachers, we expected that teachers with a high personal growth initiative would more readily capitalize on the professional developmental opportunity and, consequently, become more autonomy supportive.

Transformational leadership is a style in which a teacher (the leader) seeks to inspire students (followers) by promoting their strengths, listening to their concerns, focusing on their needs, and mobilizing their inner motivational resources (Judge & Piccolo, 2004). Because we expected teachers who endorsed a transformational leadership style to focus on students' needs and strengths, we expected the transformational leadership style to predict the autonomy-supportive motivating style.

1.3. Hypothesized personality-based antecedents of the controlling motivating style

We further sought to explain both who is characteristically controlling and who remains controlling even after participation in the intervention experience (i.e., who resists the intervention's message and recommendations). As such, the study assessed teachers' beginning of the semester (i.e., pre-intervention, or T1) controlling motivating style and also teachers' end of the semester (i.e., post-intervention, or T2) changes in the controlling motivating style.

Teachers who are controlling and teachers who remain controlling after training are likely to be those who possess individual differences that orient them favorably to enacting controlling attitudes and behaviors, such as believing that people should submit to legitimate authority, holding a favorable view on the motivational use of rewards and punishers, preferring to create a tightly-organized social environment, being intolerant to open-ended (uncertain) lesson plans, and believing that the primary drivers of motivation are environmental incentives and social expectations. We did not expect any dispositional trait to be associated with these teacher characteristics, though there is some evidence that a controlling style is associated with a low level of agreeableness (Olesen, 2011; Olesen et al., 2010). Instead, we focused on the following five surface traits as our hypothesized personality-based antecedents of a controlling style: control causality orientation, transactional leadership, authoritarianism, closed-mindedness, and discomfort with ambiguity.

A *control causality orientation* characterizes the degree to which one's attention and concerns tend to be oriented toward external contingencies and controls. Individuals with a high control causality orientation experience environments in terms of rewards and social pressures and, in doing so, often lose sight of their own needs, interests, and values (Deci & Ryan, 1985; Ryan & Deci, 2017). Because controlling teaching builds instruction around the strategic and timely offering of attractive rewards and social pressures, we expected that the control causality orientation would predict the controlling motivating style, and there is support in the literature for this prediction as teachers' control orientation has been shown to correlate with raters' scoring of their in-class controlling instructional behavior, such as demanding respect and yelling (Van den Berghe et al., 2013).

Transactional leadership is a style in which a teacher (the leader) uses directives, close supervision, and a strategic use of rewards and punishments (extrinsic motivators) to gain students' (followers') compliance to leader-prescribed behaviors and outcomes (Judge & Piccolo, 2004). Because the transactional leadership style is often called "contingent reward leadership" (Bass & Avolio, 1994), we expected it to predict the controlling motivating style, because the use of contingent rewards is a central aspect of a controlling motivating style (Bartholomew et al., 2010).

Authoritarianism is the belief that subordinates should submit to and obey authority figures (Altemeyer, 1998). Because people high in authoritarianism emphasize sameness and conformity to prevailing social

norms, submission to legitimate authority, and the necessity of using coercion to ensure conformity (Altemeyer, 1996), we expected authoritarianism would predict the controlling motivating style.

Closed-mindedness and *discomfort occasioned by ambiguity* are two facets of the need for closure. Individuals high in the need for closure have intolerance for uncertainty and aversion to ambiguity. Because these two individual differences lead people to prefer simplified instructional scripts that produce high predictability (Kruglanski, 1989; Webster & Kruglanski, 1994), we expected both closed-mindedness and intolerance for ambiguity would predict the controlling motivating style.

2. Method

2.1. Participants

Teacher-participants were the 42 full-time teachers (25 females, 17 males) who comprised the full faculty at a public elementary school in Seoul, South Korea. All teachers were certified teachers who daily taught an average of 5 classes with an average of 22 students per class. Teachers averaged 7.1 years of teaching experience (*range* = 1 to 20 years) and were, on average, 33.7 years of age (*range* = 25 to 52). Teachers taught the following grade levels: first (*n* = 8); second (*n* = 6); third (*n* = 6); fourth (*n* = 7); fifth (*n* = 7); and sixth (*n* = 8). Forty-one of the 42 teacher-participants completed all aspects of the study, including both waves of data collection and all three parts of the intervention, so the teacher retention rate was 97.6% (41/42). At the end of the study, each teacher received a gratuity equivalent to \$100.

Student-participants were the 663 students present in class when the student questionnaire was collected. Following precedent and recommendations of child development researchers (Skinner & Belmont, 1993), we administered the questionnaire only to students in grades 3, 4, 5, and 6. All students were ethnic Korean and consisted of 323 (49%) females and 337 (51%) males with 3 students not indicating a gender and 131 (20%) third-graders, 156 (23%) fourth-graders, 164 (25%) fifth-graders; and 212 (32%) sixth-graders. The purpose of collecting the student data was simply to obtain a score for students' collective autonomous motivation to be used as a statistical control in the hypothesis tests.

2.2. Procedure

One month prior to the semester, the research team met with the school principal to gain consent for the semester-long study. Following this consent, we recruited the full population of 42 teachers to participate in the study. The data collection occurred in two waves. First, during week 4 of the semester (T1), teachers completed the teacher questionnaire (to assess the two motivating styles, demographic characteristics, the big five, and the eight surface traits), while students completed the student questionnaire. Also during week 4 and after teachers completed their questionnaire, teachers participated in Parts 1 and 2 of the autonomy-supportive intervention program (ASIP). Second, during the last week of the semester (week 16, T2), teachers completed the questionnaires assessing the two motivating styles for a second time.

At both T1 and T2, the teacher questionnaire was administered in a group setting by the research team, and teachers were assured that their responses would be confidential and used only for purposes of the research study. All parts of the ASIP intervention were also conducted in a group setting with all teachers present and participating. At T1, the student questionnaire was administered by a member of the research team (not by the teacher) at the beginning of a class period. Students were asked to complete the questionnaire in response to their experiences associated with that particular class, and they were assured that their responses would be confidential and used only for purposes of the research study. This study was approved by the university's Institutional

Table 1
Measures, psychometric properties, and sample items for the eight hypothesized personality-based antecedents.

Individual difference				
Name of questionnaire	Seminal reference	Items	α	Sample item
3 hypothesized autonomy-supportive motivating style antecedents				
Autonomy causality orientation				
General causality orientations scale	Deci & Ryan, 1985	12	0.83	Seek participation: get input from others before you make the final plans.
Personal growth initiative				
Personal growth initiative scale II	Robitschek et al., 2012	16	0.94	I am constantly trying to grow as a teacher.
Transformational leadership				
Multifactor leadership scale	Avolio, Bass, & Jung, 1999	4	0.50	I am one who focuses on students' strengths.
5 hypothesized controlling motivating style antecedents				
Control causality orientation				
General causality orientations scale	Deci & Ryan, 1985	12	0.68	Take charge: make most of the decisions yourself.
Transactional leadership				
Multifactor leadership scale	Avolio et al., 1999	4	0.71	I am one who focuses on students' mistakes.
Authoritarianism				For the following pair of qualities, which one do you think is more important for a student to have? Curiosity or good manners?
National election study	DeBell, Wilson, Segura, Jackman, & Hutchings, 2011	4	0.68	
Closed mindedness				
Need for closure scale	Webster & Kruglanski, 1994	8	0.74	I feel irritated when one person disagrees with what everyone else in a group believes.
Discomfort occasioned by ambiguity				
Need for closure scale	Webster & Kruglanski, 1994	8	0.77	It's annoying to listen to someone who cannot seem to make up his or her mind.

Review Board and all participants were treated in accordance with the guidelines recommended by the university and by the American Psychological Association.

2.3. Autonomy-supportive intervention program (ASIP)

The design and implementation of the intervention followed the recommendations for the effective implementation of a short-term professional developmental opportunity (e.g., alignment with teachers' training needs, participant-centered setting, demonstration of recommended behaviors, and providing opportunities for both practice and group discussion; Desimone, 2009; Lauer, Christopher, Firpo-Triplett, & Buchting, 2014). Part 1 of the ASIP was a 2 1/2-hour morning informational workshop to introduce autonomy-supportive and controlling teaching, to offer empirical evidence on the benefits of autonomy support and the costs of teacher control, and to introduce and recommend the following six autonomy-supportive instructional behaviors: Take the students' perspective; support students' psychological needs during instruction; use invitational language; provide explanatory rationales for teacher requests; display patience; and acknowledge and accept students' expressions of negative affect (for more information, see Reeve, 2009, 2016).

Part 2 was a 3-h, same-day afternoon workshop that focused on the "how to" of the six recommended autonomy-supportive instructional behaviors. Each recommended act of instruction was first described by the research team and modeled with multiple permutations via brief video clips. Teachers then practiced and refined the enactment of each instructional behavior—while receiving guidance, scaffolding, and feedback from the research team—until they felt sufficiently skilled to try each act of instruction in their own classrooms.

Part 3 was a 2-hour afternoon peer-to-peer group discussion that took place in the ninth week of the semester, about one month after teachers completed Parts 1 and 2 and after teachers had sufficient actual classroom experience with trying out the recommended instructional behaviors. During the group discussion, teachers shared their classroom experiences in trying to offer a more autonomy-supportive and a less controlling motivating style, reported on how their students reacted to each style, and exchanged their experienced-based tips, suggestions, and strategies as to how to teach in more autonomy-

supportive and less controlling ways.

2.4. Measures

For each questionnaire except Authoritarianism,¹ we used a 1–7 response scale (1 = *strongly disagree*, 7 = *strongly agree*). We had available to us a previously-used and validated Korean translated version of almost all the questionnaires, but we used Brislin's (1980) back-translation procedure for those that we did not. We translated these English measures into Korean using a professional English-Korean translator. Once translated, two graduate students who were native Korean and fluent in both languages carried out separate English back-translations, discussing any discrepancies that emerged until reaching a consensus translation.

2.4.1. Autonomy-supportive and controlling motivating styles

We assessed the autonomy-supportive and controlling motivating styles with two complementary measures—namely, the Teaching Scenarios questionnaire and the Situations in Schools questionnaire. Both measures include separate scales to assess both the autonomy-supportive and controlling motivating styles.

On the two-page *Teaching Scenarios* measure (Reeve et al., 2014), teachers first read a 263-word essay (see Reeve et al., 2014, Table 1, page 96) that provided a prototype of autonomy-supportive teaching that then asked the following four items to assess extent of agreement with that approach to teaching: "This approach to teaching describes how I teach my students on a daily basis; This approach to teaching nicely describes what I do during class; This is an accurate and true description of what I do during my teaching; and I do *not* teach this

¹ The Authoritarianism scale was the only scale that did not use a 1–7 response scale, so we describe its response scale here. All four items began with the same stem, which was: "Please tell use which one you think is more important for a child to have:" and respondents were asked to choose between two options. The four option pairs were as follows: "independence or respect for elders"; "obedience or self-reliance"; "curiosity or good manners"; and "being considerate or well behaved". Respondents who value "respect for elders", "obedience", "good manners", and being "well-behaved" score at the maximum of the authoritarian scale (4), while those who value "independence", "self-reliance", "curiosity", and "being considerate" score at the minimum (0).

way” (reverse scored). Teachers next read a 262-word essay on the second page that provided a prototype of controlling teaching that then asked teachers to complete the same four items assessing extent of agreement with that approach to teaching (with the order of the two essays being counterbalanced). Teachers completed the 4-item personal endorsement of autonomy-supportive teaching (α 's at T1 and T2 = 0.92 and 0.88) and the 4-item personal endorsement of controlling teaching (α 's = 0.94 and 0.92) in an internally consistent way. The Teaching Scenarios measure has been used successfully in past research to assess teachers' autonomy-supportive and controlling motivating styles (Reeve et al., 2014; Reeve & Cheon, 2016).

The *Situations in School* questionnaire (SIS) was developed in collaboration with self-determination theory experts to assess multiple dimensions of teachers' motivating styles (Aelterman et al., 2017). The SIS presents 12 daily classroom situations that deal with different aspects of the preparation or delivery of the day's lesson plan. Some situations depicted a problem which requires the teacher to intervene and remedy the situation (e.g., “At a difficult point in the lesson students begin to complain. In response, you...”), other situations involved a non-problematic situation in which the teacher takes a more proactive role (e.g., “You are thinking about classroom rules. So you...”), while other situations involved the provision of learning content (e.g., “It is time for students to practice what they have learned. You...”). For each vignette, the SIS offers four different teaching behaviors that correspond to an autonomy-supportive, controlling, structuring, or chaotic style, and teachers indicate the degree to which each behavior describes their own style. Scores from the 12 response options representing each scale are averaged to create the four scores, though we used only the autonomy support and controlling scales in the present study. Teachers completed the 12-item autonomy support (α 's = 0.82 and 0.84) and the 12-item control (α 's = 0.87 and 0.93) scales in an internally consistent way. Teacher scores on the SIS questionnaire have been shown to correlate with other measures of autonomy support and control (i.e., the Teacher as Social Context Questionnaire, TASCQ, Belmont, Skinner, Wellborn, & Connell, 1988) and to predict students' perceptions of teachers' autonomy-supportive and controlling teaching (Aelterman et al., 2017).

Teachers' scores on the two autonomy-supportive style questionnaires were positively intercorrelated [$r(41) = 0.49, p < 0.001$, at T1; $r(41) = 0.49, p < 0.001$, at T2], and teachers' scores on the two controlling style questionnaires were also positively intercorrelated [$r(41) = 0.56, p < 0.001$, at T1; $r(41) = 0.59, p < 0.001$, at T2]. Given these positive intercorrelations and given that both scales were developed by SDT experts to assess the same constructs, we averaged the autonomy-supportive scores from both questionnaires into a single score (one for T1, a second for T2), and we averaged the controlling scores from both questionnaires into a single score (one for T1, a second for T2).

2.4.2. Core trait measures

Teachers completed the Big Five Inventory (John & Srivastava, 1999) to self-report their endorsement of the big five traits of *extraversion* (8-items, $\alpha = 0.90$, “I see myself as someone who is talkative.”), *neuroticism* (8-items, $\alpha = 0.88$, “I see myself as someone who worries a lot.”), *openness to experience* (10-items, $\alpha = 0.74$, “I see myself as someone who likes to reflect, play with ideas.”), *agreeableness* (9-items, $\alpha = 0.73$, “I see myself as someone who is helpful and unselfish with others.”), and *conscientiousness* (9-items, $\alpha = 0.82$, “I see myself as someone who perseveres until the task is finished.”).

2.4.3. Surface trait measures

The teacher questionnaire measured the eight surface traits listed in Table 1 (in addition to the Big Five traits). We used the Causality Orientations Scale to assess both the autonomy and control causality orientations. The *autonomy causality orientation* assesses the extent to which the person believes that his or her behavior (in life in general, not

in regard to teaching in specific) is initiated and regulated primarily by internal causalities (e.g., interests, personal goals), while the *control causality orientation* assesses the extent to which the person believes that behavior is initiated and regulated primarily by environmental causalities (e.g., rewards, social demands). We used the Personal Growth Initiatives II scale to assess the *personal growth initiative*, which assesses the person's strivings for self-improvement and personal growth. We used the Multifactor Leadership Scale to assess both the transformational and transactional leadership styles. The *transformational leadership style* represents an approach to management in which the supervisor strives to transform supervisees into becoming leaders themselves, while the *transactional leadership style* represents an approach to management in which the supervisor gives out contingent rewards. We assessed *authoritarianism* with the National Election Study survey, which assesses the extent to which the person believes that subordinates (i.e., children) should submit to and obey authorities (i.e., teachers). We used the Need for Closure scale to assess both closed-mindedness and discomfort occasioned by ambiguity. *Closed-mindedness* assesses the extent to which the person desires a quick, decisive, simple answer or perspective on a topic, while *discomfort occasioned by ambiguity* assesses the person's preference for order and predictability.

2.4.4. Teachers' demographics and students' autonomous motivation (statistical controls)

Teachers reported their gender, grade level taught, and years of teaching experience on the teacher questionnaire. The students of each teacher completed an 8-item questionnaire ($\alpha = 0.95$) assessing their collective (class-wide, or class average) level of autonomous motivation that included four items assessing intrinsic motivation (e.g., “This class is enjoyable”) and another four items assessing identified regulation (e.g., “This class is important to me.”).

3. Results

3.1. Preliminary analyses

Missing data were rare ($< 0.5\%$), so we used the expectation-maximization (EM) algorithm to produce a multiple imputed data set (generating 200 iterations). All values for skewness and kurtosis were less than $|0.9|$, indicating little deviation from normality.

3.2. Effectiveness of ASIP

Because the study did not employ an experimental design (all teachers were in the experimental group), we used a repeated measures regression (i.e., pre-post comparison) to assess whether teachers' motivating styles changed from the beginning (before the intervention) to the end (after the intervention) of the semester. On average, teachers did report becoming significantly more autonomy supportive (M s, 4.57 vs. 5.01), $F(1, 40) = 14.78, p < 0.001, \eta_p^2 = 0.27$, though they reported becoming only marginally less controlling (M s, 3.95 vs. 3.75), $F(1, 40) = 2.79, p = 0.103, \eta_p^2 = 0.07$.

3.3. Descriptive statistics and intercorrelations

The descriptive statistics and intercorrelations among the T1 and T2 autonomy-supportive motivating styles, the T1 and T2 controlling motivating styles, the three teacher demographics, students' collective autonomous motivation, the big five core traits, the three hypothesized autonomy-supportive surface traits, and the five hypothesized interpersonal control surface traits appear in Table 2. Scores for T1 and T2 autonomy support correlated significantly with two of the big five traits (openness to experience, agreeableness), all three hypothesized autonomy-supportive antecedents, and with one statistical control (years of teaching experience). Scores for T1 and T2 control correlated significantly with none of the big five traits, all five hypothesized

Table 2
Descriptive Statistics and Intercorrelations among all 21 study variables.

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
Outcome measures														
1. T1 autonomy support motivating style	–													
2. T2 autonomy support motivating style	0.56	–												
3. T1 controlling motivating style	–0.38	–0.25	–											
4. T2 controlling motivating style	–0.26	–0.49	0.74	–										
Statistical controls														
5. Teacher gender (male = 0, females = 1)	–0.11	0.09	0.24	0.14	–									
6. Teacher grade level taught	–0.11	–0.05	0.09	0.26	–0.11	–								
7. Teacher years of teaching experience	–0.33	–0.26	0.05	0.03	0.10	–0.01	–							
8. Students' autonomous motivation	0.21	0.09	–0.11	–0.11	–0.13	–0.27	–0.01	–						
Big five personality predictors														
9. Extraversion	0.15	0.12	–0.20	–0.20	0.06	0.13	0.03	–0.21	–					
10. Neuroticism	–0.29	–0.16	0.25	0.30	0.23	0.04	–0.06	0.05	–0.54	–				
11. Openness to experience	0.43	0.37	–0.12	–0.19	–0.10	–0.07	–0.03	–0.18	0.26	–0.12	–			
12. Agreeableness	0.36	0.29	–0.20	–0.27	0.24	–0.08	0.12	–0.11	0.42	–0.38	0.25	–		
13. Conscientiousness	0.16	0.33	–0.03	–0.18	0.10	0.17	0.09	–0.02	0.47	–0.46	0.22	0.56	–	
Hypothesized autonomy-supportive predictors														
14. Autonomy causality orientation	0.45	0.59	–0.24	–0.27	0.07	–0.12	–0.08	0.02	0.41	–0.23	0.37	0.39	0.21	–
15. Personal growth initiative	0.51	0.68	–0.22	–0.31	0.16	0.00	–0.29	–0.10	0.43	–0.42	0.49	0.50	0.61	0.50
16. Transformational leadership	0.27	0.48	–0.23	–0.27	0.28	–0.02	–0.12	–0.17	0.44	–0.22	0.26	–0.46	0.44	0.58
Hypothesized interpersonal control predictors														
17. Control causality orientation	–0.15	–0.23	0.60	–0.59	–0.12	0.09	0.10	–0.17	–0.30	0.24	0.10	–0.16	–0.07	–0.02
18. Transactional leadership	–0.13	–0.43	0.26	0.31	–0.09	–0.02	0.11	0.01	–0.45	0.33	–0.15	–0.16	–0.43	–0.43
19. Authoritarianism	–0.09	–0.15	0.54	0.40	0.24	–0.19	–0.13	–0.30	–0.02	–0.04	–0.04	0.10	0.02	–0.12
20. Closed-mindedness (need for closure)	–0.48	–0.41	0.37	0.34	–0.08	–0.10	–0.08	0.08	–0.50	0.41	–0.39	–0.48	–0.30	–0.48
21. Discomfort w/ambiguity (need for closure)	–0.32	–0.11	0.35	0.34	0.18	0.06	0.12	–0.06	–0.40	0.32	–0.10	–0.25	–0.16	–0.21
<i>M</i>	4.57	5.01	3.95	3.76	0.61	3.51	7.10	4.00	4.25	3.37	4.99	5.15	4.83	5.50
<i>SD</i>	0.86	0.70	1.03	1.06	0.49	1.80	4.85	0.38	1.14	1.01	0.68	0.76	0.82	0.72

Variable	15.	16.	17.	18.	19.	20.	21.
Outcome measures							
1. T1 autonomy support motivating style							
2. T2 autonomy support motivating style							
3. T1 controlling motivating style							
4. T2 controlling motivating style							
Statistical controls							
5. Teacher gender (male = 0, females = 1)							
6. Teacher grade level taught							
7. Teacher years of teaching experience							
8. Students' autonomous motivation							
Big five predictors							
9. Extraversion							
10. Neuroticism							
11. Openness to experience							
12. Agreeableness							
13. Conscientiousness							
Hypothesized autonomy-supportive predictors							
14. Autonomy causality orientation							
15. Personal growth initiative	–						
16. Transformational leadership	0.55	–					
Hypothesized interpersonal control predictors							
17. Control causality orientation	–0.20	–0.18	–				
18. Transactional leadership	–0.43	–0.44	0.42	–			
19. Authoritarianism	–0.02	–0.04	0.27	0.16	–		
20. Closed-mindedness (need for closure)	–0.53	–0.42	0.43	0.32	–0.04	–	
21. Discomfort w/ambiguity (need for closure)	–0.08	–0.16	0.43	0.37	0.12	0.36	–
<i>M</i>	4.94	5.18	3.98	3.70	1.84	5.03	4.50
<i>SD</i>	0.84	0.69	0.73	0.96	0.46	0.68	0.87

N = 41. Boldface correlation coefficients are significant, $p < 0.05$.

Range for all variables, 1–7, except for authoritarianism, which was 0–4.

controlling style antecedents, and none of the statistical controls.

3.4. Predicting initial autonomy-supportive motivating style

To predict teachers' pre-intervention T1 autonomy-supportive

motivating style, we conducted a hierarchical regression. On the first step, we entered teachers' gender, grade level taught, and teaching experience, students' collective autonomous motivation, and the big five dispositional traits. This preliminary 9-predictor simultaneous regression was significant overall, $F(9, 31) = 4.17$, $p < 0.001$

Table 3
Regressions to predict teachers' T1 and T2 autonomy-supportive motivating style.

Predictor variable	T1 autonomy-supportive motivating style					T2 autonomy-supportive motivating style				
	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>
Constant	– 1.10	1.95				0.55	1.47			
T1 autonomy support motivating style	–	–				0.19	0.14	0.23	1.36	0.183
Statistical controls—student variables										
Students' collective autonomous motivation	0.79	0.31	0.35	2.56	0.015	0.04	0.25	0.02	0.16	0.873
Statistical controls—teacher variables										
Teacher gender	0.06	0.25	0.03	0.22	0.826	0.05	0.20	0.03	0.24	0.815
Years of teaching experience	– 0.06	0.02	– 0.36	2.93	0.006	0.00	0.02	0.00	0.02	0.981
Grade level taught	0.06	0.07	0.12	0.83	0.411	0.01	0.05	0.03	0.26	0.793
Big five personality traits										
Extraversion	– 0.10	0.12	– 0.13	0.82	0.421	– 0.16	0.10	– 0.26	1.65	0.110
Neuroticism	– 0.27	0.14	– 0.31	1.85	0.073	0.04	0.12	0.06	0.32	0.748
Openness to experience	0.56	0.17	0.45	3.32	0.002	– 0.03	0.16	– 0.03	0.21	0.833
Agreeableness	0.45	0.18	0.40	2.48	0.019	– 0.13	0.15	– 0.14	0.87	0.391
Conscientiousness	– 0.24	0.18	– 0.23	1.35	0.188	0.10	0.16	0.12	0.65	0.520
Hypothesized individual differences										
Autonomy causality orientation						0.38	0.14	0.40	2.71	0.011
Personal growth initiative						0.43	0.18	0.51	2.37	0.025

Table 4
Regressions to predict teachers' T1 and T2 controlling motivating style.

Predictor variable	T1 controlling motivating style					T2 controlling motivating style				
	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>
Constant	– 2.66	2.48				– 0.12	2.30			
T1 controlling motivating style	–	–				0.54	0.16	0.52	3.47	0.002
Statistical controls—student variables										
Students' collective autonomous motivation	0.47	0.36	0.17	1.32	0.197	0.21	0.34	0.07	0.60	0.551
Statistical controls—teacher variables										
Teacher gender	0.56	0.28	0.27	2.00	0.055	0.19	0.30	0.09	0.65	0.523
Years of teaching experience	0.01	0.02	0.07	0.59	0.559	– 0.01	0.02	– 0.02	0.21	0.836
Grade level taught	0.10	0.07	0.17	1.36	0.185	0.13	0.07	0.22	1.84	0.076
Big five personality traits										
Extraversion	0.04	0.13	0.05	0.34	0.738	0.10	0.13	0.11	0.77	0.449
Neuroticism	0.03	0.16	0.03	0.19	0.854	0.02	0.15	0.02	0.11	0.914
Openness to experience	– 0.06	0.18	– 0.04	0.31	0.760	– 0.16	0.18	– 0.10	0.85	0.403
Agreeableness	– 0.35	0.19	– 0.26	1.80	0.082	– 0.03	0.20	– 0.02	0.16	0.876
Conscientiousness	0.09	0.19	0.07	0.49	0.630	– 0.25	0.19	– 0.19	1.31	0.201
Hypothesized individual differences										
Control causality orientation	0.69	0.19	0.49	3.74	0.001	0.46	0.22	0.32	2.06	0.049
Authoritarianism	1.06	0.30	0.47	3.55	0.001					

($R^2 = 0.55$), with individually significant effects for students' high collective autonomous motivation ($\beta = 0.35$, $p = 0.015$), (few) years of teaching experience ($\beta = -0.36$, $p = 0.006$), high openness to experience ($\beta = 0.45$, $p = 0.002$), and high agreeableness ($\beta = 0.40$, $p = 0.019$). On the second step, we used the forward selection procedure to test if any of the three hypothesized surface traits (autonomy causality orientation, personal growth initiative, transactional leadership) could explain additional unique variance in T1 autonomy-supportive motivating style. None was able to do so. For exploratory (rather than for hypothesis-testing) purposes, we conducted an additional step by using the forward selection procedure to test if any of the five “cross-over” surface traits associated with the controlling motivating style (control causality orientation, transactional leadership, authoritarianism, closed-mindedness, and discomfort with ambiguity) might explain additional variance in T1 autonomy-supportive style above and beyond the already-entered variables, but none was able to do so. Results from the final 9-predictor regression to predict the T1 autonomy-supportive motivating style appear on the left side of Table 3.

3.5. Predicting post-intervention changes in the autonomy-supportive motivating style

To predict teachers' post-intervention changes in T2 autonomy-

supportive motivating style, we conducted a second hierarchical regression. On the first step, we entered T1 autonomy-supportive motivating style, the same four statistical controls, and the big five dispositional traits. This preliminary 10-predictor simultaneous regression was significant overall, $F(10, 30) = 2.32$, $p = 0.037$ ($R^2 = 0.44$), but the only individually significant effect was for T1 autonomy-supportive motivating style ($\beta = 0.44$, $p = 0.039$). On the second step, we again used the forward selection procedure to test if any of the three hypothesized individual differences could explain additional unique variance in T2 autonomy-supportive motivating style. Two personality-based antecedents were able to do so. This 12-predictor regression was significant overall, $F(12, 28) = 4.53$, $p < 0.001$ ($R^2 = 0.66$), and the amount of variance accounted for by the 12-item regression increased significantly over the 10-item regression ($\Delta R^2 = 0.22$, $p < 0.001$). Individually significant effects emerged for a high level of the autonomy causality orientation ($\beta = 0.40$, $p = 0.011$) and a high level of personal growth initiative ($\beta = 0.51$, $p = 0.025$). For exploratory purposes, we again used the forward selection procedure to test if any of the five “cross-over” surface traits associated with the controlling style might explain additional variance in the T2 autonomy-supportive style above and beyond the already-entered variables, but none was able to do so. Results from the final 12-predictor regression to predict the T2 autonomy-supportive motivating style appear on the right side of

Table 3.

3.6. Predicting initial controlling motivating style

To predict teachers' pre-intervention T1 controlling motivating style, we conducted a third hierarchical regression. On the first step, we entered the four statistical controls (i.e., teachers' gender, grade level taught, teaching experience, students' collective autonomous motivation) and the big five dispositional traits. This preliminary 9-predictor simultaneous regression was not significant overall, $F(9, 31) = 0.84$, $p = 0.583$ ($R^2 = 0.20$) and no variable was able to enter as an individually significant predictor. On the second step, we used the forward selection procedure to test if any of the five hypothesized surface traits could explain unique variance in T1 controlling motivating style. Two individual differences were able to do so. This 11-predictor regression was significant overall, $F(11, 29) = 5.26$, $p < 0.001$ ($R^2 = 0.67$), and the amount of variance accounted for by the 11-item regression increased significantly over the 9-item regression ($\Delta R^2 = 0.47$, $p < 0.001$). Individually significant effects emerged for a high level of the control causality orientation ($\beta = 0.49$, $p < 0.001$) and a high level of authoritarianism ($\beta = 0.47$, $p < 0.001$). We again used the forward selection procedure to explore if any of the three “cross-over” surface traits associated with the autonomy-supportive style might explain additional variance in T1 controlling style, but none was able to do so. Results from the final 11-predictor regression to predict the T1 controlling motivating style appear on the left side of Table 4.

3.7. Predicting post-intervention changes in the controlling motivating style

To predict teachers' post-intervention changes in T2 controlling motivating style, we conducted a fourth and final hierarchical regression. On the first step, we entered T1 controlling motivating style, the same four statistical controls, and the big five dispositional traits. This preliminary 10-predictor simultaneous regression was significant overall, $F(10, 30) = 5.33$, $p < 0.001$ ($R^2 = 0.64$), but the only individually significant effect was for T1 controlling motivating style ($\beta = 0.72$, $p < 0.001$). On the second step, we again used the forward selection procedure to test if any of the five hypothesized individual differences could explain additional unique variance in T2 controlling motivating style. One additional individual difference was able to do so. The final 11-predictor regression was significant overall, $F(11, 29) = 5.75$, $p < 0.001$ ($R^2 = 0.69$), and the amount of variance accounted for by the 11-item regression increased significantly over the 10-item regression ($\Delta R^2 = 0.05$, $p = 0.049$). Individually significant effects emerged for T1 controlling motivating style ($\beta = 0.52$, $p = 0.002$) and a high level of the control orientation ($\beta = 0.32$, $p = 0.049$). We again used the forward selection procedure to explore if any of the three “cross-over” surface traits associated with the autonomy-supportive style might explain additional variance in T1 controlling style, but none was able to do so. Results from the final 11-predictor regression to predict the T2 controlling motivating style appear on the right side of Table 4.

4. Discussion

The present study sought to understand which personality-based antecedents tended teachers toward an autonomy-supportive style and which other personality-based antecedents tended teachers toward a controlling style. Teachers did vary considerably at the beginning of the semester in their pre-intervention (T1) tendency toward the autonomy-supportive ($M = 4.57$, $SD = 0.86$, on a 1–7 scale) and the controlling ($M = 3.95$, $SD = 1.03$, on a 1–7 scale) motivating styles. Levels of openness to experience and agreeableness predicted T1 autonomy support, while level of authoritarianism and the control causality orientation predicted T1 teacher control. We also sought to investigate

which personality-based antecedents might function as a catalyst for using the ASIP experience as a professional developmental opportunity to meaningfully upgrading the quality of one's classroom motivating style (i.e., become more autonomy supportive, less controlling). Levels of the autonomy causality orientation and personal growth initiative predicted a T2 increase in the autonomy-supportive style, while level of the control causality orientation predicted the post-intervention T2 maintenance of the controlling style.

4.1. Who was characteristically autonomy supportive?

Several variables explained teachers' high, rather than low, pre-intervention T1 autonomy-supportive motivating style. One antecedent was having autonomously-motivated students. This suggests that teachers tend toward an autonomy-supportive motivating style to the extent that their students tend toward autonomous motivation. A second antecedent was having little teaching experience. It is not clear if new teachers tend toward higher autonomy support or if veteran teachers tend toward lower autonomy support, but the former may be more likely because inexperienced preservice teachers do tend to begin the profession with a highly autonomy-supportive style but become less autonomy supportive after taking full responsibility for their own classrooms (Hoy & Woolfolk, 1990). Two big five traits were individually predictive—openness to experience and agreeableness. One reason why a high level of openness to experience may tend teachers toward an autonomy-supportive style is because openness attracts teachers to new and non-traditional ways of motivating one's students (McCrae, 1987). One reason why a high level of agreeableness may tend teachers toward an autonomy-supportive style is because it helps teachers cope with students' problems (e.g., disengagement, misconduct, poor performance) by listening, understanding, displaying patience, and accepting expressions of negative affect as okay (i.e., by relying on autonomy-supportive instructional strategies).

None of the three hypothesized personality-based antecedents uniquely predicted teachers' T1 autonomy-supportive motivating style. As shown in Table 2, both surface traits were highly, positively correlated with T1 autonomy support ($r = 0.45$, $p < 0.001$, for autonomy causality orientation, and $r = 0.51$, $p < 0.001$, for personal growth initiative), but they were not able to explain additional unique variance above and beyond the earlier-mentioned predictors. This is because both showed the same strong positive intercorrelations (i.e., shared predictive capacity) with both openness to experience and agreeableness (all four r 's ≥ 0.37 ; see Table 2).

4.2. Who became more autonomy supportive?

Two of the three hypothesized antecedents explained who was most able to capitalize on the professional developmental opportunity (i.e., the ASIP) to meaningfully upgrade the quality of their post-intervention classroom motivating style—namely, autonomy causality orientation and personal growth initiative (but not transformational leadership). Autonomy causality orientation may have predicted post-intervention gains in autonomy support because an autonomy causality orientation reflects an understanding that internal causalities (e.g., interests, personal goals) are the most reliable and effective sources of motivation. Believing this, teachers with a high level of an autonomy causality orientation likely reacted positively to the various recommended instructional strategies designed to spark students' interest and satisfy their psychological needs during instruction (e.g., vitalize students' inner motivational resources). During their intervention experience, these teachers likely discovered new instructional strategies that could reliably and effectively vitalize and satisfy students' inherent motivations.

Personal growth initiative is both a striving for personal growth as well as a developed set of skills that help make self-improvement possible (Robitschek et al., 2012). The level of personal growth initiative a

teacher possesses affects his or her responsiveness to new opportunities to grow, and it predicts how actively teachers strive to capitalize on the specific growth opportunities that come their way (Robitschek et al., 2012). In the design of our study, we conceptualized the ASIP intervention as one such potential growth opportunity for teachers. Teachers with a high level of personal growth initiative did become more autonomy supportive post-intervention, and two possible reasons why this professional development occurred was because these teachers (1) intentionally and actively involved themselves in the semester-long professional developmental opportunity (ASIP) and (2) tended to have the skill set within them to undertake such an intentional self-change in their motivating style (e.g., being ready for change, making plans for intentional personal growth, using available resources, and following through on one's plans for intentional personal growth).

The one hypothesized antecedent that did not predict a change in T2 autonomy support was transformational leadership. We suggest two possible explanations for this null effect—one that is conceptual and a second that is statistical. Conceptually, transformational leadership is leadership, and it is likely that autonomy support is not rooted in leading others but, instead, in supporting the inner direction they already possess (Kaplan & Assor, 2012). Statistically, transformational leadership was positively correlated with T2 autonomy-supportive motivating style ($r = 0.48$, see Table 2), but it was also equally positively correlated with the autonomy causality orientation and personal growth initiative (the three shared a good deal of common variance). The measure used in the present study yielded a low alpha coefficient ($\alpha = 0.50$), which also limited the predictive power of this variable. Perhaps a study with a larger sample size (i.e., more statistical power) or even a different measure (operational definition) would allow transformational leadership to emerge as an individually significant antecedent, a possibility we suggest for future research.

4.3. Who was characteristically controlling?

Two of the five hypothesized personality-based antecedents explained who was characteristically controlling—namely, control causality orientation and authoritarianism (but not transactional leadership, closed-mindedness, or discomfort with ambiguity). The control causality orientation reflects an understanding that external causalities (e.g., incentives, social demands) are the reliable and effective motivational sources of people's behavior. Believing this, it makes sense that teachers with a high level of the control causality orientation would tend to use instructional strategies that introduced environmentally-generated sources of motivation, such as directives and commands, pressuring language, and the offering of environmental sources of motivation (e.g., stickers, point systems).

Authoritarianism is characterized by the belief that students (e.g., subordinates) should submit to and obey the teacher's authority (Altemeyer, 1998). The teacher's authority or power is seen as legitimate because of higher age, social status, and professional expertise. The authoritarian personality sees the teacher's classroom exercise of authority and leadership as a constructive and orderly way to increase prescribed behaviors (e.g., do your homework) and to decrease proscribed behaviors (e.g., do not run in the hallways). Thus, a high level of authoritarianism is closely related with a conventional (i.e., teacher-centered) classroom and with a conventional (i.e., controlling) motivating style.

Transactional leadership, closed-mindedness, and discomfort with ambiguity were all unable to explain unique variance in the controlling motivating style. It is worth highlighting, however, that all three personality-based antecedents did correlate significantly with the controlling motivating style (both at T1 and at T2). The reason these three predictors were not able to enter the regression as individual predictors, we believe, is because they were positively intercorrelated with both the control causality orientation and authoritarianism (and even with the Big Five traits). So, all five surface traits were at least somewhat

associated with the controlling motivating style, but the control causality orientation and authoritarianism were more closely associated with this style. Perhaps a study with larger statistical power (larger N) would allow these three additional predictors to explain additional variance in the controlling motivating style, another possibility we suggest for future research.

4.4. Who remained controlling? (who resisted the ASIP)

Two variables explained teachers' T2 level of the controlling motivating style. The first was teachers' T1 level of the controlling motivating style. This suggests that the controlling motivating style is relatively stable and not so open to change through professional developmental experiences, or at least that it is not as open to change in the same way that an autonomy-supportive motivating style is.

The one personality-based antecedent that explained a high level of the T2 controlling motivating style was a high level of the control causality orientation. Given this finding, we suspect that, during the intervention and throughout the semester, teachers with a high control causality orientation likely found the intervention's autonomy-supportive message to be largely inconsistent with, and even in direct conflict against, their understanding of external causalities as the motivational basis of motivation and engagement. These teachers likely disagreed with, questioned, and counter-argued against the recommended instructional strategies. That is, these teachers likely resisted the ASIP. If so, the intervention may have had little effect on teachers with a control causality orientation. Another way of interpreting this same finding, however, is to suggest that teachers with a low control causality orientation were relatively more open to the intervention's message and hence were more open to working through the process of adopting a significantly less controlling post-intervention motivating style.

4.5. Limitations

The study had three notable limitations. One limitation was the study's small sample size. To understand how much of a limitation our sample size was to reaching generalizable conclusions, we calculated what the ideal sample size would be for a F-test-based multiple regression that tested to detect three moderately potent antecedents of an outcome ($d = 0.30$) among a set of 18 total predictors (as in Tables 3 and 4) using conventional statistics ($\alpha = 0.05$, $\text{power} = 0.95$). That ideal sample size would be 63, based on Faul, Erdfelder, Lang, and Buchner's (2007) G*Power 3 software program. Because the sample size was 42, we determined that we were under-powered by about one-third. This low statistical power likely played a key role in understanding why some of the hypothesized personality-based antecedents were unable to emerge as individually significant predictors in the stepwise regressions, despite being correlated as expected with their corresponding motivating style. While recognizing this limitation and its tendency to render our conclusions conservative, it is equally important to point out that our sample featured a crucial compensatory strength—namely, that it was actually a full population and not a sample per se. Because we were able to recruit the full faculty of an elementary school, our data collection avoided the common problem of participant self-selection into (or out of) the study. Given that several personality-based antecedents did predict the motivating styles, even with our relatively low statistical power, we suggest that these new findings justify a fresh call-to-action for future motivating styles research to incorporate a “personality as antecedents” approach.

A second limitation was the lack of a no-intervention control group. We did not include a no-intervention control group in the research design, because our question was not whether the ASIP would work (because this has been demonstrated repeatedly before) but, instead, which personality-based antecedents would explain for whom the intervention would be effective and for whom it would not. The interpretive problem with the lack of a control group, however, is that T1-T2

difference scores can occur for multiple reasons unrelated to the intervention itself. Without a control group, intervention-enabled changes in the motivating styles are confounded with whatever other events might have also occurred during the semester (e.g., perhaps students became more engaged, the curriculum became more conducive to autonomy support, and so forth).

A third limitation was that we assessed the motivating styles with only self-report. This is a limitation because it raises the possibility of demand effects. We would point out, however, that students' independent reports of autonomous motivation did significantly predict teachers' autonomy-supportive motivating style (see left side of Table 3). This shows that scores from one informant (students) corresponded with scores from another informant (teachers). That said, other investigations that utilized a similar teacher-focused intervention have included rater-scored objective ratings of teachers' in-class instructional behaviors (e.g., Cheon et al., 2016), and our study would be made methodologically stronger with the addition of objective ratings of teachers' in-class motivating styles.

Collectively and overall, these three limitations—small sample size, lack of a control group, and lack of objective measures—could be overcome in a future investigation, an empirical effort that seems worthwhile given the generally positive findings from the current study.

4.6. Future research and classroom implications

The empirical study of teachers' motivating styles has been dominated by the study of social contextual factors. The positive findings from the current study, however, represent what we believe to be a new call to action to investigate how personality also affects motivating styles. Future research may investigate other personality variables not included in the present study, such as those associated with autonomous motivation to teach (e.g., autonomous motivation, need satisfaction during teaching; Roth, Assor, Kanat-Maymon, & Kaplan, 2007; Van den Berghe et al., 2014) and teachers' epistemological beliefs about the nature of learning (Roth & Weinstock, 2013). Intrinsic instructional goals (e.g., promote students' personal growth) have also recently been linked to teachers' autonomy-supportive motivating style (Jang, 2017). Social dominance orientation (Pratto, Sidanius, Stallworth, & Malle, 1994), which emphasizes social hierarchies, may also contribute to a controlling motivating style, as might a high level of public self-consciousness, which involves being aware of oneself through the evaluative eyes of others (Scheier & Carver, 1980). Extrinsic instructional goals (e.g., promote students' high test scores) have also been linked to teachers' controlling motivating style (Jang, 2017).

The findings reported in Tables 3 and 4 suggest that teacher-focused interventions on motivating style are not “one size fits all” exercises in teachers' professional development. In other words, they may be relatively more effective for some teachers and relatively less effective for others. This insight suggests a greater need to personally-tailor future interventions, as by providing more individualize feedback, more self-assessment, and more one-on-one mentoring.

The finding that teachers high in the control causality orientation largely resisted the ASIP to maintain a post-intervention controlling style suggest that the ASIP in its current form was lacking some crucial missing ingredient for these teachers. If so, future ASIPs could be re-designed to add an additional part that specifically addressed and worked through the how-to skill of becoming less controlling toward students during instruction. During such an addition, teachers could hear how students react to controlling instruction and also, if they found these student testimonials to be persuasive, how to transform their existing controlling instructional behaviors (e.g., utter directives without rationales, rely on pressuring language) into corresponding autonomy-supportive instructional behaviors (e.g., offer explanatory rationales for teacher requests, rely on invitational and change-oriented language). Whatever the remedy, the findings suggest a prerequisite

need to first address teachers' beliefs and orientations that otherwise interfere with the conceptual change process that allows teachers to upgrade the quality of their classroom motivating style not only toward greater autonomy support and but also toward lesser control.

5. Conclusion

Levels of openness to experience and agreeableness explained teachers' characteristic autonomy-supportive motivating style, while levels of an autonomy causality orientation and personal growth initiative explained their post-intervention gains in autonomy support. Levels of authoritarianism and the control causality orientation explained teachers' characteristic controlling motivating style, while level of a control causality orientation explained their post-intervention maintenance of the controlling motivating style. Taken as a whole, these findings suggest a robust relation between personality and teachers' motivating styles and, in doing so, encourage future research on the personality-based antecedents of teachers' motivating styles.

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The Differential Effects of Parental Involvement on High School Completion and Postsecondary Attendance

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Abstract: Previous studies have shown the impact of parental involvement on a number of student achievement, motivation, and engagement outcomes, but the extent to which parental involvement influences high school completion and postsecondary attendance has received less attention in the literature. Filling that gap, this study replicates and extends previous research (Fan & Williams, 2010) by examining the influence of various dimensions of parental involvement on high school completion and postsecondary attendance (with particular interest in dropouts who later earned GEDs and went on to college). Results show that parents' educational expectations for their children play a significant role in whether students from all backgrounds persist toward completion of high school and whether they attend a postsecondary institution. This study also finds parent participation in school functions to be a significant positive predictor of both high school completion and postsecondary enrollment, while communication between parent and school about

¹ This study is the result of the author's independent research and the views expressed in the study do not necessarily represent the views of the U.S. Department of Education or the United States.

children's school problems is negatively associated with both outcomes. The implications for expanding developmentally appropriate and culturally sensitive policies for family and school engagement are discussed.

Keywords: parental involvement; high school completion; postsecondary attendance

Los efectos diferenciales de la participación de los padres en la asistencia post-secundaria y la finalización de la escuela secundaria

Resumen: Estudios previos han demostrado el impacto de la participación de los padres en una serie de logros de los estudiantes, motivación y resultados de la participación, pero el grado en que la participación de los padres influyen la finalización del secundario y post-secundaria ha recibido menos atención en la literatura. Para atender ese problema, este estudio replica y extiende la investigación anterior (Fan & Williams, 2010) mediante el examen de la influencia de diversas dimensiones de la participación de los padres en la terminación de los estudios y asistencia post-secundaria (con especial interés en los abandonos de estudiantes que más tarde obtuvieron el diploma de finalización GED y que fueron a la universidad). Los resultados muestran que las expectativas educativas de los padres sobre sus hijos tienen un papel importante para que estudiantes de todos los orígenes sociales persistan en la finalización de la escuela secundaria y asistan a una institución de educación superior. Este estudio también revela que la participación de los padres en las actividades escolares puede ser un predictor positivo significativo tanto de la finalización de la escuela secundaria y la matrícula de educación superior, mientras que la comunicación entre padres y escuelas acerca de problemas escolares de los niños se asocia negativamente con ambos resultados. Se discuten las implicaciones para la expansión de las políticas de desarrollo y culturalmente sensibles apropiadas para la participación familiar y escolar.

Palabras clave: participación de los padres; finalización de la preparatoria; asistencia post-secundaria

Os efeitos diferenciais de envolvimento dos pais na conclusão do Ensino Médio e na frequência no Ensino Superior

Resumo: Estudos anteriores demonstraram o impacto do envolvimento dos pais no desempenho do aluno, na motivação e nos resultados da participação, mas em que medida a participação dos pais influenciam a conclusão do Ensino Médio e do Ensino Superior tem recebido menos atenção na literatura. Para resolver este problema, este estudo replica e estende a pesquisa anterior (Fan & Williams, 2010), examinando a influência de várias dimensões de envolvimento dos pais na realização de estudos e de frequência no Ensino Superior (com especial interesse em desistências de estudantes que mais tarde obtiveram certificação em exames supletivos e foram para a universidade). Os resultados mostram que as expectativas educacionais dos pais sobre seus filhos têm um lugar importante para que os estudantes de todas as origens sociais persistam em concluir o ensino médio e frequentem a universidade. Este estudo também revela que o envolvimento dos pais nas atividades escolares pode ser um elemento positivo significativo, tanto da conclusão do ensino médio quanto no ingresso no ensino superior, enquanto a comunicação entre pais e escolas sobre problemas escolares das crianças foi negativamente associado em ambos resultados. As implicações para a expansão das políticas de apropriadas e culturalmente sensíveis para participação familiar e escolar são discutidas nesse artigo.

Palavras-chave: envolvimento dos pais; conclusão do ensino; assistência pós-secundário

Introduction

Guiding students toward high school completion and college enrollment are major goals of the U.S. education system. The individual and societal benefits of higher education, including higher earnings and employment rates, greater job satisfaction and social mobility, healthier lifestyles, and more active citizens, to name a few, are well documented in the literature (e.g., Baum, Ma, & Payea, 2013; Brand & Xie, 2010; Kenkel, 1991; Ou, 2008; Pew Research Center, 2014). For example, in a longitudinal study of high school sophomores in 2002, some 26% of those with less than high school completion in 2012 were unemployed, compared to 15% of those with a high school diploma or general educational development (GED) credential and 5% of those with a bachelor's degree or higher (Lauff & Ingels, 2013). In terms of income, 7% of those with less than high school completion earned an income of \$40,000 or more from employment, compared to 14% with a high school diploma or GED and 33% of those with a bachelor's degree or higher. Receiving public assistance also differentiated the three groups as 47% of cohort members with less than high school completion had received public assistance in 2011, compared to 32% of those with a high school diploma or GED and 5% of those with a bachelor's degree or higher. These statistics are not surprising, given that federal agencies, such as the Bureau of Labor Statistics (BLS) and the U.S. Department of Education, have reported similar patterns for many years (BLS, nd; Kena et al., 2015).

Given these large disparities by educational attainment, factors that lead to the decision to drop out of school have been studied extensively (e.g., Alexander, Entwisle, & Horsey, 1997; Battin-Pearson et al., 2000; Dynarski & Gleason, 1999; Fan & Wolters, 2014; Henry, Knight, & Thornberry, 2012; Neild, Stoner-Eby, & Furstenberg, 2008; Rumberger & Larson, 1998). Student risk factors include living in a single parent household, being economically disadvantaged, and experiencing grade retention, limited English proficiency, emotional and/or behavioral disorders, and learning disabilities, to name a few. However, studies have also found that, when asked, students cite a number of school, family, and work-related reasons for dropping out of school (e.g., Malkus & Sen, 2012), resulting in the need for multiple approaches to address this problem. In particular, the National Dropout Prevention Center/Network (NDPC/N), a well-known and respected clearinghouse for research in this area, promotes 15 strategies shown to be effective at reducing dropout behavior. These strategies range from early interventions, such as increasing preschool participation and family engagement, to making the most of instruction, by providing professional development for teachers of at-risk youth (for more information, see <http://dropoutprevention.org/effective-strategies/>).

Disengagement from school is not only of interest to researchers and practitioners, but also to policymakers who are working to both understand and find solutions to this problem, which disproportionately impacts some student populations (e.g., minorities and low-income students), compared to others. There is strong agreement among federal policymakers that an important part of any strategy to reduce dropout rates (overall and particularly among vulnerable subgroups), is for school leaders to improve family-school relations and increase parental involvement in education (e.g., deCastro & Catsambis, 2009; Hill & Chao, 2009; Hill, Tyson, & Bromell, 2009; Hoover-Dempsey, Ice, & Whitaker, 2009; 107th Congress, 2002). In particular, the 2002 reauthorization of the Elementary and Secondary Education Act (ESEA), better known as the No Child Left Behind Act (NCLB; 107th Congress, 2002), mandated that states seeking funding for Title I (i.e., low-income) schools identify and implement practices for involving parents that are “based on the most current research that meets the highest professional and technical standards, on effective parental

involvement that fosters achievement to high standards for all children.” (Section 1111.d). The 2015 reauthorization, known as the Every Student Succeeds Act, or ESSA, maintains this commitment to parent and family engagement activities (114th Congress, 2015). Hence, the effect of parental involvement on student achievement and dropout behavior is of continuing interest to practitioners and policymakers alike.

Parental Involvement during the Adolescent Years

The belief that children benefit from their parents’ involvement in school-related activities is supported by research, particularly studies of the impact of parental involvement on students’ academic outcomes, behavior, motivation, engagement, and self-efficacy (e.g., Domina, 2005; Fan & Williams, 2010; Jeynes, 2005). However, research also shows a steady decline in parental involvement once children reach the middle and high school years (e.g., Eccles et al., 1993; Epstein & Dauber 1991; Spera, 2005; U.S. Department of Education, 1998). During this time, adolescents begin to express a desire for more independence and autonomy – feelings that are reinforced by the changes in school structure and expectations for independent work that students encounter in secondary school settings (Epstein & Sanders, 2002). Unfortunately, using developmentally appropriate strategies to help adolescents successfully transition from elementary to middle (or from middle to high) school does not appear to be a widespread practice. Rather, middle and high school programs aimed at increasing parental involvement are often uninformed by research and best practice for how to effectively collaborate with parents to support adolescent achievement (Hill & Chao, 2009). At the same time, there is less research evidence on the effects of parental involvement for secondary school outcomes than there is for elementary school outcomes. Thus, not only is it challenging to find ways to keep parents involved during these years, but a greater understanding of the relationship between parental involvement and secondary outcomes – such as high school completion and postsecondary attendance – is also needed.

Parental Involvement and Student Outcomes

Studies have shown the positive impact of parental involvement on a number of proximal and distal student outcomes, including reading and mathematics achievement (Jeynes, 2005; Sheldon & Epstein, 2005; Sirvani, 2007; Sui-Chu & Willms, 1996; Yan & Lin, 2005), student behavior in school (Domina, 2005), school attendance, preparation for class, and course completion (Simon, 2001), student motivation, academic self-efficacy, and engagement (Fan & Williams, 2010; Gonzalez-DeHass et al, 2005), and middle school dropout behavior (Rumberger, 1995). However, not all parental involvement activities have positive effects (Domina, 2005; Fan, 2001; Izzo, Weissberg, Kasprow, & Fendrich, 1999). For example, in an early childhood education study, the quality of parent-teacher interactions predicted improvements in student achievement and behavior but frequent parent-teacher contact was associated with declines in acceptable classroom behavior (Izzo et al., 1999). In Fan’s (2001) study, parents’ aspirations for their children’s educational attainment exceeded all other aspects of parental involvement in predicting middle school students’ academic growth, even after controlling for socioeconomic status (SES). However, some parental involvement behaviors (e.g., education-related communication with child, volunteering at child’s school) were not as consistently predictive of student academic growth, and others (e.g., frequent contact with child’s school) had negative effects on student achievement. Another study on the influence of parental involvement on student achievement of elementary school children found that the statistically significant positive effects of activities such as volunteering at school, and checking

and helping children with homework actually become nonsignificant (and even negative), after controlling for children's prior academic achievement and school and family background characteristics (Domina, 2005). Clearly, more research is needed to replicate and extend the findings in this area and to examine outcomes (e.g., high school completion and postsecondary attendance) for students at higher levels of education than elementary and middle school, where much of the existing research is focused.

Parental Involvement Differences by Race/Ethnicity and SES

Previous research has also examined parental involvement across racial/ethnic groups; however, the evidence is mixed at best. While overall, it may appear that parents of black and Hispanic youth are less involved than white parents (e.g., Yan & Lin, 2005), some studies show – after controlling for other background variables – that black and Hispanic parents may often be more involved than White parents in the education of their children (e.g., Sui-Chu & Willms, 1996). Still, other studies show no differences by race/ethnicity at all (e.g., Hill et al., 2004). Additionally, research on the effectiveness of parental involvement across different socioeconomic groups is also inconclusive. That is, well-educated and affluent parents tend to draw on their experiences and understanding of education processes and operations to both advocate for their children and engage in practices that align with school efforts. However, research has also shown those same practices may be observed among less-educated/lower-income parents, once they are taught how to navigate the complex system of American schools and how to support their children in ways that promote academic success (Nicolau & Ramos, 1990; Olivos, 2006; Smith, Robbins, Stagman, & Mahur, 2013). Further, varying cultural perceptions of parent and teacher roles, as well as language differences and school and community barriers to parental involvement, may also contribute to differences in parental involvement by race/ethnicity and SES. For example, in many Spanish-speaking countries, teachers and school leaders are viewed as education experts, and therefore many Hispanic parents in the U.S. (both native and foreign-born) may defer to, rather than question or oppose, school officials when making decisions for their children (deCastro & Catsambis, 2009). Unfortunately, this kind of behavior can be mistaken for apathy on the part of parents who may just be less comfortable than other parents when it comes to directing their children's education. In this, and possibly other ways, existing theory and research are somewhat limited in explaining apparent differences between racial/ethnic and socioeconomic groups, which can hinder efforts to develop positive parent-school relationships.

Dimensions and Types of Parental Involvement

Another challenge to measuring parental involvement is that there is no consistent definition of what it entails. In general, researchers agree that parental involvement encompasses a whole host of activities and behaviors that promote the academic and social success of one's children (Fishel & Ramirez, 2005) and that it is better understood as a multidimensional construct (Epstein, 1995; Fan & Williams, 2010; Grolnick & Slowiaczek, 1994). Epstein (1995) – one of the most widely cited researchers to first suggest a multidimensional framework for parental involvement – ultimately conceptualized it as six types of activities that are essential to a comprehensive program of a family, school, and community partnership: (1) parenting, (2) communicating, (3) volunteering, (4) learning at home, (5) decision making and (6) collaborating with the community. According to Epstein, students are best served when schools help families establish supportive home environments for learning, provide two-way systems of communication about school programs and student progress,

actively recruit and organize help from parents, facilitate at-home learning, involve parents from all race and socioeconomic backgrounds as representatives and leaders on school committees, and identify and effectively integrate community resources to strengthen school programs. Obviously, these practices, when implemented, are meant to more deeply engage parents in the school community than simply providing information through newsletters and progress reports. Other researchers (e.g., Henderson, 2002; Olivos, 2006) share this perspective, noting that authentic programs for increasing school-family engagement will recognize and value differences in the ways that parents – especially those of diverse racial/ethnic groups – interact with their children's schools.

While Epstein (1995) and others (e.g., Singh, Bickley, Trivette, Keith, & Keith, 1995) developed theories based either on their intuition about what should logically constitute parental involvement or by analyzing the content of questionnaire items, Fan (2001) was one of the first to empirically test these theories and demonstrate – through exploratory factor analysis and latent growth curve analysis – the existence of multiple and distinct dimensions of parental involvement and their effects on students' academic growth in high school. Using 14 survey items related to parental involvement from NCES' National Education Longitudinal Study of 1988 (NELS:88), Fan identified seven dimension of parental involvement: (1) TV rules, (2) Communication, (3) Contact with School, (4) PTA, (5) Volunteer, (6) Supervision, and (7) Education Aspiration. Fan's study found comparable levels of parental involvement across racial/ethnic groups and that parents' aspirations for their children's educational attainment was a consistent and positive predictor of students' academic growth in reading, mathematics, science and social studies from 1988 to 1992.

More recently, Fan and Williams (2010) used a similar approach as Fan (2001) in examining the differential effects of eight parental involvement dimensions on student motivation, academic self-efficacy, and engagement in a nationally representative sample of high school sophomores. The dimensions studied included: (1) parental aspirations for their children's educational attainment, (2) parent participation in school functions, (3) family rules reflecting parental home supervision, (4) parental advising, (5) parent participation in their children's extracurricular activities, (6) parent-school communication regarding children's problems at school, (7) school-initiated contact with parents regarding benign school issues, and (8) parent-initiated contact with schools regarding benign school issues. In this later study, Fan and Williams (2010) separated parent-school communications regarding children's problems at school from parent-school communications regarding benign issues in order to examine the negative relationship between parent-school communication and student academic outcomes (i.e., behavior and achievement) uncovered in earlier studies (Fan, 2001; Izzo et al., 1999). Also, Fan and Williams separately examined parent-initiated and school-initiated contact regarding benign school issues as a way of investigating the differential effects of each on student motivation, academic self-efficacy, and engagement. Their results demonstrated – once again – the powerful association between parents' educational aspirations for their children and student academic outcomes. Parent aspirations and school-initiated contact with parents showed strong positive effects on students' school engagement and their intrinsic motivation and self-efficacy towards mathematics and English. However, similar to previous research, parent-school contact regarding students' school problems was negatively associated with all outcomes studied. Finally, parental advising positively predicted students' academic self-efficacy and intrinsic motivation in English, while family rules for watching television positively predicted students' intrinsic motivation and engagement towards mathematics and English.

Parental Involvement, High School Completion, and Postsecondary Attendance

All of the above cited studies show the effects of parental involvement – whether positive or negative – on a number of student achievement, motivation, and engagement outcomes. However, the extent to which specific parental contact and involvement practices influence middle and high school completion and postsecondary attendance has received less attention in the literature. Rumberger's (1995) study on the differential effects of parental involvement activities on middle school dropout behavior is a notable exception. He found that the most powerful parental involvement factors – among those studied – were the extent to which parents participate in school parent-teacher organizations and act as volunteers at their child's school. Students with less academic support and supervision were 34% more likely to drop out than other students. Also, students whose parents had low educational expectations for them (i.e., only expecting high school graduation) were more than five times as likely as other students to drop out of school in the eighth grade. Additionally, Ross et al (2012) investigated the effects of a number of variables thought to impact immediate postsecondary enrollment after high school (e.g., GPA, mathematics achievement, previous grade retention, school absenteeism, participation in high school sports and extracurricular activities, discussing coursework with parents, working at a job more than 30 hours per week, and having close friends who dropped out of school). The study showed that, after controlling for various student and family background variables, students who often discussed school courses with their parents had 44% higher odds of immediate enrollment in postsecondary education, compared to those who never had these discussions with their parents. These few studies notwithstanding, more research is needed to understand how parental involvement positively influences secondary school outcomes and how education policies – such as Title I provisions under ESEA – can be leveraged to capitalize on those relationships.

Study Purpose

This study replicates and extends previous research by examining the impact of various dimensions of parental involvement (as defined in Fan & Williams, 2010) on high school completion and postsecondary attendance (with particular interest in dropouts who later earned GEDs and went on to college). This study fills an important gap in the emerging literature on parental involvement and has implications for expanding developmentally appropriate and culturally sensitive policies for family and school engagement. The study answers the following research question:

Are specific dimensions of parental involvement previously shown to impact the likelihood of middle school dropout behavior (Rumberger, 1995) and/or shown to increase high school students' academic self-efficacy, engagement, and intrinsic motivation in mathematics and English (Fan & Williams 2010) similarly associated with high school completion and postsecondary attendance?

The answer to this question may depend – to some extent – on other factors, such as student and family background characteristics. In fact, among a nationally representative sample of high school sophomores in 2002, Malkus and Sen (2012) showed that high school completion status (in 2006) varied by a number of student characteristics. For example, male students and black, Hispanic, and low SES students were more often represented among dropouts than they were among high school graduates or GED recipients. More specifically, Malkus and Sen reported that 49% of high school graduates were male compared to 59% of GED recipients and 60% of dropouts. In terms of race/ethnicity, 13% of high school graduates were Black, compared to 16% of GED recipients and 18% of dropouts. The percentages for Hispanic/Latino high school graduates,

GED recipients, and dropouts were 14%, 16%, and 33%, respectively. That study also reported that 22% of high school graduates were from the lowest socioeconomic status quartile, compared to 35% of GED recipients and 55% of dropouts who also came from low-income families. Furthermore, parental involvement has been shown to vary by race/ethnicity, socioeconomic status, and family structure (Aston & McLanahan, 1991; Desimone, 1999; Zellman & Waterman, 1998). Given these findings, this study controls for the influence of student and family background variables (i.e., race/ethnicity, sex, and family income).

Methodology: Data, Measures, and Analysis

Data

To replicate and extend the analysis conducted in Fan & Williams (2010), I used data from the Education Longitudinal Study of 2002 (ELS: 2002), a nationally representative study of tenth graders in 2002 and 12th graders in 2004 and which followed the cohort through 2012, when most members would have been approximately 26 years old (Lauff & Ingels, 2013). ELS: 2002 – one of many school-based longitudinal studies conducted by the National Center for Education Statistics (NCES) – followed students as well as high school dropouts, monitoring their transitions to postsecondary education, the labor force, and family formation. The four rounds of data collection on this cohort of high school sophomores include the base year in 2002, the first follow-up in 2004, the second follow-up in 2006, and the third follow-up in 2012.

In addition to collecting information from the cohort, ELS includes data from questionnaires administered to the students' parents, teachers, librarians, and school administrators. The base year (2002) sample included 16,197 tenth graders, weighted to represent the approximately 3 million high school sophomores enrolled in U.S. schools. Among those sampled, 15,362 students and 13,488 parents completed questionnaires. In the weighted sample, 50.0% of students were female and 50.0% were male; 60.3% were White, 15.9% were Hispanic/Latino, 14.4% were Black, 4.2% were Asian/ Pacific Islander, 1.0% were American Indian/Alaska Native, and 4.3% were of two or more races (Ingels, Burns, Chen, Cataldi, & Charleston, 2005). All four rounds of data collection achieved weighted response rates of 84% and above. Nonresponse bias analyses were conducted at each round to adjust for nonresponse so that the data could be used with confidence. During this process, NCES identified 78 high-nonresponse student questionnaire variables in the dataset. Among these variables, the nonresponse bias analysis detected a bias of 5% or higher in less than one half of 1% of the observations. For more information on the nonresponse bias analysis, and other possible limitations of the dataset, see the ELS data file documentation (Ingels et al., 2014).

Similar to previous NCES longitudinal studies, ELS: 2002 surveyed parents about specific activities they engage in with their tenth grader. The availability of multiple items related to parental involvement makes it possible to examine how the various dimensions of parental involvement may affect student outcomes, including high school completion and postsecondary attendance.

Measures: Parental Involvement Variables

The types of parental involvement I examine here include (1) parent participation in their children's extracurricular activities, (2) parental advising, (3) parent-school communication regarding children's problems at school, (4) school-initiated contact with parents regarding benign school issues, (5) parent-initiated contact with schools regarding benign school issues, (6) parent

participation in school functions, (7) parental aspirations for their children's educational attainment, and (8) family rules reflecting parental home supervision. In the base year of ELS: 2002, parents responded to questionnaire items asking about various activities that they had engaged in with their child or their child's school. The selected questionnaire items for this study are those used to represent the eight dimensions of parental involvement, as defined by Fan and Williams (2010). These items are similar to those used in a number of empirical studies and have been shown to have acceptable reliability and validity (e.g., Fan, 2001; Hill & Craft, 2003; Yan & Lin, 2005). Table 1 provides a list of the items I used to measure each parental involvement dimension (including the internal consistency estimates reported in Fan & Williams, 2010). The parental aspiration dimension is a composite variable that NCES created (and imputed using a weighted sequential hot deck procedure) for the ELS: 2002 dataset. Unfortunately, the family rules dimension, composed of items measuring the extent to which parents reported having four specific rules for their tenth-grader (i.e., maintaining a certain grade average, doing homework, doing household chores, and watching television) did not exhibit adequate internal consistency (Cronbach's $\alpha = .59$) in the Fan and Williams (2010) study. Therefore, in this study, I – like Fan and Williams (2010) – treated the four variables separately in the analyses.

Table 1

Selected ELS: 2002 Questionnaire Items Used to Measure 7 Dimensions of Parental Involvement

Dimension	Questionnaire Items
Parent participation in extracurricular activities with children (Cronbach's alpha = .76)	Looking back over the past year, how frequently did you and your tenth grader participate in the following activities together? (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Frequently) Attending concerts, plays, or movies outside of school (BYP57C) Attending sporting events outside of school (BYP57D) Attending family social functions (party, wedding) (BYP57F) Taking day trips or vacations (BYP57G) Working on a hobby or playing sports (BYP57H) Going to restaurants/eating out (BYP57J) Doing something else fun together (BYP57L)
Parental advising (Cronbach's alpha = .77)	In the first semester or term of this school year, how often have you and/or your spouse/partner provided advice or information about the following to your tenth grader? (1 = Never, 2 = Sometimes, 3 = Often) Selecting courses or programs at school (BYP56A) Plans and preparation for college entrance exams such as ACT, SAT, or ASVAB (BYP56B) Applying to college or other schools after high school (BYP56C) Specific jobs your tenth grader might apply for after high school (BYP56D) Community, national, and world events (BYP56E) Things that are troubling your tenth grader (BYP56F)
Parent-school communication concerning children's school problems (Cronbach's alpha = .76)	Since your tenth grader's school opened last fall, how many times have you or your spouse/partner been contacted by the school (or you or your spouse/partner contacted the school) about the following? (1 = None, 2 = Once or twice, 3 = Three or four times, 4 = More than four times) Your tenth grader's poor performance in school (BYP52A and BYP53A) Your tenth grader's problem behavior in school (BYP52F and BYP53F)
School-initiated contact with parents and Parent-initiated contact with school (Cronbach's alpha = .65 and .71, respectively)	Since your tenth grader's school opened last fall, how many times have you or your spouse/partner been contacted by the school (or you or your spouse/partner contacted the school) about the following? (1 = None, 2 = Once or twice, 3 = Three or four times, 4 = More than four times) Your tenth grader's school program for this year (BYP52B and BYP53B) Your tenth grader's plans after leaving high school (BYP52C and BYP53C) Your tenth grader's course selection for entry into college, vocational, or technical school after completing high school (BYP52D and BYP53D) Information on how to help your tenth grader at home with specific skills or homework (BYP52I and BYP53I)

Table 1 continued

Selected ELS: 2002 Questionnaire Items Used to Measure 7 Dimensions of Parental Involvement

Dimension	Questionnaire Items
Parent participation in school functions (Cronbach's alpha = .72)	In this school year, do you or your spouse/partner do any of the following? (0 = No, 1 = Yes) Belong to the school's parent-teacher organization (BYP54A) Attend meetings of the parent-teacher organization (BYP54B) Take part in the activities of the parent-teacher organization (BYP54C) Act as a volunteer at the school (BYP54D) Belong to any other organization with several parents from your tenth grader's school (for example, neighborhood or religious organizations) (BYP54E)
Parental aspirations for children's postsecondary education	How far in school the parent wants their tenth grader to go (BYPARASP) 1 = Less than high school graduation 2 = High school graduation or GED only 3 = Attend or complete 2-year college/school 4 = Attend college, 4-year degree incomplete 5 = Graduate from college 6 = Obtain master's degree or equivalent 7 = Obtain PhD, MD, or other advanced degree
Family Rules	Are there family rules that are enforced for your tenth grader about any of the following activities? (0 = No, 1 = Yes) Maintaining a certain grade average (BYP69A) Doing homework (BYP69B) Doing household chores (BYP69C) Watching television (BYP69D)

Measures: Student and Family Background Variables

The student and family background variables I used in this analysis include sex, race/ethnicity, and socioeconomic status (SES). For all three of these variables, missing values were imputed by NCES before releasing the ELS: 2002 dataset. Sex was constructed from the base-year student questionnaire and when missing, NCES determined sex using the school roster or by logical imputation using the student's first name. Race/ethnicity was also self-reported and imputed by NCES using similar procedures as for the sex variable. For the current study, I used the following six race categories: White, American Indian/Alaska Native, Asian/Pacific Islander, Black, Hispanic, and two or more races. With the exception of the Hispanic category, all race categories exclude students of Hispanic or Latino origin. The variable I used to describe students' SES is a composite variable within the ELS dataset that NCES constructed from five component variables: father's education level, mother's education level, family income, father's occupation, and mother's occupation. Data for all five components were collected on the parent questionnaire and imputed

when missing. For more information on NCES imputation procedures, see the ELS data file documentation (Ingels et al., 2014).

Measures: Dependent Variables

In this study, I examine the effects of various parental involvement behaviors on two educational outcomes – high school completion (either through high school diploma or GED) and postsecondary attendance by 2006. High school completion was measured by NCES using self-reported data from the second follow-up student questionnaire in 2006. Where missing, data from transcripts or the first follow-up questionnaire in 2004 were used. Postsecondary attendance status was taken from the second follow-up student questionnaire, and is based on students' self-report of whether they had ever attended a postsecondary institution since high school. Where missing, NCES provides imputed data in the ELS: 2002 dataset.

Analysis

Similar to Fan and Williams (2010), the current study accounts for the complex, two-stage (i.e., school selection, followed by student selection) sampling design employed by ELS: 2002. I applied the full sample weight (F2BYWT) to all estimates and used Taylor-linearized variance estimation (using primary sampling unit and strata weighting) to produce unbiased estimates of the standard errors reported in this paper. The Taylor series approximation technique makes appropriate adjustments for participant nonresponse and unequal probabilities of selection – two complex survey issues that can seriously affect variance estimation, if not adequately addressed. I conducted all of the analyses using complex survey (i.e., SVY) commands within the STATA 13 statistical software package (StataCorp, 2013) and I included appropriate weights (at the stratum, cluster, and student level) to adjust for nonresponse and the unequal probability of selection associated with ELS: 2002.

As is common with many large-scale data sets, ELS: 2002 contains missing data across a number of variables, including the parental involvement questionnaire items involved in this study. The amount of missing data (across all variables in this study) ranged between 0.2% and 25.9% (unweighted), which is large enough to warrant closer attention (Graham & Hofer, 2000). Fortunately, there are many options for addressing missing data, such as traditional methods of listwise or pairwise deletion, means substitution, etc. However, these approaches can result in drastic reductions in sample size and do not account for nonrandom missing data. The risks of producing biased estimates using these methods – and the advantages of other approaches, such as multiple imputations – are well-documented (Baraldi & Enders, 2010; Fichman & Cummings, 2003; Howell, 2007; Little & Rubin, 1987; Rubin, 1987).

To avoid some of the issues associated with these approaches, in this study I employed sequential regression multivariate imputation (SRMI) to generate five sets of imputed data for the analysis. SRMI is a flexible technique that can handle variables of different types (e.g., categorical, continuous) when selecting appropriate regression models to predict missing data. Another advantage is that SRMI makes use of all of the information in a dataset, when imputing data for each missing value. I conducted the SRMI method using the “mi impute chained” command in STATA 13, which supports multivariate imputation using chained equations (ICE). For more information on the SRMI procedure, see Raghunathan, Lepkowski, Van Hoewyk & Solenberger (2001).

After creating the parental dimension scales from the individual questionnaire items, I employed the mi impute chained procedure in STATA 13 to produce the five imputed datasets.

Then, I performed descriptive analyses to describe various characteristics and outcomes for the sample.

To study the effects of parental involvement on high school completion via diploma or GED certificate, I conducted logistic regression analyses using data for the entire cohort of sophomores in 2002 and then separately on the subpopulation of non-diploma recipients (primarily sophomores who dropped out of high school at some point between the base year and second follow up data collections in 2002 and 2006, respectively). To study the effects of parental involvement on college-going by 2006, I performed similar analyses for the sophomore cohort and the subpopulation of non-diploma recipients. Additionally, I conducted each logistic regression analysis across the five imputed datasets using the “mi estimate: svy” command in STATA 13. In the analyses, I controlled for student and family background variables, namely sex, race/ethnicity, and SES.

Unless otherwise indicated, study results are based on imputed data from the five generated datasets. Only statistically significant differences are highlighted in the comparisons. However, STATA’s mi estimate command does not support t-tests for comparing estimates with imputed data. Therefore, in the descriptive analysis of means and percentages, I compared the 95% confidence intervals for each of the parental involvement variable estimates. I present standardized regression coefficients for the multivariate analyses.

Results

Table 2 shows the weighted, non-imputed, percentage of spring 2002 tenth graders, by high school completion status in 2006. Eighty-eight percent (88%) of sophomores in 2002 had earned a high school diploma by 2006, compared to 4% who dropped out of high school but later received a GED and 8% with less than high school completion.

Table 2

Percentage of spring 2002 sophomores, by high school completion status in 2006

High school graduates		GED recipients		Non-completers ¹	
Percentage	SE	Percentage	SE	Percentage	SE
87.8	0.45	3.9	0.22	8.2	0.39

Note: Table values represent weighted, non-imputed data.

¹Includes students receiving a certificate of attendance, and those still enrolled in high school in 2006. Students receiving certificates of attendance and those still enrolled in high school in 2006 represent approximately one percent of the unweighted study sample.

Table 3a presents the means and standard errors for each of the parental involvement variables, overall and by high school completion status. Among the four types of parental involvement that parents were asked to rate on a 4-point scale, overall (and across all high school completion categories) the highest averages were reported for parent participation in extracurricular activities with children ($M = 3.06$, $SE = .007$; see Appendix A-1 for 95% confidence intervals). That is, on average, parents reported being “sometimes” involved with their children’s extracurricular activities. Averages for the other 4-point composite variables follow: parent-school communication concerning children’s school problems ($M = 1.32$, $SE = .007$), school-initiated contact with parents ($M = 1.33$, $SE = .006$), and parent-initiated contact with school ($M = 1.37$, $SE = .006$). Overall, communication between parents and schools was infrequent (i.e., less than “once or twice” during

the school year). Parental advising – which was rated on a 3-point scale – averaged 2.27 points overall, with a standard error of .006.

Table 3a

Means and standard errors for parental involvement variables, by high school completion status in 2006

Parental Involvement Variable	Total		High School Diploma Recipients		GED recipients		Non-Completers ¹	
	M	SE	M	SE	M	SE	M	SE
Parent participation in extracurricular activities with children	3.06	0.007	3.08	0.007	2.94	0.035	2.85	0.027
Parental advising	2.27	0.006	2.28	0.006	2.24	0.032	2.15	0.028
Parent-school communication concerning children's school problems	1.32	0.007	1.26	0.006	1.76	0.059	1.80	0.041
School-initiated contact with parents	1.33	0.006	1.33	0.007	1.34	0.032	1.38	0.023
Parent-initiated contact with school	1.37	0.006	1.36	0.007	1.50	0.036	1.43	0.028
Parent participation in school functions	0.29	0.005	0.30	0.005	0.21	0.015	0.19	0.012
Parental aspiration for children's postsecondary education	5.32	0.016	5.38	0.156	4.97	0.075	4.83	0.061
Family rules for maintaining grade	0.82	0.005	0.82	0.005	0.81	0.027	0.81	0.023
Family rules for doing homework	0.93	0.004	0.93	0.004	0.91	0.018	0.93	0.012
Family rules for doing household chores	0.88	0.004	0.88	0.004	0.93	0.015	0.92	0.011
Family rules for watching television	0.65	0.007	0.64	0.007	0.63	0.039	0.69	0.021

Note: Table values represent averaged estimates from five imputed datasets.

¹Includes students receiving a certificate of attendance, and those still enrolled in high school in 2006. Students receiving certificates of attendance and those still enrolled in high school in 2006 represent approximately one percent of the unweighted study sample.

Parents' educational aspirations for their children were measured using a seven-point scale (ranging from less than high school graduation to Ph.D., M.D., or other advanced degree). On average, parents aspired for their children to at least graduate from college ($M = 5.32$), although this item appears to vary more across the sample ($SE = .016$) than the other parental involvement dimensions. To further examine this finding, I calculated parents' educational aspirations for their children, by race/ethnicity and SES. Table 3b shows the resulting means and standard errors. Compared to other racial/ethnic groups, the parents of Asian/Pacific Islander ($M = 5.76$, $SE = .036$) and black ($M = 5.55$, $SE = .040$) students reported the highest expectations for their tenth-grader (see Appendix A-2 for 95% confidence intervals). Table 3c shows that, after combining categories 5 (graduate from college), 6 (obtain master's degree or equivalent), and 7 (obtain PhD, MD, or other advanced degree) into one category (bachelor's degree or higher), the highest percentage was also observed for Asian/Pacific Islander students (94%). The percentage for black students (89%) was not statistically different from White, American Indian/Alaska Native, Hispanic, or students of two or more races (see Appendix A-3 for 95% confidence intervals).

Table 3b

Means and standard errors of parents' aspirations for their tenth grader's postsecondary education, by race/ethnicity and SES

Student Characteristic	Parents' aspirations for their tenth grader's postsecondary education ¹	
	M	SE
Race/ethnicity		
White	5.23	0.021
American Indian/Alaska Native	5.16	0.171
Asian/Pacific Islander	5.76	0.036
Black	5.55	0.040
Hispanic	5.34	0.037
Two or more races	5.32	0.072
Socioeconomic Status (SES) Quartile		
Lowest quartile	5.03	0.034
Second quartile	5.18	0.029
Third quartile	5.39	0.023
Highest quartile	5.70	0.020

Note: Table values represent averaged estimates from five imputed datasets.

¹Based on (BYPARASP) How far in school the parent wants their tenth grader to go, where

- 1 = Less than high school graduation
- 2 = High school graduation or GED only
- 3 = Attend or complete 2-year college/school
- 4 = Attend college, 4-year degree incomplete
- 5 = Graduate from college
- 6 = Obtain master's degree or equivalent
- 7 = Obtain PhD, MD, or other advanced degree

Table 3c

Percentage of spring 2002 sophomores whose parents aspired for them to attain a bachelor's degree or higher, by race/ethnicity and SES

Student Characteristic	Parents' aspirations for their tenth grader to attain a bachelor's degree or higher ¹	
	Percentage	SE
Total	86.42	0.451
Race/ethnicity		
White	85.74	0.601
American Indian/Alaska Native	81.93	4.597
Asian/Pacific Islander	93.64	0.910
Black	88.61	0.953
Hispanic	85.93	0.942
Two or more races	84.66	2.025
Socioeconomic Status (SES) Quartile		
Lowest quartile	77.77	0.951
Second quartile	82.46	0.863
Third quartile	89.94	0.583
Highest quartile	96.04	0.441

Note: Table values represent averaged estimates from five imputed datasets.

¹Based on (BYPARASP) How far in school the parent wants their tenth grader to go.

Categories 5, 6, and 7 (see descriptions below) were combined to produce these estimates.

- 1 = Less than high school graduation
- 2 = High school graduation or GED only
- 3 = Attend or complete 2-year college/school
- 4 = Attend college, 4-year degree incomplete
- 5 = Graduate from college
- 6 = Obtain master's degree or equivalent
- 7 = Obtain PhD, MD, or other advanced degree

Regarding family rules, the majority of parents reported having rules for their child in terms of maintaining grades (82%), doing homework (93%), doing household chores (88%), and watching television (65%).

A quick comparison of the 95% confidence intervals (see table A-1) for each estimate in Table 3a yields a number of other findings, including that the parents of students who received a high school diploma by 2006 (compared to GED recipients and non-completers) reported (1) slightly higher levels of involvement in their children's extracurricular activities, (2) higher levels of involvement in school functions, (3) slightly higher educational expectations for their children, and (4) slightly fewer instances of parent-school communication concerning children's school problems.

Intercorrelations among Study Variables

Table 4 presents estimates of the correlations between study variables. The two outcomes – high school completion and postsecondary attendance by 2006 – had a moderate positive correlation ($r = .35, p < .01$). Among the parental involvement variables, parent-school communication concerning children's school problems was negatively correlated with both high school completion

($r = -.19, p < .01$) and postsecondary attendance ($r = -.24, p < .01$). Parental aspirations for their children's postsecondary education was positively correlated with both high school completion ($r = .13, p < .01$) and postsecondary attendance ($r = .27, p < .01$). The remaining parental involvement variables had weaker – although in some cases statistically significant – correlations with the two outcome variables. The student background variables (sex and SES) significantly correlated with a number of study variables. However, SES was more strongly correlated with postsecondary attendance ($r = .34, p < .01$) than high school completion ($r = .19, p < .01$). Regarding intercorrelations between the parental involvement variables, I found correlations similar to those reported in Fan and Williams (2010), and like their work, I observed these correlations to be no larger than .50, indicating minimal risk of multicollinearity.

Table 5 shows the weighted, non-imputed, percentage of spring 2002 tenth graders who ever attended a postsecondary institution (PSI), by high school completion status in 2006. Overall, 71% of sophomores in 2002 had attended a PSI by 2006. However, a higher percentage of high school graduates (77%) had attended a PSI, compared to GED recipients (37%) and non-completers (11%).

Multivariate Analysis: High School Completion

The logistic regression models analyzing the effects of parental involvement, sex, race/ethnicity, and SES were significant in predicting high school completion by 2006 (via diploma or GED) both for the 2002 sophomore cohort overall ($F(18, 243.1) = 32.58, p < .001$) and for the subpopulation of non-diploma recipients ($F(18, 246.3) = 2.60, p < .001$). Specifically, table 6 shows that parent participation in extracurricular activities with children ($\beta = .31, p = .02$), parent participation in school functions ($\beta = .50, p = .03$), and parents' aspirations for their children's postsecondary education ($\beta = .13, p < .001$) demonstrated positive influences on high school completion among 2002 sophomores overall. Additionally, parent-school communication concerning child's school problems ($\beta = -.99, p < .001$) and family rules for doing household chores ($\beta = -.40, p = .03$) both exhibited negative effects. However, in the second model, after controlling for sex, race/ethnicity, and SES, none of the parental involvement variables significantly predicted GED completion among non-diploma recipients.

Table 4

Intercorrelations among study variables

Variable	1	2	3	4	5
1. High school completion by 2006 ¹	-				
2. Postsecondary attendance by 2006	0.35**	-			
3. Parent participation in extracurricular activities with children	0.11**	0.13**	-		
4. Parental advising	0.06**	0.10**	0.44**	-	
5. Parent-school communication concerning children's school problems	-0.19**	-0.24**	-0.04**	0.02*	-
6. School-initiated contact with parents	0.00	0.02	0.14**	0.16**	0.15**
7. Parent-initiated contact with school	-0.01	-0.01	0.19**	0.25**	0.35**
8. Parent participation in school functions	0.09**	0.18**	0.33**	0.24**	-0.03**
9. Parental aspirations for children's postsecondary education	0.13**	0.27**	0.11**	0.19**	-0.16**
10. Family rules for maintaining grade	0.02	0.01	0.13**	0.13**	0.04**
11. Family rules for doing homework	0.01	0.01	0.14**	0.14**	0.02
12. Family rules for doing household chores	-0.02*	-0.06**	0.14**	0.11**	0.04**
13. Family rules for watching television	-0.01	-0.03**	0.16**	0.16**	0.05**
14. Sex	0.03**	0.09**	-0.01	0.01	-0.13**
15. SES	0.19**	0.34**	0.23**	0.21**	-0.06**

*p < .05; ** p < .01

Note: Table values represent weighted, non-imputed data.

¹Includes high school diploma recipients and GED recipients

Table 4 (Cont'd)

Intercorrelations among study variables

Variable	6	7	8	9	10
1. High school completion by 2006 ¹					
2. Postsecondary attendance by 2006					
3. Parent participation in extracurricular activities with children					
4. Parental advising					
5. Parent-school communication concerning children's school problems					
6. School-initiated contact with parents	-				
7. Parent-initiated contact with school	0.47*	-			
8. Parent participation in school functions	0.24**	0.27**	-		
9. Parental aspirations for children's postsecondary education	0.03**	0.01	0.14**	-	
10. Family rules for maintaining grade	0.01	0.06**	0.05**	0.06**	-
11. Family rules for doing homework	0.04**	0.06**	0.07**	0.01	0.44**
12. Family rules for doing household chores	0.04**	0.06**	0.04**	-0.02	0.23**
13. Family rules for watching television	0.06**	0.10**	0.11**	0.03**	0.24**
14. Sex	-0.04**	-0.04**	-0.01	0.06**	-0.02
15. SES	0.14**	0.14**	0.31**	0.25**	-0.03*

*p < .05; ** p < .01

Note: Table values represent weighted, non-imputed data.

¹Includes high school diploma recipients and GED recipients

Table 4 (Cont'd)

Intercorrelations among study variables

Variable	11	12	13	14	15
1. High school completion by 2006 ¹					
2. Postsecondary attendance by 2006					
3. Parent participation in extracurricular activities with children					
4. Parental advising					
5. Parent-school communication concerning children's school problems					
6. School-initiated contact with parents					
7. Parent-initiated contact with school					
8. Parent participation in school functions					
9. Parental aspirations for children's postsecondary education					
10. Family rules for maintaining grade					
11. Family rules for doing homework	-				
12. Family rules for doing household chores	0.29**	-			
13. Family rules for watching television	0.25**	0.30**	-		
14. Sex	0.01	-0.01	-0.02	-	
15. SES	0.01	-0.04**	0.00	-0.04**	-

*p < .05; ** p < .01

Note: Table values represent weighted, non-imputed data.

¹Includes high school diploma recipients and GED recipients

Table 5

Percentage of spring 2002 sophomores who ever attended a postsecondary institution, by high school completion status in 2006

Total		High school graduates		GED recipients		Non-completers ¹	
Percentage	SE	Percentage	SE	Percentage	SE	Percentage	SE
70.9	0.67	77.3	0.58	37.3	2.71	10.7	1.27

Note: Table values represent weighted, non-imputed data.

¹Includes students receiving a certificate of attendance, and those still enrolled in high school in 2006. Students receiving certificates of attendance and those still enrolled in high school in 2006 represent approximately 1% of the unweighted study sample.

Table 6

Summary of logistic regression analyses for parental involvement variables predicting high school completion (via diploma or GED) by 2006, overall and among non-diploma recipients

Variable	Overall ¹		Non-diploma recipients ²	
Parent participation in extracurricular activities with children	0.31	*	0.08	
Parental advising	0.10		0.21	
Parent-school communication concerning children's school problems	-0.99	***	-0.11	
School-initiated contact with parents	-0.10		-0.34	
Parent-initiated contact with school	0.17		0.27	
Parent participation in school functions	0.50	*	-0.12	
Parental aspirations for children's postsecondary education	0.13	***	0.05	
Family rules for maintaining grade	0.22		0.11	
Family rules for doing homework	-0.11		-0.26	
Family rules for doing household chores	-0.40	*	0.20	
Family rules for watching television	-0.14		-0.26	
Sex				
<i>Male</i>				
Female	0.17		-0.81	
Race/ethnicity				
<i>White</i>				
American Indian/Alaska Native	-0.82	*	-0.13	
Asian/Pacific Islander	0.19		-0.44	
Black	-0.50	**	-0.50	*
Hispanic	-0.48	**	-0.60	*
Two or more races	-0.32		-0.01	
SES	0.88	***	0.56	***

*p < .05; ** p < .01; ***p < .001

Note: Table values (standardized regression coefficients) represent averaged estimates from five imputed datasets. Italics refer to reference categories.

¹Among the entire cohort of tenth graders in 2002.

²Among students who did not earn a high school diploma by 2006 (includes GED recipients, students receiving certificates of attendance, and students still enrolled in high school in 2006). Students receiving certificates of attendance and those still enrolled in high school in 2006 represent approximately 1 % of the unweighted study sample.

Table 7

Summary of logistic regression analyses for parental involvement variables predicting postsecondary attendance by 2006, overall and among non-diploma recipients

Variable	Overall ¹		Non-diploma recipients ²	
Parent participation in extracurricular activities with children	0.14		0.00	
Parental advising	0.09		0.15	
Parent-school communication concerning children's school problems	-0.92	***	-0.37	*
School-initiated contact with parents	-0.06		-0.16	
Parent-initiated contact with school	0.03		0.06	
Parent participation in school functions	0.79	***	0.95	*
Parental aspirations for children's postsecondary education	0.28	***	-0.01	
Family rules for maintaining grade	0.06		0.18	
Family rules for doing homework	0.14		0.02	
Family rules for doing household chores	-0.41	**	-0.44	
Family rules for watching television	-0.23	**	-0.08	
Sex				
<i>Male</i>				
Female	0.36	***	-0.06	
Race/ethnicity				
<i>White</i>				
American Indian/Alaska Native	-0.68	*	-0.51	
Asian/Pacific Islander	0.62	***	0.16	
Black	-0.18	*	0.08	
Hispanic	-0.10		0.10	
Two or more races	-0.35	*	0.16	
SES	1.01	***	0.77	***

*p < .05; ** p < .01; ***p < .001

Note: Table values (standardized regression coefficients) represent averaged estimates from five imputed datasets. Italics refer to reference categories.

¹Among the entire cohort of tenth graders in 2002.

²Among students who did not earn a high school diploma by 2006 (includes GED recipients, students receiving certificates of attendance, and students still enrolled in high school in 2006). Students receiving certificates of attendance and those still enrolled in high school in 2006 represent approximately 1% of the unweighted study sample.

Multivariate Analysis: Postsecondary Attendance

The logistic regression models analyzing the effects of parental involvement, sex, race/ethnicity, and SES were also significant in predicting postsecondary attendance by 2006 both for the 2002 sophomore cohort overall ($F(18, 306.0) = 66.14, p < .001$) and for the subpopulation of non-diploma recipients ($F(18, 249.7) = 3.00, p < .001$). Similar to the high school completion model, parent participation in school functions ($\beta = .79, p < .001$), and parents' aspirations for their children's postsecondary education ($\beta = .28, p < .001$) positively influenced postsecondary attendance among 2002 sophomores overall (see table 7). However, parent participation in extracurricular activities with children ($\beta = .14, p = .07$), was not a significant predictor. Also, among study variables, there were more statistically significant negative predictors of postsecondary attendance than for high school completion. Specifically, parent-school communication concerning children's school problems ($\beta = -.92, p < .001$) and family rules for doing household chores ($\beta = -.41, p < .01$) continued to show negative effects and another variable – family rules for watching television – also demonstrated a negative influence on postsecondary attendance for the cohort overall ($\beta = -.23, p < .01$). Among non-diploma recipients, the only significant positive predictor of postsecondary attendance (other than SES) was parent participation in school functions ($\beta = .95, p = .01$). The only significant negative predictor was parent-school communication concerning children's school problems ($\beta = -.37, p = .01$).

Discussion

In this study, I replicate the means and intercorrelations reported by Fan & Williams (2010) who also employed multiple imputation (mi) techniques to address missing data across the same ELS parental involvement, sex, and SES variables as used here. In their study, parental involvement was used to predict students' academic self-efficacy, engagement, and intrinsic motivation in English and mathematics. Although the Fan and Williams study used the MI Markov Chain Monte Carlo approach (available through the PROC MI command in the SAS 9.2 software package) and their analysis generated only three mi datasets (compared to the five mi datasets generated here), my results are similar to theirs for each of these variables (although Fan and Williams appear to have reported standard deviations, which differ from my weighted estimates of standard error).

The current study further extends the literature by examining how different aspects of parental involvement influence other educational outcomes, namely, high school completion and postsecondary attendance. The findings I report here suggest that explanations for student persistence through secondary school and on to college that depend solely on race, ethnicity, socioeconomic status, or other background characteristics are incomplete and miss other important factors (such as parental involvement) that also contribute to these outcomes. Similar to studies that examined the relationship between parental involvement dimensions and other outcomes – such as middle school dropout behavior (Rumberger, 1995) and students' self-efficacy and engagement in mathematics and English (Fan & Williams, 2010) – it appears that parents' educational expectations for their children also play a significant role in whether students from all backgrounds persist toward completion of high school and whether they attend a postsecondary institution. In terms of high school completion (by 2006) among the entire cohort of 2002 sophomores, in this study I also found parent participation in extracurricular activities and school functions to be significant positive predictors, while communication between parent and school about children's school problems and having family rules for doing household chores exhibited negative effects. With regards to

postsecondary attendance, parent participation in school functions was a positive predictor of overall cohort attendance at a PSI as well as separately among non-high school diploma recipients.

The only negative predictor shared between the overall cohort model and the non-diploma recipients model was parent-school communication about children's school problems. This finding is similar to the results reported by Fan (2001) when exploring a similar type of involvement among parents of high school-aged students. This specific parental involvement dimension, termed "Contact with School", was comprised of three survey items regarding parents' contact with their children's school about (1) academic performance, (2) academic programs, and (3) behavior. Fan observed that the students of parents who reported more frequent contact with the school also had lower initial academic performance, which may explain the negative relationship between parent-school contact and academic growth, as measured in Fan's study. Thus, it is not surprising that parent-school communication about children's school problems is significantly related to dropping out of high school and not enrolling in postsecondary education.

While I am not recommending that parents and schools avoid communicating about students' academic or behavior problems, consideration should be given to increasing the frequency of other kinds of parent-school communication and contact. Unfortunately, parents often face time pressures and competing demands for their attention, leading to families and schools only communicating when there is a problem. Over time, a pattern of negative interactions (and disagreements) between parents and schools develops (Epstein, 1996), which is counterproductive to the goal of increasing positive family-school engagement. For this, and possibly other reasons, teachers of adolescents should plan for earlier engagement with parents (i.e., before problems surface) using efficient and effective communication tools, such as email, Web sites, electronic discussion boards, and blogs, to reduce or eliminate this barrier (Mandara, 2009).

An explanation for the lack of significant associations in the non-diploma recipients model for high school completion (via GED) is not easily found. One consideration is that possibly other factors, not studied here, are influential in predicting GED completion among students who did not earn a high school diploma by 2006. For instance, in another analysis of GED recipients from this ELS cohort, Malkus and Sen (2012) found that when asked about their reasons for leaving high school, a higher percentage of GED recipients reported leaving for a school-related reason (91%) than either a work-related or family-related reason (29% and 26%, respectively). Among GED recipients, the highest reported school-related reasons for leaving high school were: leavers thought it would be easier to get a GED (48%), leavers did not like school (44%), leavers were getting poor grades or failing school (39%), or leavers had missed too many school days (39%). As to reasons for earning a GED, 66% of recipients cited a need to meet requirements for additional study (e.g., a two- or four-year degree or sub-baccalaureate credential).

These findings could inform future studies of influential predictors of high school dropout and GED completion. That is, students at risk of dropping out of school and not completing any secondary or postsecondary credential may benefit from parental involvement in their high school education and extracurricular activities but perhaps they would benefit even more from school interventions designed to address some of the most frequently reported reasons for dropping out. Take for example, research demonstrating the strong negative relationship between chronic absenteeism and students' academic achievement, high school graduation and post-secondary enrollment outcomes (Balfanz & Byrnes, 2012). To address this problem, state and local education agencies have begun to add measures of student attendance to "early warning" indicator systems used to identify students at risk of dropping out or falling behind in school. The extent to which these early warning systems and interventions could explicitly include ways to engage parents – and

then study the effects on high school completion – is a promising area for future research and policy development.

The finding that parental involvement in school functions positively predicts postsecondary attendance among GED recipients could be used to encourage continued parental engagement for high school dropouts who enroll in a GED program. Furthermore, although the percentage of GED recipients who attended a postsecondary institution by 2006 (37%) is lower than for high school graduates, the fact that more than a third went on to enroll in some type of postsecondary education should encourage policymakers and practitioners to target resources and support for more of these students to pursue higher education. In fact, evidence of successful programs that help students earn a GED credential and enroll in college are beginning to emerge. For example, a study of the Bridge to Health and Business program, which offers students a career-related GED curriculum, found that one year after enrolling in the program, Bridge students were much more likely than those pursuing traditional GED programs to have finished the course, passed the GED exam, and enrolled in college (Martin & Broadus, 2013). Future research should also study the postsecondary experiences of GED recipients in the ELS cohort to describe the range of options high school dropouts take advantage of and to what extent parental involvement may play a role in their success (or lack thereof).

Conclusion: Parental Involvement Matters in High School

The results presented here underscore the continued need for parental involvement once children reach high school. How to encourage and sustain effective levels of parental engagement is hard to prescribe, but the literature offers recommendations for parents, the federal government, and state and local educational agencies. For parents, the strategies that worked with their children in elementary school may not be as effective once the children reach adolescence. Therefore, research suggests that parents engage in more developmentally appropriate ways, such as communicating high expectations for their children's future (Chao & Hill, 2009). While, the current study and previous research overwhelmingly support the idea that parental expectations play a major role in a whole host of educational outcomes for children, this study also shows where high expectations, alone, may not be enough to propel students to reach their potential. That is, although I show here that (with the exception of Asian/Pacific Islanders), the parents of black students reported having the highest educational aspirations for their children in tenth-grade, being black was also associated with lower likelihoods of high school completion and postsecondary attendance, even after controlling for SES (see tables 6 and 7). To improve students' chances of success, research suggests that parents supplement their high expectations with actively assisting their children in planning for college (Chao & Hill, 2009). To the extent that parents are not familiar with the college planning process, schools should be working to provide this information and other skills to enhance the "college knowledge" of both parents and students. Other recommendations include augmenting the instruction and extracurricular activities that youth receive at school by enrolling them in afterschool tutorials, study groups, community sports programs, etc. However, given that high SES parents will likely have better access to these kinds of services than low SES parents, federal and locally-funded programs may be needed to offset costs, as well as provide transportation and other resources for high-needs children. Finally, research suggests that parental involvement in such activities as managing the homework of high school-aged children should shift from a supervisory role to more of a supportive one, as these youth become increasingly more independent and able to make decisions for themselves (Chao & Hill, 2009). However, learning to do this effectively takes skill, specifically in terms of knowing how to provide opportunities for youth to link schoolwork with

current events, how to monitor (rather than check) homework, and how to provide the autonomy for high school students to make decisions, while still setting boundaries around time use. This is another area where schools have a duty to coach and train parents about effectively engaging in their children's education.

As mentioned earlier, NCLB (and now ESSA) provided funding (through Title I) for parent engagement activities and required that schools provide parents with a written parental involvement policy that is based on parent input and leadership. The law also required that these policies be accessible to parents with limited English proficiency and that other reasonable support be provided (for more information, see section 1118 of NCLB or section 1116 of ESSA). However, these requirements are of little use if they are not informed by the local context. That is, one-size-fits-all approaches to increasing parental involvement will not work in all communities. To be effective for black and Latino parents and students, for example, some research suggests that school leaders first cultivate a school climate that welcomes and includes cultural diversity so that trust is established between parents, students, teachers, principals, and community members (Epstein & Sanders, 2002; Henderson & Mapp, 2002). In other words, for schools to succeed in engaging families from diverse backgrounds, more consideration must be given to practices that recognize, respect, and address the needs of individual families (as well as class and cultural differences between families), and that embrace a philosophy of partnership with shared responsibility and power.

Limitations

Most of the data used in this analysis were self-reported by students and their parents and, while typical of large-scale studies, this method of data collection can yield biased estimates due to participants providing socially-desirable or unreliable information. Furthermore, no causal conclusions can be made from the multivariate statistics presented here. Although I observed statistically significant associations between some aspects of parental involvement in 2002 and students' high school completion and postsecondary attendance by 2006, there are potentially other factors not studied which may have also influenced these outcomes. For instance, parents' aspirations for their children's educational attainment appears to have a strong influence on students' high school completion and postsecondary attendance (as well as on other educational outcomes, as shown in previous studies). However, this relationship is not in itself evidence that simply having high educational expectations for one's child, regardless of relevant student characteristics (e.g., prior achievement or behavior), will lead to favorable outcomes for him/her. It may be that student achievement or behavior in earlier grades may influence parents' educational expectations for their children in tenth grade. Future research should study parental expectations for tenth grade students across various student characteristics prior to tenth grade (e.g., ninth grade GPA, whether student had ever been held back a grade or suspended from school) and examine the possible mediating effects of these prior characteristics on the relationship between parents' educational aspirations for their children and students' high school completion and postsecondary enrollment. Finally, I found both positive and negative relationships between specific types of parental involvement and the educational outcomes studied here (high school completion and postsecondary attendance). The extent to which this narrow set of activities and behaviors accurately captures the most important aspects of parental involvement poses limitations for the study of this construct. Thus, the analysis presented here may underestimate the real contributions that parents make to their children's growth, development, and success during and after the high school years.

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Appendix A

Table A-1.

95% confidence intervals for mean estimates of parental involvement variables, by high school completion status in 2006

	Total	High School Diploma Recipients	GED recipients	Non- completers ¹
Parental Involvement Variable	[95% CI]	[95% CI]	[95% CI]	[95% CI]
Parent participation in extracurricular activities with children	[3.04, 3.07]	[3.07, 3.10]	[2.87, 3.01]	[2.79, 2.90]
Parental advising	[2.26, 2.28]	[2.27, 2.30]	[2.18, 2.31]	[2.10, 2.21]
Parent-school communication concerning children's school problems	[1.31, 1.34]	[1.25, 1.27]	[1.64, 1.88]	[1.72, 1.88]
School-initiated contact with parents	[1.32, 1.34]	[1.31, 1.34]	[1.27, 1.40]	[1.33, 1.43]
Parent-initiated contact with school	[1.36, 1.38]	[1.35, 1.37]	[1.43, 1.57]	[1.37, 1.49]
Parent participation in school functions	[0.28, 0.30]	[0.29, 0.31]	[0.18, 0.24]	[0.16, 0.21]
Parental aspirations for children's postsecondary education	[5.29, 5.35]	[5.35, 5.41]	[4.82, 5.11]	[4.71, 4.95]
Family rules for maintaining grade	[0.81, 0.83]	[0.81, 0.83]	[0.76, 0.87]	[0.76, 0.86]
Family rules for doing homework	[0.92, 0.93]	[0.92, 0.93]	[0.87, 0.95]	[0.90, 0.95]
Family rules for doing household chores	[0.88, 0.89]	[0.87, 0.89]	[0.89, 0.96]	[0.90, 0.95]
Family rules for watching television	[0.63, 0.66]	[0.63, 0.66]	[0.55, 0.72]	[0.65, 0.74]

Note: Table values represent averaged estimates from five imputed datasets.

¹Includes students receiving a certificate of attendance, and those still enrolled in high school in 2006. Students receiving certificates of attendance and those still enrolled in high school in 2006 represent approximately one percent of the unweighted study sample.

Table A-2

95% confidence intervals for mean estimates of parents' aspirations for their tenth grader's postsecondary education, by race/ethnicity and SES

Student Characteristic	Parents' aspirations for their 10th grader's postsecondary education ¹
	[95% CI]
Race/ethnicity	
White	[5.19, 5.27]
American Indian/Alaska Native	[4.82, 5.49]
Asian/Pacific Islander	[5.69, 5.83]
Black	[5.47, 5.63]
Hispanic	[5.27, 5.42]
Two or more races	[5.18, 5.46]
Socioeconomic Status (SES) Quartile	
Lowest quartile	[4.96, 5.09]
Second quartile	[5.12, 5.24]
Third quartile	[5.35, 5.44]
Highest quartile	[5.66, 5.74]

Note: Table values represent averaged estimates from five imputed datasets.

¹Based on (BYPARASP) How far in school the parent wants their tenth grader to go, where

- 1 = Less than high school graduation
- 2 = High school graduation or GED only
- 3 = Attend or complete 2-year college/school
- 4 = Attend college, 4-year degree incomplete
- 5 = Graduate from college
- 6 = Obtain Master's degree or equivalent
- 7 = Obtain PhD, MD, or other advanced degree

Table A-3

95% confidence intervals for percentage estimates of spring 2002 sophomores whose parents aspired for them to attain a bachelor's degree or higher, by race/ethnicity and SES

Student Characteristic	Percentage of tenth graders whose parents aspired for them to attain a bachelor's degree or higher ¹
	[95% CI]
Total	[85.51, 87.29]
Race/ethnicity	
White	[84.51, 86.88]
American Indian/Alaska Native	[71.12, 89.3]
Asian/Pacific Islander	[91.60, 95.21]
Black	[86.60, 90.35]
Hispanic	[83.97, 87.68]
Two or more races	[80.25, 88.23]
Socioeconomic Status (SES) Quartile	
Lowest quartile	[75.84, 79.58]
Second quartile	[80.69, 84.09]
Third quartile	[88.74, 91.03]
Highest quartile	[95.07, 96.82]

Note: Table values represent averaged estimates from five imputed datasets.

¹Based on (BYPARASP) How far in school the parent wants their tenth grader to go. Categories 5, 6, and 7 (see descriptions below) were combined to produce these estimates.

- 1 = Less than high school graduation
- 2 = High school graduation or GED only
- 3 = Attend or complete 2-year college/school
- 4 = Attend college, 4-year degree incomplete
- 5 = Graduate from college
- 6 = Obtain Master's degree or equivalent
- 7 = Obtain PhD, MD, or other advanced degree

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Terris Ross leads the elementary and secondary division of the Policy and Program Studies Service (PPSS) at the U.S. Department of Education. There, she provides technical guidance and direction for national educational research activities, primarily in the areas of school accountability and student assessment, data analysis and reporting, and the use of data for policy decisions. Prior to joining PPSS, Terris served as an education statistician on the Annual Reports team at the National Center for Education Statistics (NCES), where she was lead author and principal researcher on the congressionally-mandated *Higher Education: Gaps in Access and Persistence Study*, a report which examined the lack of access to and persistence in college of males from underrepresented racial/ethnic groups. Before joining the U.S. Department of Education, Terris led the Assessment, Evaluation, and Development office in Henry County Schools, GA, as well as serving the Georgia Department of Education as lead analyst for the School Improvement Division. Terris holds bachelor's and master's of science degrees in mathematics from Clark Atlanta University, a specialist degree in Educational Leadership from Florida Atlantic University, and a Ph.D. in educational policy studies with a concentration in research, measurement and statistics from Georgia State University.

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The Role of Unconditional Parental Regard in Autonomy-Supportive Parenting

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Abstract

Two studies explored the role of parents' unconditional positive regard (UCPR) as perceived by adolescents and young adults in promoting the effectiveness of specific parenting practices that may support offspring's academic autonomous motivation. Study 1 tested the hypothesis that UCPR predicts rationale-giving and choice-provision practices and, at the same time, moderates their relations with adolescents' autonomous motivation. Study 2 replicated the association between UCPR and the parental practices, and further explored the role of parents' authenticity as an antecedent of UCPR and parental autonomy support. Study 1 included 125 adolescents and Study 2 considered 128 college-students and their mothers. The offspring reported on their perceptions of their mothers and on their autonomous motivation, and the mothers reported on their sense of authenticity. Both studies found consistent associations between UCPR and parenting practices that may support autonomous motivation. Moreover, Study 1 demonstrated that the rationale giving and choice provision were more strongly related to adolescents' autonomous motivation when adolescents perceived mothers as high on UCPR. Finally, Study 2 demonstrated that mothers' authenticity predicted UCPR, which in turn was related to autonomy-supportive parenting. Findings support the assumption that parents' autonomy-supportive practices are more effective when accompanied by UCPR.

In the last few decades, research anchored in self-determination theory (SDT; Ryan & Deci, 2000) has demonstrated the advantages of autonomy-supportive socialization practices for children's well-being, academic engagement, adaptive emotion regulation, and prosocial behavior (Deci & Ryan, 2008; Grolnick, 2003; Grolnick, Deci, & Ryan, 1997; Roth, Assor, Niemiec, Ryan, & Deci, 2009; Ryan & Deci, 2000). Therefore, recent empirical attention has turned to antecedents of autonomy support, mostly in the children's environment (Grolnick, 2003, 2007). Following this line of research, the present investigation explored possible parent-related antecedents of autonomy-supportive parenting (ASP). The moderating effect of one of these antecedents on the positive effects of ASP was also tested.

Within SDT, the ASP concept refers to parental practices that are hypothesized as enhancing offspring's sense of self-determination regarding the actions or goals in which they engage (Deci & Ryan, 2008). Specifically, such practices may include taking the child's perspective, acting in ways that encourage choice, providing meaningful rationales and relevance, and refraining from using language or other actions that are likely to be experienced as pressure toward particular behaviors (Ryan & Deci, 2000). Supporting autonomy in these ways has been found to enhance intrinsic motivation, facilitate well-internalized extrinsic motivation, prompt the experience of autonomy and authenticity, and result in effective performance

and psychological well-being (Grolnick, 2003; Grolnick et al., 1997).

Nevertheless, since ASP is defined by specific behaviors such as providing clear rationales and limited choices, Grolnick (2007) argued that these exact same practices could also be enacted in a controlling, autonomy-suppressive way, in which case children would not perceive them as autonomy-supportive. For example, a parent may provide a rationale for his/her expectations but do so in a very coercive tone of voice without giving the child an opportunity to express doubts or concerns. Likewise, even when a rationale is not conveyed in a controlling way, it might be perceived by children as an autonomy-suppressive strategic parental attempt to obtain the child's compliance with the parental agenda. Katz and Assor (2007) reviewed research showing that choice-provision, another autonomy-supportive behavior, does not always enhance autonomous motivation. Thus, it appears that generally desirable parenting practices that would be considered autonomy-supportive from an SDT perspective do not always yield autonomy-enhancing motivational effects.

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In the present research, we focused on a parental antecedent of ASP—unconditional positive regard (UCPR)—that is likely to be an important determinant of the extent to which parents' rationale giving and choice provision actually lead to their children's autonomous motivation. In our first study reported here (Study 1), we used a moderated mediation model (James & Brett, 1984; Judd & Kenny, 1981; Preacher, Rucker, & Hayes, 2007) to examine UCPR as a possible predictor of these specific parenting practices, and at the same time as a possible moderator of the relations between those practices and children's outcomes. In Study 2, a replication of the link between UCPR and ASP is examined, and, in addition a possible antecedent of UCPR is explored. Specifically, a parental personal disposition—authenticity (Kerns & Goldman, 2006)—was hypothesized to function as an antecedent of UCPR.

CHILDREN'S EXPERIENCE OF PARENTAL UCPR AS A MODERATOR AND PREDICTOR OF RATIONALE GIVING AND CHOICE PROVISION

Following Rogers (1961), children's experience of UCPR is defined as children's perception that their parents accept their emotional experience and do not view it as invalid or wrong, even when they clearly do not accept the child's behavior. Rogers (1951, 1959) was the first to posit that UCPR is crucial for optimal human development. According to Rogers, UCPR creates a growth-promoting climate that is important for children's development of unconditional self-regard. Empirical research on UCPR is quite scarce, despite the considerable research that has been conducted in the last decade demonstrating the harmful effects of "parental conditional regard"—parents' provision of warmth and affection that is contingent on their child's behavior (Assor, Roth, & Deci, 2004; Assor & Tal, 2012; Barber, Stolz, & Olsen, 2005; Roth, 2008; Roth & Assor, 2010, 2012; Roth, Assor, et al., 2009; Roth, Ron, & Benita, 2009).

In the present research, we focused on offspring's perceptions of school-related UCPR, referring to children's perception of their parents as accepting their feelings toward school-related issues, even when children do not meet parental expectations for academic effort and performance. Thus, when children experience their parents as high on UCPR, they perceive their parents as accepting their emotional experience regarding school even when parents are not satisfied with their school behavior.

For example, if a child is bored and irritated by a teacher and consequently publicly makes fun of the teacher or insults him/her as "incompetent," parents who are high on UCPR can clearly indicate that this is an unacceptable behavior. However, they would also convey their understanding and acceptance of the emotional experience underlying the unacceptable behavior. Such a parent might take the child's perspective and acknowledge the child's feelings, provide rationale for discontinuing the hurtful behavior toward the teacher, and work with the child in

an attempt to deal with the situation in a more constructive and less hurtful way. In some cases, the parent may even try to help the child feel less irritated and angry at the teacher by helping the child see that what was boring repetitive teaching for her/him was useful and necessary for other children. In this case, the child may start to feel less irritated by the teacher. Importantly, the decrease in anger toward the teacher would not be due to an attempt at suppressing feelings that are unacceptable to parents, but due to a more positive interpretation of the perceived frustrating behavior of the teacher.

It is important to note that we view UCPR as an experience of children and not as an experience of parents. From the parent's point of view, he/she may use conditional regard (e.g., love withdrawal) because the parent deeply cares about the child and would like to "motivate" him/her. Thus, the experience of conditional regard is the child's experience and not the parent's. Also, note that especially with regard to the variable of UCPR, we are discussing a phenomenological experience of the child. This experience may be produced by a combination of subtle parental behaviors across a relatively long time period. But parents may be the least capable of providing accurate reports of the extent to which they behave in ways that reflect UCPR.

The concept of UCPR should be differentiated from two related concepts—parental warmth (Schaefer, 1965) and parental conditional regard (Assor et al., 2004; Roth, Assor, et al., 2009)—that are also distinct from each other. Past research has demonstrated that warmth and conditional regard are only moderately interrelated, and each has unique effects on important psychological outcomes (Assor et al., 2004; Roth, 2008; Israeli-Halevi, Assor & Roth, in press). Thus, parental expression of warmth and affection does not necessarily involve or preclude parents' conditional regard—their usage of warmth conditionally as a "carrot and stick" means for shaping children's behavior (i.e., using warm regard as a contingent positive reinforcement or withdrawing it as punishment). In the current research, we measured both warmth and conditional regard to examine their discriminant validity with UCPR. Thus, UCPR may differ from warmth because the latter may not necessarily involve unconditional acceptance of the child's experience when the parent does not accept the child's behavior. As for parental conditional regard, it is possible to claim that UCPR may not differentiate from this concept because the two may emerge as two poles of the same continuum. However, low UCPR does not necessarily involve high conditional regard. Thus, permissive or neglectful parenting may result in low perceptions of both UCPR and conditional regard. Measurement of warmth and conditional regard will permit validation of the UCPR concept.

In our current research, to elucidate the relatively unexplored concept of UCPR as a predictor of ASP, we did not examine a general autonomy-supportive climate, which may involve confounding parental practices that do not necessarily yield autonomy-enhancing motivational effects or may include perceptions of UCPR. Instead, in Study 1, we narrowed our empirical

focus to the exploration of only two specific parental practices held in wide consensus for their autonomy-enhancing potential (i.e., parental rationale giving and choice provision; Soenens, Vansteenkiste, & Van Petegem, 2015). In addition, to validate those practices' autonomy-supportive effects, in Study 1 we examined not only offspring's perceptions of parents' practices but also offspring's self-reports about their own autonomous motivations. Moreover, in both of our studies, to further enable specificity of reporting among parents and offspring, we selected one specific domain for investigating UCPR and ASP—academic engagement—which is a key area for negotiation between parents and children (Smetana, Daddis, & Chuang, 2003).

As depicted in Figure 1, using a moderated mediation model (Preacher et al., 2007), in Study 1 we hypothesized that UCPR would serve as a predictor of rationale giving and choice provision and at the same time would act as a moderator in the relation between these practices and offspring's outcomes. Thus, we hypothesized that these two potentially autonomy-supportive practices—rationale giving and choice provision—would show stronger positive effects on offspring's self-reported autonomous motivation for academics when accompanied by a perception of their parents as higher in school-related UCPR. Parents who can take their child's perspective and accept the child's emotional experience at school despite unacceptable child behaviors may be able to provide more appropriate choices for future academic behavior that are relevant to the child's experience and more meaningful rationales for parental expectations based on the child's perspective, thus leading to higher autonomous motivation in the child. This hypothesis is also consistent with Darling and Steinberg's (1993) view that specific parental practices may have different effects depending on parents' more general attitudes. For example, Steinberg, Lamborn, Dornbusch, and Darling (1992) showed that the effectiveness of parents' school involvement in facilitating adolescents' academic achievement was greater among authoritative than nonauthoritative parents. In line with this approach, we hypothesized that the positive effects of specific potentially autonomy-supportive parental behaviors may be enhanced when the parents are perceived as high on UCPR.

If UCPR is an important antecedent of the discussed practices and moderator of their effects, it is useful to examine possible parental characteristics that may predict UCPR, such as parental authenticity. In our second study, we tested the hypothesis that parents' self-reported authenticity would predict their children's perceptions of UCPR and by doing so would predict offspring's perceptions of ASP.

PARENTS' AUTHENTICITY AS A PREDICTOR OF UCPR AND ASP

Authenticity is defined as autonomous acts that originate from one's core self, representing those preferences and values that are wholeheartedly endorsed (Kernis & Goldman, 2005). Authentic actions are those for which one takes responsibility; they are not half-hearted or disowned (Ryan & Deci, 2006).

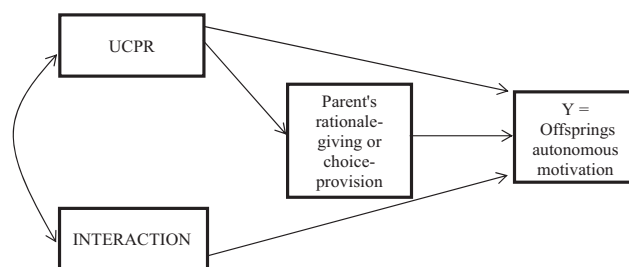


Figure 1 UCPR as a predictor of parental practices and as a moderator of their effects on autonomous motivation. Schematic representation of the moderated mediation hypothesis adopted from Preacher et al. (2007). Note: UCPR = offspring's perception of unconditional parental regard. INTERACTION = interaction between UCPR and parent's rational giving/choice provision.

More specifically, Kernis and Goldman (2005, 2006) suggested that authenticity comprises four distinct but interrelated components: awareness, unbiased processing of self-relevant information, relational orientation, and behavior that coincides with the core self. In the present research, we focused on the latter behavioral manifestation of authenticity, which results from the other three components (Kernis & Goldman, 2006) and entails the extent to which individuals engage in behaviors freely because those behaviors align with their core values, beliefs, and self-aspects (Deci & Ryan, 2000; Lakey, Kernis, Heppner, & Lance, 2008). SDT theorists define this behavioral aspect of authenticity as self-integration or autonomous motivation (Ryan & Deci, 2006; Ryan, Deci, Grolnick, & La Guardia, 2006).

Research has supported the validity of Kernis and Goldman's (2005) measure for authenticity, demonstrating its relations with various aspects of healthy psychological and interpersonal functioning (Kernis & Goldman, 2006; Lakey et al., 2008). For example, Lakey et al. (2008) found that authenticity predicts not only low defensiveness but also mindfulness, which involves the extent to which individuals pay nonjudgmental and unbiased attention to their current experiences (Brown & Ryan, 2003). Moreover, past research found mindfulness to be strongly related to autonomous functioning, characterized by relatively low levels of ego-involvement (Brown & Ryan, 2003).

Recent SDT research suggests that authenticity of significant adults may affect children. Thus, Roth, Assor, Kaplan, and Kanat-Maymon (2007) demonstrated that teachers' authenticity (referring to the behavioral equivalent of autonomous motivation; Ryan & Deci, 2000, 2006) predicted students' perceptions of autonomy-supportive teaching. In addition, Roth (2014) showed that teachers' authenticity (autonomous motivation) predicted students' perceptions of autonomy-supportive teaching through the moderating factor of teachers' belief that autonomous motivation is essential to life satisfaction.

Along the same lines, the present research extended these prior findings on teachers to parents. In this research the measurement of parental autonomy support was not restricted to the specific potentially autonomy-supportive practices of rationale giving and choice provision as we did in Study 1; instead we

used a well-known and elaborated measure of ASP (the Perceptions of Parents Scale; Grolnick, Ryan, & Deci, 1991; Niemiec et al., 2006). To our knowledge, the only studies that have explored parental characteristics in relation to ASP were conducted by Landry et al. (2008) on mothers' trust in children's organismic development and Grolnick, Price, Beiswenger, and Sauck (2007) on mothers' ego-involvement. In these rare studies of a parental dispositional factor as an antecedent of ASP, Landry et al. (2008) found that parental belief that a child's healthy development occurs naturally predicts ASP, whereas Grolnick et al. (2007) found that ego-involved mothers were prone to environmental pressures that undermine ASP. No prior research has explored parental characteristics as antecedents of children's perceptions of UCPR.

Thus, in Study 2, we tested whether or not parents' self-reported differences in authenticity would predict ASP through UCPR. One process by which parents' authenticity (autonomous motivation) might lead their children to view them as higher in UCPR might be that authentic parents, who act freely, mindfully, and nonjudgmentally, may likewise relate nonjudgmentally to their children's experiences, viewing those experiences as aligned with what they perceive as their children's authentic core values, beliefs, and self-aspects. Therefore, such parents may be nonjudgmental about their children's academic experiences and more accepting when the children fail to meet parental expectations (UCPR). In turn, such parents might be perceived as more autonomy supportive inasmuch as they may be more willing to take the child's perspective, encourage the child's expression, and provide relevant rationales and some degree of choice (ASP).

The second process by which authenticity (autonomous motivation) might lead to UCPR involves parents' personal, experience-based understanding of autonomous motivation and its benefits. In this process, parents who have experienced the advantages of autonomous motivation would prefer that their children also act from autonomous motivations because they understand that these types of motivations lead to a high quality of life. Indeed, Roth (2014) found a relation between the behavioral component of teachers' authenticity and their belief that autonomous motivation is important for life satisfaction. Thus, autonomously motivated parents may use their own motivational experiences as a basis for inferring the importance of being accepting of children's experiences (UCPR) and in turn more supportive of their autonomy.

THE PRESENT STUDIES

We conducted two studies to test the present hypotheses concerning UCPR and autonomy supportive practices. We investigated the extent to which adolescents (Study 1) and young adults (Study 2) perceived their parents as providing regard that was not contingent on their academic achievements and efforts, thus replicating the studied relationships in two different age groups and academic settings—junior high school and college,

respectively. The focus on adolescents is in line with various developmental and motivational researchers (Hill & Holmbeck, 1986; Ryan & LaGuardia, 2000; Steinberg, 1989) who consider the development of a more autonomous functioning as a critical developmental process for adolescents. As a consequence, an important task for parents is to support their offspring's autonomous regulation (Soenens et al., 2007). Additionally, we focused on adolescents and young adults due to their sufficient maturity to respond to the parenting evaluation and self-report measures (Merrell, 2008). Research on the development of self-understanding (e.g., Damon & Hart, 1988; Harter, 1998) has indicated that by the age of 15 most adolescents are capable of describing the types of psychological processes assessed in the present research.

The first study tapped adolescents' reports of their parents' behaviors (UCPR, rational giving and choice provision) and self-reports (autonomous motivation). As described above, we tested the role of UCPR as a predictor of parents' rationale giving and choice provision, and as a moderator of the relation between these practices and adolescents' autonomous motivation to engage in academic activities. The second study tapped mothers' reports concerning their own authenticity (autonomous motivation) as well as their offspring's (college students') perceptions of the mothers' UCPR and ASP. Hence, the second study tested the hypotheses that mothers' authenticity would predict their offspring's perception of UCPR, which in turn would predict the offspring's perceptions of ASP.

Study 1

The first study tested the hypotheses that perceived UCPR would predict perceived parental rationale giving and choice provision and would moderate their relations with adolescents' autonomous academic motivation. Thus, we hypothesized that rationale giving and choice provision would relate more strongly with adolescents' autonomous motivation when they perceived parents as providing greater UCPR.

Method

Participants and Procedures. Participants were 125 ninth-grade students (52% female) ages 14 to 15 years old ($M = 14.5$ years) from five classes in two Israeli junior high schools serving middle- and lower-middle-class families. As required by the Israeli Ministry of Education, active informed consent was obtained from the adolescents, and passive informed consent was obtained from parents. The latter procedure entailed parents' receipt of a letter from the researcher providing information about the study purposes and method; parents were asked to complete a form if they did not wish their child to participate in the study. Only two families declined to permit their children's participation.

Research assistants administered questionnaires to students while teachers were not present in the classroom. Participants

completed the questionnaires in two consecutive sessions, separated by 1 hour. In the first session, participants reported on their perceptions of parents (ASP and UCPR), and in the second session they reported on their motivation in school.

Measures. Students responded to all three scales using a 6-point Likert-type scale ranging from 1 (*not true at all*) to 6 (*very true*).

Students' Perceptions of Mothers' Rationale Giving and Choice Provision. This measure included two subscales, for students' perceptions about mothers' rationale giving and choice provision. For rationale giving, we used Roth, Assor, et al.'s (2009) measure, yielding a Cronbach's alpha of .72. Participants first read a stem describing a brief account of a parent-child school-related disagreement ("When I think that my investment in school is adequate, but my mom thinks it is not, she..."). Three items describing mothers' rationale giving followed the stem (e.g., "...she explains to me why she thinks so"). For choice provision, the 3-item subscale for mothers' provision of choice was taken from Niemiec et al. (2006), comprising items such as "My mother, whenever possible, allows me to choose what to do" (Cronbach's alpha = .87).

Students' Perceptions of Mothers' Academic-Related UCPR. This 4-item measure was developed for the present study (Cronbach's alpha = .88). Three items assessed students' perceptions of their mothers' unconditional acceptance and approval in relation to the students' academics (e.g., "My mother usually makes me feel that she loves and appreciates me regardless of my academic achievements"), and one item assessed unconditional acceptance in general. Discriminant validity was computed using the scale's correlation with the parental warmth scale (Children's Report of Parent Behavior Inventory; Schludermann & Schludermann, 1983; Cronbach's alpha = .86; mean = 5.14; SD = 1.34) and with two components of parental conditional regard (Roth, Assor, et al., 2009): conditional negative regard (i.e., love withdrawal contingent on the adolescent's failure to meet parental academic expectations; "If I do poorly in school my mother will ignore me for a while"; Cronbach's alpha = .86; mean = 1.76; SD = .70) and conditional positive regard (i.e., provision of more affection than usual contingent on the adolescent's success in meeting parental academic expectations; "I feel that when I'm studying hard my

mother appreciates me much more than usual"; Cronbach's alpha = .91; mean = 3.18; SD = 1.34). As expected, UCPR correlated positively with warmth ($r = .53, p < .01$), negatively with conditional negative regard ($r = -.51, p < .01$), and negatively with conditional positive regard ($r = -.28, p < .01$). These moderate correlations for UCPR with warmth, love withdrawal, and conditional positive regard suggest that the concepts are related but distinct and measure different phenomena.

Students' Self-reported Autonomous Motivation in School. This 8-item measure was based on the mean of the two 4-item subscales from Roth et al.'s (2007) scale that directly measured autonomous motivation for the academic domain: identified and intrinsic motivation subscales. This tool assessed the extent to which the adolescent identified with the value of learning for his/her future plans, together with interest and enjoyment in learning. Cronbach's alpha coefficient of this measure was .81.

Results and Brief Discussion

As seen in Table 1, the pattern of correlations among the research variables supported our hypotheses. Adolescents' perceived UCPR and perceived parental rationale giving and choice provision all revealed positive correlations with self-reported autonomous motivation, and UCPR also correlated positively with provision of rationale and choice.

To test the main hypothesis theorizing that UCPR would predict choice and rationale provision and would moderate their relations with adolescents' autonomous motivation, we used the SPSS macro developed by Preacher et al. (2007) to test moderated mediation. We conducted the analysis for rationale giving and choice provision separately because we hypothesized that each of the potentially autonomy-supportive practices could be enacted in different emotional contexts (i.e., high or low on UCPR; Darling & Steinberg, 1993) and as such might yield different correlates.

First, we found that the relations between UCPR (the independent variable) and the two hypothesized mediators were significant ($b = .38, p < .01$ for the relation with choice provision and $b = .26, p < .01$ for the relation with rationale giving). The moderated mediation model (see Figure 1) for choice provision revealed that only the interaction term of UCPR $\times$ Choice had a

Table 1 Descriptive Statistics for Study 1 Variables

Variable	M	SD	Correlations		
			UCPR	Rationale	Choice
Perceptions of mothers' UCPR	4.89	1.05	—		
Perceptions of mothers' rationale-giving	4.82	1.03	.26**	—	
Perceptions of mothers' choice-provision	4.65	.83	.48**	.24*	—
Self-reported autonomous motivation	4.12	.91	.40**	.40**	.43**

Note. UCPR = unconditional parental regard.

* $p < .05$ ** $p < .01$

significant effect on autonomous motivation ($b = .07, p < .05$). The same held true for the moderated mediation model (see Figure 1) for rationale giving; thus, only the UCPR $\times$ Rationale interaction had a significant effect on autonomous motivation ($b = .11, p < .05$). The signs of the interaction terms were consistent with the interpretation that the indirect effect was larger for students who perceived their parents as higher on UCPR.

Next, we probed the indirect effects on three different values of the moderator (UCPR): the mean (4.89), one standard deviation above the mean (5.94), and one standard deviation below the mean (3.84). Along with normal-theory tests, we tested whether the three conditional indirect effects differed from zero. For choice provision, all three conditional indirect effects were positive and significant (For $-1SD$: $b = .071, p < .05$; for the mean: $b = .091, p < .05$; and for $+1SD$: $b = .11, p < .05$). Thus, the magnitude of the conditional indirect effects revealed that the indirect association between UCPR and adolescents' autonomous motivation through choice became stronger as a function of increment in UCPR. For rationale giving, significant conditional indirect effects emerged corresponding to the mean ($b = .061, p < .05$) and to one standard deviation above the mean ($b = .09, p < .05$), but the effect for one standard deviation below the mean was not significant ($b = .03, ns$). Hence, the conditional indirect effects' magnitudes indicated that, as UCPR increased, the indirect effect through rationale became stronger.

In the last decade, bootstrapping has been advocated as an alternative to normal-theory tests of mediation (Lockwood & MacKinnon, 1998; MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2004; Shrout & Bolger, 2002). To obtain bootstrap confidence intervals, we used 5000 resampling. For choice provision, the 95% confidence interval was $\{.11, .24\}$ with indirect effect value of 0.14 ($p < .05$), and for rationale giving the confidence interval was $\{.07, .22\}$ with a value of .09 ($p < .05$). Because these intervals did not contain 0, the conditional indirect effects significantly differed from 0, at $\alpha = .05$. Thus, bootstrapping added to the results of the normal-theory tests.

In sum, the findings of Study 1 supported the hypotheses that UCPR would predict adolescents' autonomous motivation through both potentially autonomy-supportive practices (i.e., provision of choice and rationale). Moreover, the results supported the hypothesis that UCPR would moderate the effects of these practices on adolescents' autonomous motivation. Thus, the relations between the specific autonomy-supportive practices and adolescents' autonomous motivation were stronger for adolescents who perceived their mothers as high on UCPR.

Study 2

In Study 1, UCPR was identified as playing a dual role in predicting and moderating the effect of potentially autonomy-supportive practices on adolescents' self-reported academic autonomous motivation. In light of this important role played by UCPR in the effectiveness of parental practices, it seemed important to explore its antecedents. Hence, we undertook Study

2 to shed some light on a specific parental characteristic—authenticity—as a possible predictor of offspring's perceptions of parents' academically related UCPR.

The goal of Study 2 was to test the hypothesis that mothers' authenticity would predict their college student offspring's perceptions of UCPR, which in turn would predict those college students' perceptions of the mothers' autonomy support. Thus, Study 2 sought to replicate the association found in Study 1 between UCPR and autonomy support in an older age group and in a different academic setting. Furthermore, Study 2 expanded on the previous study by further exploring the role of UCPR as mediating the relation between parental authenticity and ASP.

Method

Participants and Procedures. Participants were 128 college students (63% women) with a mean age of 21.3 years ($SD = 1.67$) and their mothers (mean age = 48 years, $SD = 4.5$). The students received extra credit in an introductory psychology course for their and their mothers' participation in the study. At the end of one of their classes, those students who consented to participate completed the two questionnaires, reflecting their perceptions of their mothers' UCPR and autonomy support. A trained research assistant gave the instructions. The research team contacted mothers by mail. Mothers self-reported their authenticity and returned the completed anonymous questionnaire by mail in a sealed envelope. Only two mothers did not send in their reports.

Measures. College students and their mothers completed questionnaires using a 6-point Likert-type scale ranging from 1 (*not true at all*) to 6 (*very true*).

Mothers' Self-reported Authenticity. Kernis and Goldman's (2006) 11-item *behavior* subscale was used (Cronbach's $\alpha = .68$). Mothers rated the extent to which they behaved in accordance with their own values, preferences, and needs (e.g., "I find that my behavior typically expresses my values"; "I try to act in a manner that is consistent with my personally held values, even if others criticize or reject me for doing so").

College Students' Perceptions of Mothers' Academic-Related UCPR. This was the same 4-item measure from Study 1. Cronbach alpha coefficient in this sample was .92.

College Students' Perceptions of Mothers' Autonomy Support. We used the well-known autonomy support subscale of the Perceptions of Parents Scale (Grolnick et al., 1991; Niemiec et al., 2006), which included three parts: three items assessing mothers' provision of choice (similar to the choice-provision items used in Study 1), three items assessing

Table 2 Descriptive Statistics for Study 2 Variables

Variable	<i>M</i>	<i>SD</i>	Correlations	
			Mothers' authenticity	Perceptions of mothers' UCPR
Mothers' self-reported authenticity	5.24	.83	—	
Students' perceptions of mothers' UCPR	5.88	1.15	.29*	—
Students' perceptions of mothers' ASP	5.35	1.16	.27*	.69*

Note. UCPR = unconditional parental regard; ASP = autonomy-supportive parenting.

* $p < .01$

mothers' taking of her child's perspective (e.g., "My mother is usually willing to consider things from my point of view"), and three reversed items assessing parental control (e.g., "My mother tries to tell me how to run my life"). Cronbach's alpha coefficient was .87.

Results

Table 2 presents the descriptive statistics for the three research variables, including zero-order correlations. In line with our prediction, the three correlations were positive and significant. Specifically, mothers' self-reported authenticity significantly correlated positively with their young-adult offspring's perceptions of mothers' UCPR ($r = .29, p < .01$) and perceptions of mothers' ASP ($r = .27, p < .01$). The correlation between UCPR and ASP was also positive and significant, $r = .69, p < .01$.

Our main hypothesis in the second study focused on perceived maternal UCPR as a mediator of the relation between mothers' authenticity and perceived maternal ASP. To test for mediation, the bootstrap confidence interval was calculated with 5000 resampling. The 95% confidence interval was {.09; .28} with indirect effect value of 0.18 ($p < .05$). Because these intervals did not contain 0, the conditional indirect effect significantly differed from 0, at $\alpha = .05$. It is important to note that while regressing ASP simultaneously on UCPR and parents' authenticity, the beta coefficient for the relation between UCPR and ASP is .66 ($p < .01$), and the beta coefficient for the relation between authenticity and ASP is .15 ($p < .05$).

GENERAL DISCUSSION

Considerable research in the last three decades has established the association between parents' autonomy-supportive practices and their children's autonomous motivation; however, exploration of possible factors that may enhance ASP or its impact is less common. The present studies extend past research by shedding some light on possible predictors of ASP for adolescents and young adults in the academic domain. The findings of the first study support the hypotheses that UCPR both predicts potentially autonomy-supportive practices and moderates their effects on adolescent offspring outcomes. Specifically, perceptions of the mother's UCPR were found to predict her perceived

provision of rationale and choice, which, in turn, predicted her adolescent's autonomous motivation to engage in school. Furthermore, the mother's UCPR was also shown to moderate the relation between perceptions of her rationale and choice provision and her adolescent's autonomous academic motivation. Specifically, the relation between each potentially autonomy-supportive practice (providing choices, giving rationales) and adolescents' autonomous motivation was stronger when the youngsters perceived their mothers as providing higher UCPR. This finding coincides with the SDT proposition that autonomy-supportive practices should be enacted with warm, nonjudgmental acceptance.

Investigating an older age group of college students and their mothers, the second study replicated the first study's finding concerning the role played by the mother's UCPR in predicting her autonomy-supportive practices. Study 2 then expanded on the prior study by exploring the role of maternal authenticity as a predictor of UCPR and ASP. In line with our hypothesis, the mother's self-reported authenticity predicted her young-adult offspring's perception of her UCPR, which in turn predicted the young adult's perception of the mother's ASP. Thus, Study 2 is one of the first studies to explore a specific characteristic of parents that may predict ASP.

UCPR is one of few concepts in psychological research that attract much theoretical attention and discussion but have not been subjected to systematic empirical research. One reason that may explain this lacuna is the nondirective nature of UCPR as a socialization practice. Thus, research on socialization devotes attention to parenting practices that have the potential to direct the child's behavior and perspective. The present research is one of few studies that empirically explore outcomes of UCPR. Moreover, the main argument that was supported in the present research is that directive parental practices (e.g., provision of rationale) are more effective when accompanied by children's perceptions of UCPR.

In line with the above reasoning, this is the first study to test, within the SDT, Darling and Steinberg's (1993) influential proposition that specific parental practices may have different effects depending on parents' more general attitudes. Thus, our findings are in line with Darling and Steinberg's (1993) reasoning that UCPR may serve as an emotional context (parental style) in which parental autonomy-supportive practices seem to be more effective. Darling and Steinberg suggested that parental style

may influence the effectiveness of parental practices in at least two ways: (a) by transforming the nature of the parent–child interaction, and thus moderating the specific practices’ influence on child outcomes, and (b) by influencing the child’s openness to parental influence. The present findings cannot support these processes, but it seems valuable to speculate about them in relation to the specific parental style and practices explored here.

The first process—transforming the parent–child interaction—suggests that the nature of the parental rationale-giving or choice-provision practice itself may change according to the emotional climate in which it is enacted. Thus, one may speculate that the child will perceive these specific practices as truly autonomy supportive when the emotional climate in which they are communicated to the child is genuinely characterized by UCPR. On the other hand, the same practices will likely be less effective (i.e., not truly autonomy supportive) when the child does not experience UCPR by parents. For example, when the parent who is communicating a rationale is perceived by the child as judgmental and as using conditional regard to shape the child’s behaviors, the child may perceive the parent’s rationale giving as relatively controlling. In such a case, a supposedly autonomy-supporting explanation or justification for parental expectations may be perceived by the child as controlling because it is provided in a judgmental context in which the child feels he/she is valued as either “good” or “bad”—as deserving parental love and acceptance or not—based on the child’s behaviors. In line with this reasoning, autonomy-supportive practices may be applied instrumentally but ineffectively by social agents who understand these techniques’ potential effectiveness in reducing the child’s resistance to the agent’s socialization attempts but who fall short of generating the desired consequences because the practices are not delivered within an emotional climate of unconditional acceptance.

The second process suggested by Darling and Steinberg (1993) focuses on the child’s openness to parental influence as a consequence of the familial emotional climate. A well-documented finding is that children identify with parents and adopt their behaviors more frequently when the parents are perceived as affectionate and caring (Payne & Mussen, 1956; Ryan & Deci, 2000). Thus, it may be speculated that UCPR can contribute to more successful socialization attempts because children are more willing to adopt a warm and affectionate parent’s expectations than a distant and judgmental parent’s. Moreover, affectionate parents who respond nonjudgmentally to their children’s misbehavior (or to children’s failures in meeting parental expectations) may be able to provide feedback that can be heard and digested by the child without suppressing the child’s autonomy. In contrast, that very same feedback may be perceived as autonomy suppressive in other contexts where the parent–child relationship is characterized by a more controlling and judgmental climate. In other words, parents who are perceived as conditionally accepting, where parental love is seen as contingent upon the child’s behavior, might have to “walk on eggshells” in order to be perceived as less autonomy suppressive by their children, whereas parents who are perceived as provid-

ing UCPR may be able to communicate their opinions, and disappointments, without the detrimental effects of coercive and intrusive parenting (Barber, 1996). Indeed, this discussion is speculative, and **future research would do well to explore these two processes** suggested by Darling and Steinberg (1993) in relation to UCPR and ASP.

Without a doubt, using autonomy-supportive practices (rationale giving, choice provision, perspective taking, etc.) accompanied by positive regard in response to children’s transgressions seems a demanding task for parents at times. However, based on the results of the present studies, it seems legitimate to speculate that acceptance of the experience that led to the child’s misbehavior (UCPR) may lead to a genuine attempt to take the child’s perspective, and as a result may make the rationale for parents’ expectations and provisions of choice more relevant to the child’s experience. However, as the present results suggest, mothers vary in this capacity. Study 2 provides the first indication for a factor that may explain part of this variation. Mothers’ authentic behavior—their autonomous acts aligning wholeheartedly with their core beliefs, preferences, and values—was found to predict young adults’ perceptions of their mothers’ UCPR—offspring’s perceptions of nonjudgmental parental acceptance—which in turn predicted these college students’ perceptions of autonomy-supportive mothering. It may be conjectured that the nondefensive responses of parents to their own authentic experiences may be extended to their responses to their children’s experiences. Thus, being able to be open up nonjudgmentally to one’s own authentic positive and negative experiences may perhaps allow parents to accept their children’s experiences, even when those children are already young adults, with a less judgmental stance and with fewer distortions. If validated by **future research, this finding has high theoretical and practical value.**

Among the strengths of the present research are the multiple reporters (mothers and their children during adolescence and young adulthood) and the rigorous data-analysis approach. Nonetheless, the main limitation of the two studies is their cross-sectional design that does not allow causal inferences. Given the theoretical causal assertion suggested here, it seems important to further explore those questions via a longitudinal design that would allow limited support for causal hypotheses. Moreover, the current cross-sectional design did not allow for testing of developmental questions related to the specific parental behaviors explored here. In addition, the current studies focused on school-related UCPR; **future researchers would do well to explore UCPR in other domains such as prosocial behaviors, emotion regulation, and so forth.** In addition, the relations among domains should be investigated, together with the exploration of a general UCPR approach that is examined across domains. Another limitation involves the focus on mothers. It is reasonable to claim that in specific domains (e.g., sports, academics) perceptions of fathers’ UCPR may be a more powerful predictor of children’s outcomes in comparison to perceptions of mothers. In addition, we assessed only one out of four components of authenticity (the behavioral component). Although

Kernis and Goldman (2006) argue that the behavioral manifestation of authenticity results from the other three components, future research may want to explore the four components of parental authenticity. Finally, the present research examined UCPR and authenticity as possible predictors of ASP. Future research should examine other possible predictors, especially parents' socialization.

In sum, the present research findings support the hypothesis that provision of UCPR enhances the effectiveness of parents' provision of rationale and choice in relation to their children's autonomous academic motivation. Thus, acceptance of children's experiences in a manner that is not contingent on their behaviors appears to make parental practices more effective. Furthermore, parents' authentic behavior (i.e., behavioral engagement that aligns with one's core values, beliefs, and self-aspects) predicts parents' nonjudgmental acceptance (i.e., UCPR) of their children's experience, which in turn predicts children's perceptions of ASP. Future research should explore the specific mechanisms underlying these effects.

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"I will guide you" The indirect link between overparenting and young adults' adjustment



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ABSTRACT

This study addresses knowledge gaps regarding family dynamics, and identifies young adults at-risk for psychopathological symptoms. In particular, we examined overparenting and its associations with young adults' adjustment (distress and interpersonal sensitivity). Both direct and indirect relations were assessed, the latter through young adults' relational characteristics (attachment, psychological control perception, and boundaries diffusion perception). Also, the contribution of gender of parents and young adults was addressed. Questionnaires were collected from 89 Jewish-Israeli intact families. Mothers reported significantly more use of overparenting than fathers. More overparenting of fathers had a direct relation with less adjustment in young adults. This direct relation was partially mediated by higher levels of young adults' attachment anxiety (for the dependent variables distress and interpersonal sensitivity) and young adults' perceptions of parental psychological control (for the dependent variable distress). More overparenting of mothers was related to less interpersonal sensitivity for male young adults and for young adults who reported less parental psychological control. This study showed that parenting qualities and their interplay with young adults' relational characteristics continue to play an important role in the lives of young adult offspring. Therefore, clinicians dealing with young adults at risk for, or suffering from, psychopathology, should be attentive to overparenting and its possible implications.

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1. Introduction

Several family system theories have described the significant impact of family interaction on offspring's predisposition for psychopathology, such as increased levels of anxiety and psychosomatic symptoms (Minuchin et al., 1975; Boszormenyi-Nagy and Ulrich, 1981; Bowen, 1993). According to family system theories, differentiation is considered a crucial aspect of family interaction. Differentiation entails processes of distance and closeness and, more specifically, whether family members manage to achieve an age-appropriate balance between these processes. It is believed that offspring of parents who are too distant or too intrusive/controlling suffer more often from psychopathology, because these parenting behaviors do not comply with offspring's needs for relatedness and autonomy (Minuchin et al., 1975; Boszormenyi-Nagy and Ulrich, 1981; Bowen, 1993). Pervasive difficulty in regulating social distance is at the heart of personality disorders (Westen and Heim, 2003; Tackett et al., 2009), and difficulties in separateness are revealed in

interpersonal dependency and depression (Bornstein, 2011; McClintock et al., 2014). In this way, family system theories incorporate the premises of the self-determination model, which states that individuals have common innate needs for balancing processes of relatedness and autonomy (Deci and Ryan, 1985; Baumeister and Leary, 1995).

Alternatively, a more relativistic discourse is presented in the differential susceptibility and psychogenic needs models (Murray, 1938; Belsky and Pluess, 2009). These models stress individual differences in the strength of needs for relatedness and autonomy, and people's susceptibility to external events. Following the latter models, one could assume that only individuals with a high need for relatedness suffer from distant parenting, while only individuals with a high need for autonomy suffer from intrusive/controlling parenting. In other words, following the family system and self-determination theories, offspring's characteristics are believed to mediate the relation between family differentiation processes and psychopathology, while following the differential susceptibility and psychogenic needs theory, offspring's characteristics are believed to moderate the relation between family differentiation processes and psychopathology.

Addressing theories on differentiation in family interaction, researchers have recently started to investigate overparenting (also referred to as helicopter parenting, intensive parenting, parenting out of control; Nelson, 2010; LeMoyné and Buchanan, 2011;

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Segrin et al., 2012; Schiffrin et al., 2014a). Overparenting refers to the use of developmentally inappropriate levels of involvement, control, and problem solving by parents of young adults, and indicates problems in family differentiation, as it emphasizes relatedness while disregarding autonomy (Lemoyne and Buchanan, 2011; Segrin et al., 2012). The goal of the current study is to further our understanding of family dynamics, and identify young adults at-risk for psychopathological symptoms. Therefore, we examine overparenting and its associations with young adults' adjustment. In addition to direct relations, the indirect association through young adults' relational characteristics (inadequate boundaries perception, and attachment security) is addressed. Finally, we investigate the contribution of both parental and young adults' gender.

Although the empirical research on overparenting is still relatively new, studies have demonstrated the association with increased difficulties and distress, predisposing the development of psychopathology (e.g., more anxiety, depression, pain and stress, less general wellbeing and satisfaction, and lower levels of self-efficacy; LeMoine and Buchanan, 2011; Segrin et al., 2013b; Bradley-Geist and Olson-Buchanan, 2014; Schiffrin et al., 2014a, 2014b). However, understanding the pathways between overparenting and young adults' adjustment remains a significant task for researchers and clinicians.

Following the observational learning theory (Bandura, 1997), one might assume that parents who overparent, model the importance of excessive levels of investment in relationships with others, thereby contributing to their offspring's *interpersonal sensitivity*, which is defined as a personality trait representing the undue and excessive sensitivity to, and awareness of, behaviors and feelings of others (Boyce and Parker, 1989). People with high levels of interpersonal sensitivity are highly expectant of criticism and rejection from others (Boyce and Parker, 1989). Since augmented levels of distress and interpersonal sensitivity predict a long-term increase in chronic health problems, functional impairment, and psychiatric diagnosis comorbidity, it is important to address possible contributing factors such as overparenting (Boyce and Parker, 1989; Newman et al., 1996; Hall et al., 2009; Bogren et al., 2010; Bell and Freeman, 2014).

Following theories on family differentiation, young adults' relational characteristics can be hypothesized to explain the relation between overparenting and young adults' adjustment. As overparenting is believed to harm young adults' adjustment through the accentuation of relatedness at the expense of autonomy, young adults' perception of inadequate boundaries with their parents can be assumed to play a crucial role. *Inadequate boundaries perception* reflects the child's observation of blurred and/or inflexible parent-child boundaries and hierarchy. Several inadequate boundaries profiles have been revealed, among which are parentification, triangulation, psychological control, and guilt induction (Barber, 2002; Mayseless and Scharf, 2009). Parentification relates to children giving up their own needs for comfort, protection, and guidance in order to fulfill their parent's needs, to an extent that exceeds cultural developmental norms (Boszormenyi-Nagy and Spark, 1973; Minuchin, 1974; Chase, 1999). Triangulation refers to an interaction pattern in which a child mediates between his or her parents or sides with one parent against the other (Bowen, 1993; Chase, 1999). Psychological control occurs when parents control their children's behavior indirectly, through control of the child's emotions and cognitions (Steinberg, 1990; Barber, 1996). Guilt induction is often seen as a practice of psychological control, as it refers to inducing guilt in order to control a child's behavior (Barber, 1996). Past research has revealed that inadequate boundaries perception is related to lower levels of young adults' adjustment (Mayseless and Scharf, 2009). In line with the family system and self-determination theories, one can hypothesize that young adults interpret overparenting as disregarding their boundaries, because this impedes their innate need for autonomy, and thus can be

hypothesized to function as a mediator. However, in line with the differential susceptibility and psychogenic needs theories, inadequate boundaries perception can also be hypothesized to function as a moderator between overparenting and adjustment: overparenting might only be interpreted as disregarding boundaries by young adults with high needs for autonomy and, as a consequence, overparenting might only relate to lower levels of adjustment for these latter young adults.

In addition, young adults' *felt security* might color their experiences of overparenting, thereby serving as a possible intervening variable in the relation between overparenting and adjustment (Bowlby, 1969, 1982; Sroufe and Waters, 1977). Theories on felt security describe how experiences of security in close relationships are related to internalized representations (i.e., internal working models) of the self and significant others (Bowlby, 1969, 1982; Shaver and Mikulincer, 2007). These internal working models in turn guide perceptions, behavior, and experiences in later relationships (Collins, 1996; Cassidy and Shaver, 1999). Felt security provides successful emotional regulation and regulation of emotional closeness (Shaver and Mikulincer, 2007). Individual differences in felt insecurity are often represented by two dimensions, namely attachment anxiety and attachment avoidance (Brennan et al., 1998). Attachment anxiety reflects an individuals' intensive worry about the availability of their significant others. Attachment avoidance reflects a person's preference for emotional distance and discomfort with dependence on others. Attachment insecurity has been shown to relate to lower levels of young adults' adjustment and higher levels of psychopathology (Mikulincer and Shaver, 2010; Otani et al., 2014).

In line with the family system and self-determination theories, overparenting can be hypothesized to hamper feelings of security because of its typical features of inappropriate responsiveness and low amounts of autonomy. In line with differential susceptibility and psychogenic needs theories, one can hypothesize that overparenting will be experienced differently based on one's attachment security. Avoidantly attached young adults might experience overparenting as especially problematic as it interferes with their elevated need for autonomy, while anxiously attached young adults might experience overparenting less negatively since it meets their augmented need for relatedness. Securely attached young adults may perceive their parents' over-involvement less negatively than their counterparts because they may attribute their parents' behaviors to caring and good intentions (Waters et al., 1993). Previous research on the link between parenting behavior and children's adjustment found both mediating and moderating relationships through attachment (Carpenter, 2001; Bosmans et al., 2006; Merz and Consedine, 2009).

Gender might also play a role in overparenting and its implications. Sex role theories (Bem, 1974; Hosley and Montemayor, 1997) suggest that regardless of changes in the current social structure, compared to masculinity, femininity continues to be associated with more expressiveness. Therefore, mothers might adopt higher levels of overparenting. Also, parental gender may moderate the link between overparenting and young adults' adjustment. It has been suggested that compared to fathers' parenting, mothers' parenting has the greatest impact on children's adjustment because mothers generally are more involved with their children (Patock-Peckham and Morgan-Lopez, 2009; Nelson et al., 2011). In addition, in line with the differential susceptibility theory, and the psychogenic needs model, the strength of associations between parenting behavior and child outcome may differ depending on the young adult's gender. Because of gender-role expectations, females are believed to develop a stronger sense for relational stimuli, such as warmth, support, and closeness (Bem, 1974; Hosley and Montemayor, 1997). Therefore, girls may assign higher importance to parenting behavior and be more strongly influenced by it. This hypothesis has been supported with

regard to other family aspects, such as family cohesion (Feldman et al., 1998; Holman and Birch, 2001). Finally, the specific combination of parent–child gender might be relevant. Studies have revealed that individuals form stronger connections with those of the same sex (Rossi and Rossi, 1990; Otani et al., 2009). However, Kloep and Hendry (2010) revealed that parents have more difficulties separating from children with opposite genders.

In sum, in the current study we examine the following hypotheses: (a) mothers report higher levels of overparenting than fathers; (b) compared to fathers' overparenting, mothers' overparenting has the strongest relation to young adults' adjustment; (c) there is an indirect relationship between overparenting and young adults' adjustment, through young adults' inadequate boundaries perception (mediation or moderation), young adults' attachment (mediation or moderation) and young adults' gender (moderation).

2. Methods

2.1. Participants and procedure

The sample consisted of 89 young adults, 42 males (47.2%) and 47 females, and their mothers and fathers (only intact families were included). All families were Jewish-Israeli, stemmed from a middle class socio-economic background and had 1–4 children ($M=2.76$; $S.D.=0.72$). Thirty one and a half percent (31.5%) of the mothers and 23.6% of the fathers completed high school, and the remainder had higher education. Young adults were invited to participate via the snowball sampling technique, while the balance was recruited through social network sites. Young adults were asked to invite their parents to participate. The young adults' age ranged from 20 to 30 years ($M=25.56$; $S.D.=2.69$), 93.2% were born in Israel, and 78.5% were students or had an academic education. Participants completed the questionnaires via e-mail or on paper, according to their preferences. A total of 68.5% of the mothers and 76.4% of the fathers had a higher education.

2.2. Measures

Overparenting was measured using a scale created by Segrin et al. (2012), completed by mothers and fathers. The measure included 39 items that were answered on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The items loaded on four scales, namely anticipatory problem solving (e.g., I tell my child how to plan out certain activities, Cronbach's alpha 0.88 for mothers and 0.86 for fathers), advice/affect management (e.g., I say or do things to cheer my child up, 0.84 and 0.82), child self-direction (e.g., I let my child solve most problems on his/her own [reverse-scored], 0.84 and 0.71), and tangible assistance (e.g., I see to it that my child's financial needs are taken care of, 0.69 and 0.64). The original development study (Segrin et al., 2012) showed good construct validity for the overparenting scale, as its subscales correlated as expected with subscales of the parental authority questionnaire (Buri, 1991) and the family adaptability and cohesion evaluation scales, version IV (Olson et al., 2006). In addition, the original development study showed good internal consistency reliability: $\alpha=0.74$ for tangible assistance; $\alpha=0.79$ for child self-direction; $\alpha=0.81$ for advice and affect management; and $\alpha=0.88$ for anticipatory problem solving (Segrin et al., 2012). The overparenting measure was completed by the parents, while all other measures were completed by the young adults.

Level of distress was assessed by 11 items from the Mental Health Inventory (e.g., feeling depressed, lonely, nervous, anxious, or in control; Veit and Ware, 1983). Young adults were asked to answer each item using a 1 (never) to 6 (all the time) point Likert scale. Averaging item scores, three subscales were computed, namely depression (3 items), loss of control (4 items), and anxiety (4 items). The Mental Health Inventory has shown high internal reliability and good test–retest reliability, as well as construct and discriminant validity (e.g., Florian and Drory, 1990; Gill et al., 2007; Scharf et al., 2011). The original development study (Veit and Ware, 1983) showed good internal consistency reliability: $\alpha=0.86$ for depression; $\alpha=0.83$ for loss of control; and $\alpha=0.90$ for anxiety. Cronbach's alphas in this study (using a shortened version) were respectively 0.84, 0.63, and 0.87 for depression, loss of control and anxiety.

The Interpersonal Sensitivity Measure (Boyce and Parker, 1989; Harb et al., 2002) assessed excessive sensitivity to the interpersonal behavior of others, to social feedback and to (perceived or actual) negative evaluation by others. The items were completed on a four-point Likert scale ranging from 1 (very unlike me) to 4 (very like me). The revised Interpersonal Sensitivity Measure (Harb et al., 2002) included three subscales: Interpersonal Worry and Dependency (11 items, e.g., 'My value as a person depends enormously on what others think of me'), unassertive interpersonal behavior (8 items, e.g., 'I will do something I do not want to do rather than offend or upset someone'), and low self-esteem (10 items, e.g., 'If other people

knew what I am really like, they would think less of me'). The reliability and validity of the Interpersonal Sensitivity Measure has been demonstrated in depressed and social anxiety populations (Boyce and Parker, 1989; Harb et al., 2002). In the original development study of the revised Interpersonal Sensitivity Measure (Harb et al., 2002), Cronbach's alphas were 0.88 for interpersonal worry and dependency; 0.79 for unassertive interpersonal behavior; and 0.80 for low self-esteem. Cronbach's alphas in the current study were 0.86 (interpersonal worry and dependency), 0.66 (low self-esteem), and 0.73 (unassertive interpersonal behavior).

Perception of psychological control, guilt induction, parentification, and triangulation were examined by the Inadequate Boundaries Scale (IBS; Mayseless and Scharf, 2000, 2009). A total of 28 items was answered by the young adults with regard to their mothers and fathers separately: psychological control (8 items, e.g., The parent tries all the time to change what I feel or think about things, Cronbach's alpha 0.84 for mothers and 0.80 for fathers), guilt induction (8 items, e.g., It is very important for the parent that I thank him/her for everything he/she has done for me, 0.80 for both parents), parentification (8 items, e.g., Sometimes I felt that I was the only person to whom the parent could turn, 0.86 and 0.80), and triangulation (5 items, e.g., When disagreements developed between the parents I restored peace, 0.86 and 0.82). Items were answered on a five-point Likert scale ranging from 1 (never or almost never) to 5 (always or almost always). The original development study (Mayseless and Scharf, 2000) showed good internal consistency reliability: $\alpha=0.80$ and 0.83 for psychological control of mothers and fathers respectively; $\alpha=0.85$ and 0.79 for guilt induction of mothers and fathers respectively; $\alpha=0.80$ and 0.76 respectively for parentification of mothers and fathers; and $\alpha=0.67$ and 0.73 respectively for triangulation of mothers and fathers.

Attachment of the young adults was assessed using the Experiences in Close Relationships scale (ECR; Brennan et al., 1998). Young adults rated 36 items describing their feelings in close relationships on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). The items measure anxious attachment and avoidant attachment. Brennan et al. (1998) showed a low correlation ($r=0.11$) between the scales, supporting the discriminant validity. In addition, convergent validity was shown by expected correlations with 14 other measures of attachment-related concepts. Also, good internal consistency reliability was shown: $\alpha=0.91$ for the anxiety subscale and $\alpha=0.94$ for the avoidance subscale. In the current study, Cronbach's alphas were high for both avoidance (0.90) and anxiety (0.91).

2.3. Data-analysis

All analyses were performed using PASWstatistics22. A paired samples *t*-test was used to assess the significance of the difference in overparenting between mothers and fathers. Mediation was assessed following the guidelines of Preacher and Hayes (2004, 2008). Analyses were done separately for mothers and fathers, and unstandardized beta coefficients were reported. Moderation was evaluated by means of univariate hierarchical multiple regression analysis (UHMRA), following the guidelines of Aiken and West (1991). Analyses were done separately for mothers and fathers. For UHMRA, first, independent relations were tested by including overparenting and one moderator in the first block. Second, moderated relations were assessed, by entering an interaction variable in the second block. Moderation was considered significant when the multiple R^2 significantly increased after entering the interaction term, as indicated by a significant incremental *F* test. Dependent variables were standardized, and independent variables were centered. As suggested by Aiken and West (1991), we report unstandardized regression coefficients. All analyses were performed using bias-corrected bootstrap sampling over 1000 iterations.

3. Results

Table 1 presents the correlations between the study variables. In order to prevent interference from multicollinearity, several second order scales were created. Common measures were created for distress (mean of depression, loss of control, and anxiety; Cronbach's alpha was 0.91), interpersonal sensitivity (mean of worry dependency, low self-esteem, and unassertive; 0.86), overparenting (mean of anticipatory problem solving, advice/affect management, tangible assistance, and reversed child self-direction; 0.83 for mothers, 0.77 for fathers), boundaries diffusion (mean of parentification and triangulation; 0.90 for mothers, 0.86 for fathers), and psychological control (mean of guilt induction and psychological control, 0.88 for mothers, 0.87 for fathers). The latter second order scale was defined psychological control, since guilt induction is often seen as a specific psychological control tactic (Barber, 1996).

A paired samples *t*-test revealed significant differences between reports of overparenting by mothers and fathers ($t(88)=1.99$,

Table 1
Intercorrelations between study variables.

		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Distress – child																									
1	Depression	0.78 ^a	0.79 ^a	0.31 ^b	0.30 ^b	0.15	0.11	0.06	0.18	−0.09	0.23 ^c	0.23 ^c	0.10	−0.16	0.19	0.30 ^b	0.19	0.16	0.18	0.05	0.14	0.14	0.27 ^c	0.18	0.08
2	Loss of control		0.70 ^a	0.39 ^a	0.36 ^b	0.21	0.15	0.10	0.17	−0.15	0.26 ^c	0.18	0.15	−0.13	0.20	0.40 ^a	0.16	0.15	0.21	0.11	0.08	0.15	0.23 ^c	0.17	0.20
3	Anxiety			0.38 ^a	0.27 ^b	0.14	0.12	0.05	0.14	−0.13	0.15	0.20	0.09	−0.25 ^c	0.16	0.36 ^b	0.29 ^b	0.28 ^b	0.17	0.09	0.24 ^c	0.25 ^c	0.21	0.14	0.16
Interpersonal Sensitivity – child																									
4	Worry dependency				0.31 ^b	0.59 ^a	0.03	0.07	0.15	−0.02	0.21	0.18	0.13	−0.13	0.11	0.65 ^a	0.24 ^c	0.28 ^b	0.16	0.04	0.08	0.26 ^c	0.23 ^c	0.24 ^c	0.21
5	Low self-esteem					0.15	−0.18	−0.18	0.03	0.06	0.09	0.06	0.12	0.03	0.60 ^a	0.37 ^a	−0.01	−0.04	0.03	0.07	−0.07	0.07	0.02	0.15	−0.08
6	Unassertive						−0.09	0.12	0.00	0.19	0.04	0.18	−0.05	−0.02	0.10	0.43 ^a	0.13	0.07	−0.01	−0.05	−0.01	0.06	0.04	0.02	−0.08
Overparenting mother																									
7	Problem solving							0.56 ^a	0.53 ^a	−0.36 ^a	0.41 ^a	0.06	0.13	−0.30 ^b	−0.14	0.02	0.12	0.22 ^c	0.30 ^b	0.19	0.16	0.17	0.24 ^c	0.17	0.06
8	Advice/affect management								0.31 ^b	−0.25 ^c	0.38 ^a	0.31 ^b	0.10	−0.13	−0.16	−0.02	0.23 ^c	0.21 ^c	0.12	−0.05	0.19	0.18	0.12	0.05	0.02
9	Tangible assistance									−0.12	0.24 ^c	0.16	0.48 ^a	−0.25 ^c	−0.02	0.02	0.04	0.14	0.06	−0.01	0.07	0.16	−0.01	−0.08	0.05
10	Child self-direction										−0.04	0.08	0.02	0.27 ^b	0.10	0.08	0.18	−0.04	−0.00	−0.00	0.11	−0.04	0.06	−0.16	−0.07
Overparenting father																									
11	Problem solving											0.60 ^a	0.37 ^a	−0.28 ^b	0.03	0.23 ^c	0.24 ^c	0.22 ^c	0.24 ^c	0.17	0.24 ^c	0.24 ^c	0.32 ^b	0.25 ^c	0.14
12	Advice/affect management												0.17	−0.27 ^c	−0.10	0.11	0.13	0.09	0.13	0.01	0.27 ^c	0.16	0.18	0.04	−0.07
13	Tangible assistance													−0.22 ^c	0.08	0.13	0.07	0.16	0.08	0.03	0.02	0.18	0.03	0.01	0.26 ^c
14	Child self-direction														0.01	−0.15	−0.08	−0.16	−0.11	−0.01	−0.13	−0.16	−0.17	−0.19	−0.12
Attachment																									
15	Avoidance															0.23 ^c	0.01	−0.06	0.16	0.04	−0.07	−0.04	0.04	0.17	−0.19
16	Anxiety																0.14	0.19	0.22 ^c	0.17	−0.04	0.16	0.24 ^c	0.33 ^b	0.06
Interpersonal boundaries – child about mother																									
17	Parentification																	0.66 ^a	0.26 ^c	0.12	0.74 ^a	0.59 ^a	0.24 ^c	0.08	0.02
18	Triangulation																		0.26 ^c	0.13	0.45 ^a	0.91 ^a	0.26 ^c	0.20	0.23 ^c
19	Guilt induction																			0.62 ^a	0.31 ^b	0.20	0.84 ^a	0.54 ^a	−0.02
20	Psychological control																				0.15	0.17	0.51 ^a	0.70 ^a	−0.03
Interpersonal boundaries – child about father																									
21	Parentification																					0.53 ^a	0.33 ^b	0.04	−0.04
22	Triangulation																						0.22 ^c	0.19	0.22 ^c
23	Guilt induction																							0.64 ^a	−0.00
24	Psychological control																								−0.11
25	Gender child																								

^a $p < 0.001$.

^b $p < 0.01$.

^c $p < 0.05$.

$p=0.04$). Overparenting was more often reported by mothers ($M=3.18$, $S.D.=0.48$) than by fathers ($M=3.07$, $S.D.=0.43$).

The output of the mediation analyses is presented in Table 2. Fig. 1 pictures the significant mediations. The results revealed an indirect relation between more overparenting of fathers and more distress and interpersonal sensitivity in young adults, mediated by higher levels of attachment anxiety (both for distress and interpersonal sensitivity) and higher levels of psychological control interpretation (for distress).

The output of the moderation analyses is presented in Table 3. Fig. 2 pictures the results of the post-hoc simple slope tests for significant interactions. The results of the UHMRA showed an indirect relation between overparenting of mothers and interpersonal sensitivity in young adults, moderated by the young adult's perception of psychological control, gender, and attachment avoidance. Post-hoc simple slope tests revealed that for young adults with lower perceptions of psychological control, higher levels of overparenting were related to less interpersonal sensitivity ($B=-0.89$, $SE=0.33$, $p=0.006$). For young adults with higher perceptions of psychological control, higher levels of overparenting were related to more interpersonal sensitivity, however after bootstrapped resampling this latter slope remained only marginally significant ($B=0.64$, $SE=0.35$, $p=0.06$). In addition, the relation between overparenting of mothers and interpersonal sensitivity of young adults was positive for female young adults and negative for male young adults. However, only the simple slope for males was significant ($B=-0.81$, $SE=0.35$, $p=0.02$). Concerning attachment avoidance, a post-hoc simple slope test indicated no significant differences.

4. Discussion

Insight in the link between overparenting and young adults' distress is needed in order to prevent long-term negative outcome such as psychiatric diagnosis comorbidity (e.g., Newman et al., 1996; Hall et al., 2009). This study adds to the knowledge on overparenting and young adults' adjustment by investigating differences between mothers' and fathers' use of overparenting, and by examining both direct and indirect relations between mothers' and fathers' use of overparenting and young adults' adjustment. Results showed that mothers more frequently reported overparenting than fathers, which is in line with our hypothesis based on sex role theory. Padilla-Walker and Nelson (2012) did not find significant differences between mothers' and fathers' report of overparenting. The inconsistency with the results from this study might be explained by sample differences. This study included Jewish-Israeli families, while Padilla-Walker and Nelson included American families. Although we are not aware of scientific research on overparenting in different cultures, Israeli mothers are generally considered as being very involved in their children's lives (Scharf, 2014). Another sample difference concerns the age of the child, as Padilla-Walker and Nelson included younger subjects ($M=19.65$; $S.D.=2.00$ versus $M=25.56$; $S.D.=2.69$). Yeung et al. (2001) indicated that the differences between the amount of time mothers and fathers spend with their children increase with the age of the child, with mothers spending significantly more time than fathers.

Furthermore, we observed a significant relation between more overparenting in fathers and more distress/interpersonal sensitivity in young adults. This relation was partially mediated by young adults' perception of their fathers as psychologically controlling (for the dependent variable distress) and higher levels of attachment anxiety (for the dependent variables distress and interpersonal sensitivity). For mothers, there was a significant moderated link between overparenting and young adults' interpersonal sensitivity: for young adults with lower levels of psychological

control perception and for males, higher levels of overparenting were related to less interpersonal sensitivity.

Based on the results concerning psychological control perception, we can hypothesize that young adults tend to perceive their fathers' overparenting as negative, while their mothers' overparenting is not significantly interpreted this way. However, when young adults do perceive the overparenting of their mothers as psychologically controlling, it is associated with lower levels of adjustment. This latter finding relates to the differential susceptibility and psychogenic needs theories, and to several empirical studies that indicate that it is the fit of parenting with a child's unique needs, or a child's unique interpretations of the parenting behavior, that relates to adjustment, rather than the parenting behavior itself (e.g., Murray, 1938; Belsky and Pluess, 2009; Rousseau et al., 2014).

Also young adults' attachment was found to play a mediating role in the relation between fathers' overparenting and young adults' adjustment: fathers' overparenting was significantly related to higher attachment anxiety, which was connected to lower levels of adjustment. This result also offers a suggestion for further research on possible precursors of fathers' use of overparenting. Research showed that fathers of anxiously attached young adults are more likely to be anxiously attached themselves (van Ijzendoorn, 1995). Anxiously attached fathers might try to control their offspring's behaviors more closely than other fathers due to their concern regarding their offspring's separateness. We only found evidence for a mediating, but not moderating, role of attachment. As fathers are generally perceived to be less involved than mothers, fathers' overparenting might be perceived as more extreme and inadequate parenting behavior, and consequently relate to lower levels of young adults' adjustment. Other empirical studies also found limited evidence for the moderating effects of attachment in the relation between parenting behavior and child adjustment (Bosmans et al., 2006).

In line with the differential susceptibility and psychogenic needs theories, this study revealed positive outcomes of mothers' overparenting, for male young adults only. In line with gender-role theories (Bem, 1974; Hosley and Montemayor, 1997), past research showed that from a young age, boys are granted higher autonomy and the theme of autonomy was more salient and emphasized among sons (Fiese and Skillman, 2000; Santor and Youniss, 2002). In addition, one can assume that young adult males might interpret their mothers' overparenting positively as a mean to free them to do what they really want to do rather than as a sign of weakness or failure, possibly accounting for higher levels of adjustment (Rossi and Rossi, 1990; Eggebeen, 1992).

A significant part of the relation between fathers' overparenting and young adults' adjustment was not explained by psychological control perception and attachment anxiety. Further research should investigate the role of additional intervening variables, such as coping skills (Segrin et al., 2013a, 2013b; Bradley-Geist and Olson-Buchanan, 2014). Following the family system and self-determination theory, one can assume that parents who report high levels of overparenting prevent their children from learning how to function independently or cope with problems, which in turn is related to lower levels of adjustment. However, following the differential susceptibility and the psychogenic needs models, coping skills might rather function as a moderator. In order to uncover other relevant mechanisms explaining the link between overparenting and adjustment, in depth interviews might provide valuable insights.

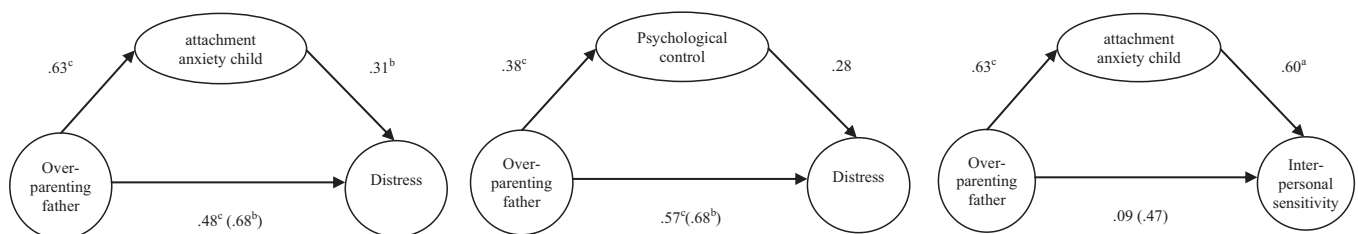
This study failed to indicate boundaries diffusion as a significant intervening variable in the relation between overparenting and young adults' adjustment. Previous studies did reveal a relation between overparenting and boundaries diffusion (cf., enmeshed family systems) and between boundaries diffusion and young adults' adjustment (Werner et al., 2001; Manzi et al., 2006; Mayseless and Scharf, 2009). As Israeli parents are generally considered to be highly involved, it is possible that in the Israeli

Table 2

The indirect relation between overparenting and young adults' distress/interpersonal sensitivity: mediation.

Independent variable	Mediation variable	Dependent variable = Young adults' distress							Dependent variable = Young adults' interpersonal sensitivity						
		Total	Direct		Indirect 95% CI		R ² change		Total	Direct		Indirect 95% CI		R ² change	
		B	(SE)	B	(SE)	Lower	Upper		B	(SE)	B	(SE)	Lower	Upper	
Overparenting mother	Perception of parent's psychological control	0.39	0.22	0.34	0.22	−0.01	0.21	0.06	−0.07	0.22	−0.10	0.23	−0.03	0.17	0.01
	Perception of boundaries diffusion	0.39	0.22	0.31	0.22	−0.01	0.27	0.08 ^c	−0.07	0.22	−0.14	0.22	−0.01	0.32	0.04
	Avoidant attachment	0.39	0.22	0.46	0.22	−0.24	0.01	0.09 ^c	−0.07	0.22	0.02	0.21	−0.30	0.01	0.10 ^c
	Attachment anxiety	0.39	0.22	0.40	0.20	−0.23	0.18	0.19 ^a	−0.07	0.22	−0.05	0.17	−0.34	0.33	0.42 ^a
Overparenting father	Perception of parent's psychological control	0.68 ^b	0.24	0.57 ^c	0.24	0.01	0.32	0.11 ^b	0.47	0.24	0.40	0.25	−0.03	0.26	0.05
	Perception of boundaries diffusion	0.68 ^b	0.24	0.58 ^c	0.25	−0.02	0.35	0.10 ^b	0.47	0.24	0.43	0.26	−0.09	0.25	0.04
	Avoidant attachment	0.68 ^b	0.24	0.67 ^b	0.23	−0.09	0.15	0.12 ^b	0.47	0.24	0.46	0.23	−0.12	0.22	0.14 ^b
	Attachment anxiety	0.68 ^b	0.24	0.48 ^c	0.23	0.04	0.45	0.19 ^a	0.47	0.24	0.09	0.20	0.07	0.69	0.42 ^a

B=bootstrapped unstandardized beta coefficient; SE=bootstrapped standard error.

^a $p < 0.001$.^b $p < 0.01$.^c $p < 0.05$.**Fig. 1.** The indirect relation between overparenting in fathers and young adults' distress/interpersonal sensitivity, mediated through psychological control of fathers as perceived by the young adult, and attachment anxiety of the child Model R^2 =respectively 0.11^b; 0.19^a; 0.42^a $a=p < 0.001$; $b=p < 0.01$; $c=p < 0.05$.

culture, the involvement aspect of overparenting is more normative and therefore not necessarily associated with enmeshed family patterns (Manzi et al., 2006; Scharf, 2014).

This study did not show mothers' overparenting to have a stronger relation to young adults' adjustment than fathers' overparenting. Other studies that failed to confirm differences in the relation between maternal, respectively paternal, parenting and child adjustment suggested that, especially in older children, paternal parenting becomes more important, fading out the differences with maternal parenting (Day and Padilla-Walker, 2009; Verhoeven et al., 2012). Compared to maternal overparenting, paternal overparenting was associated with a greater variety of offspring's outcome. Research showed that as a result of gender role expectations, mothers are more concerned with interpersonal relations and caring, and more involved in the lives of their children, than fathers (Rossi and Rossi, 1990; Eggebeen, 1992; Phares et al., 2009; Coyl-Shepherd and Newland, 2013). Therefore, young adults might consider maternal overparenting to be much more common and acceptable, and less extreme, than paternal overparenting. When fathers do use overparenting, offspring might interpret this as a sign of their incompetence to take care of themselves, or their weakness or failure, possibly accounting for lower levels of adjustment.

4.1. Strengths, limitations, and suggestions for further research

This study was among the first to investigate overparenting of both mothers and fathers from the same family and to investigate the

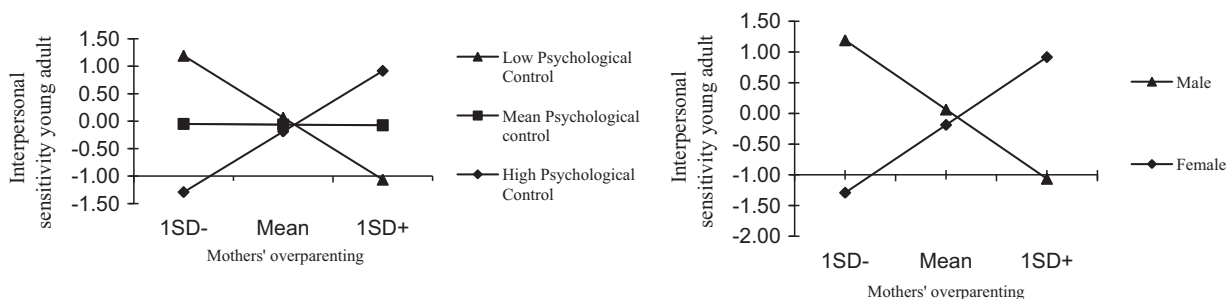
indirect relations between overparenting of mothers and fathers and young adults' adjustment through attachment, inadequate boundaries perception, and gender of the young adult. The study included multiple informants (parents reported on overparenting and young adults on attachment, inadequate boundaries, and adjustment), decreasing shared-method variance bias (Holmbeck et al., 2002), and indicating that parent's report of their parenting practices can be usefully adopted to predict young adults' perceptions and adjustment. Inevitably, limitations exist. An important restriction is that no longitudinal data was gathered. Further research should include follow-up measurement points in order to understand if overparenting predicts the young adults' characteristics (higher levels of insecure attachment and psychological control perception, lower levels of adjustment) or whether it is the young adults' characteristics that stimulate parents to employ higher levels of overparenting. Another limitation is that only families from a middle class socio-economic background were included. Inclusion of other families might have yield different results, since previous research suggested that higher levels of parental involvement are especially protective in families with lower socio-economic backgrounds (Flouri and Buchanan, 2004). Also, the study only included self-report measures. The inclusion of alternative measures such as interviews or observation may shed different light on family interactions, and therefore be a better predictor or predict different aspects of young adults' perception and adjustment. Therefore, further research should replicate this study, using different methods. In addition, this study showed that the assessed models explained between 4% and 42% of the variance in young adults' adjustment, meaning that although

Table 3

The indirect relation between overparenting and young adults' distress/interpersonal sensitivity: moderation.

Independent variables	Parent = mother								Parent = father							
	Dependent variable = Young adults' distress				Dependent variable = Young adults' interpersonal sensitivity				Dependent variable = Young adults' distress				Dependent variable = Young adults' interpersonal sensitivity			
	B	(SE)	F-change	R ² change	B	(SE)	F-change	R ² change	B	(SE)	F-change	R ² change	B	(SE)	F-change	R ² change
Block 1			2.61	0.06			0.12	0.00			4.77 ^c	0.10			1.86	0.04
Overparenting parent	0.37	0.21			−0.08	0.29			0.64 ^b	0.23			0.47	0.28		
Gender child	0.29	0.21			0.08	0.21			0.24	0.21			0.02	0.21		
Block 2			1.43	0.02			8.55 ^b	0.09			0.10	0.00			0.16	0.00
Overparenting parent	0.33	0.21			−0.17	0.25			0.63 ^c	0.24			0.47	0.29		
Gender child	0.30	0.21			0.09	0.20			0.24	0.21			0.02	0.21		
Overparenting parent * gender child	0.53	0.43			1.28 ^c	0.50			0.15	0.49			−0.20	0.60		
Block 1			2.61	0.06			0.37	0.01			5.52 ^b	0.11			2.49	0.06
Overparenting parent	0.34	0.21			−0.10	0.28			0.57 ^c	0.23			0.40	0.28		
Perception of parent's psychological control	0.22	0.15			0.13	0.15			0.28	0.17			0.19	0.16		
Block 2			0.48	0.01			12.06 ^b	0.12			1.23	0.01			3.18	0.03
Overparenting parent	0.33	0.21			−0.13	0.24			0.53	0.23			0.34	0.27		
Perception of parent's psychological control	0.19	0.16			−0.01	0.15			0.24	0.18			0.13	0.15		
Overparenting parent * perception of parent's psychological control	0.23	0.30			1.12 ^b	0.34			0.42	0.32			0.69	0.39		
Block 1			3.96 ^c	0.08			1.72	0.04			4.93 ^b	0.10			2.00	0.04
Overparenting parent	0.31	0.20			−0.14	0.27			0.58 ^c	0.25			0.43	0.28		
Perception of boundaries diffusion regarding parent	0.26 ^c	0.12			0.23	0.13			0.19	0.15			0.08	0.15		
Block 2			0.07	0.00			0.01	0.91			0.41	0.00			0.00	0.00
Overparenting parent	0.32	0.20			−0.18	0.27			0.56 ^c	0.25			0.43	0.27		
Perception of boundaries diffusion regarding parent	0.27 ^c	0.13			0.21	0.11			0.16	0.17			0.08	0.15		
Overparenting parent * perception of boundaries diffusion regarding parent	−0.06	0.23			0.21	0.29			0.19	0.27			0.00	0.45		
Block 1			4.05 ^c	0.09			4.62 ^c	0.10			5.98 ^b	0.12			6.77 ^b	0.14
Overparenting parent	0.46 ^c	0.21			0.02	0.29			0.67 ^b	0.23			0.46	0.29		
Attachment avoidance child	0.24	0.13			0.33 ^c	0.12			0.20	0.13			0.32 ^b	0.11		
Block 2			0.03	0.00			4.22 ^c	0.04			1.22	0.01			1.18	0.01
Overparenting parent	0.46 ^c	0.22			0.01	0.27			0.66 ^b	0.24			0.45	0.28		
Attachment avoidance child	0.24	0.13			0.33 ^b	0.11			0.23	0.13			0.35 ^b	0.11		
Overparenting parent * attachment avoidance child	0.05	0.27			−0.54	0.31			−0.30	0.33			−0.29	0.30		
Block 1			9.82 ^a	0.19			30.95 ^a	0.42			9.96 ^a	0.19			31.08 ^a	0.42
Overparenting parent	0.41 ^c	0.18			−0.05	0.19			0.48 ^c	0.22			0.09	0.20		
Attachment anxiety child	0.37 ^b	0.09			0.61 ^a	0.09			0.31 ^b	0.09			0.60 ^a	0.08		
Block 2			0.37	0.00			0.03	0.00			0.03	0.00			1.63	0.01
Overparenting parent	0.41 ^c	0.18			−0.05	0.20			0.49 ^c	0.23			0.13	0.20		
Attachment anxiety child	0.36 ^b	0.09			0.61 ^a	0.09			0.32 ^b	0.10			0.62 ^a	0.08		
Overparenting parent * attachment anxiety child	0.10	0.12			0.02	0.18			−0.03	0.16			−0.21	0.22		

B=bootstrapped unstandardized beta coefficient; SE=bootstrapped standard error.

^a $p < 0.001$.^b $p < 0.01$.^c $p < 0.05$.**Fig. 2.** The indirect relation between overparenting in mothers and young adults' interpersonal sensitivity, moderated through psychological control of mothers as perceived by the young adult, and gender of the child.

the investigated variables significantly contribute to young adults' adjustment, other aspects remain important. This latter idea is in line with the theory on biopsychosocial determination of adjustment (Sarafino, 1998). Note, however, that this study examined families with middle socio-economic status. Examining these hypotheses among families with low socio-economic status might yield different results (Flouri and Buchanan, 2004; Bornstein and Bradley, 2014). Also, the study included a rather small sample. The small sample size, and thereby the decrease in power, led us to discuss the indirect relation between overparenting and interpersonal sensitivity through psychological control perception, even though after bootstrap analysis it was only marginally significant ($p=0.06$). Future studies should investigate the hypothesis that this result will be significant when replicated in larger samples. The inclusion of a rather small sample size also led us not to assess all variables in one comprehensive statistical test. Future research with larger samples should investigate more extensive models that include maternal and paternal data, as well as a within family variation effect.

4.2. Practical implications

This study shows that parenting aspects and their interplay with young adults' relational characteristics continue to play an important part in the lives of young adult offspring, and therefore clinicians should be attentive for it when dealing with young adults who are at risk for or suffer from psychopathology. When problems related to overparenting and psychological control perception are revealed, establishing therapeutic relations that especially focus on strengthening personal decision making and intrinsic goals could be beneficial in preventing future deterioration of problems (Ryan and Deci, 2008). The study may also direct our attention to parents of young adults who are at risk for or suffer from psychopathology. These parents are shown to increasingly suffer from regrets regarding their own lives, or parents' marital conflict, all of which might increase their tendency of over-involvement with their offspring (Coyne et al., 2002; Segrin et al., 2013a, 2013b). Helping parents to accept their own accomplishments and failures, and/or to focus on solving their marital problems might diminish their exaggerated, less adaptive behaviors and improve their life satisfaction.

Conflicts of interest

None.

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None.

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How teacher emotional support motivates students: The mediating roles of perceived peer relatedness, autonomy support, and competence

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Abstract

Multilevel mediation analyses test whether students' mid-year reports of classroom experiences of autonomy, relatedness with peers, and competence mediate associations between early in the school year emotionally-supportive teacher-student interactions (independently observed) and student-reported academic year changes in mastery motivation and behavioral engagement. When teachers were observed to be more emotionally-supportive in the beginning of the school year, adolescents reported academic year increases in their behavioral engagement and mastery motivation. Mid-year student reports indicated that in emotionally-supportive classrooms, adolescents experienced more developmentally-appropriate opportunities to exercise autonomy in their day-to-day activities and had more positive relationships with their peers. Analyses of the indirect effects of teacher emotional support on students' engagement and motivation indicated significant mediating effects of autonomy and peer relatedness experiences, but not competence beliefs, in this sample of 960 students (ages 11–17) in the classrooms of 68 middle and high school teachers in 12 U.S. schools.

Keywords

Teacher emotional support; Behavioral engagement; Mastery achievement goals; Autonomy support; Peer relatedness; Adolescence

1. Introduction

Teacher emotional support is essential to high quality instruction (National Research Council, 2004; Pianta & Hamre, 2009; Wubbels & Brekelmans, 2005), and evidence links

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teacher-provided emotional support to students' motivation and engagement (Cooper, 2013; Eccles & Wang, 2014; Patrick, Ryan, & Kaplan, 2007; Reyes, Brackett, Rivers, White, & Salovey, 2012; Roorda, Koomen, Spilt, & Oort, 2011; Ryan & Patrick, 2001; Skinner, Furrer, Marchand, & Kindermann, 2008). In this study we investigate whether the link between teacher emotional support and student motivation can be explained by students' self-reported experiences in their classroom. We draw on self-determination theory (Deci, Vallerand, Pelletier, & Ryan, 1991; Ryan & Deci, 2000), which in prior research finds that satisfaction of three needs—autonomy, relatedness, and competence—are keys to understanding students' motivation and engagement. Based on this work, we examine whether students' perceived *classroom experiences* that are targeted at meeting their needs for autonomy, relatedness, and competence beliefs mediate associations between teachers' emotional support, as independently observed, and students' self-reported changes in motivation (mastery achievement goals) and behavioral engagement.

1.1. Emotionally-supportive interactions in the classroom

Teacher emotional support comprises teachers' demonstration of genuine concern for and care about their students, respect for their students, desire to understand students' feelings and points of views, and dependability (Patrick, Anderman, & Ryan, 2004; Pianta & Allen, 2008; Pianta & Hamre, 2009). Multiple motivational theories, including self-systems theory (Connell & Wellborn, 1991; Skinner et al., 2008), achievement goal theory (Ames, 1992; Dweck & Leggett, 1988), and self-determination theory (Deci et al., 1991; Ryan & Deci, 2000), identify these attributes as pivotal to positively motivating and engaging students, and the evidence is fairly robust in supporting this supposition (see Wigfield, Eccles, Schiefele, Roeser, & Davis-Keane, 2006 for a review). Although motivationally-oriented research on teacher emotional support is largely based on student reports of teacher behaviors, a strength of this study is that teachers' emotionally-supportive behaviors are measured directly using the Classroom Assessment Scoring System-Secondary (CLASS-S; Pianta, Hamre, Hayes, Mintz, & LaParo, 2011), which focuses on teacher-student interactions that promote students' cognitive and social development in educational settings (Hamre & Pianta, 2010). Based largely on adolescent developmental and motivation research, CLASS-S' emotional support domain is defined as teacher-student interactions that promote social connection and cohesion, convey concern for students' feelings and interest in their individuality, and honor students' desire to learn meaningful material and have a say in their learning.

CLASS-S captures the broad construct of emotionally-supportive teacher-student interactions as they are evidenced in three dimensions. *Positive climate* includes the presence of shared positive affect (e.g., laughter and enthusiasm), an interactive peer environment, communication of positive expectations, and the use of respectful language and cooperation. *Teacher sensitivity* is indicated by a teacher's awareness of and responsiveness to students' cues (e.g., misunderstanding, distress, and emotionality), timely provision of help when students ask for it, and the degree of student responsiveness and openness to a teacher's questions. A teacher's *regard for adolescent students' perspectives* is demonstrated through encouragement and following of students' ideas and opinions, making connections to students' experiences, providing meaningful choices and opportunities to take leadership roles, and incorporating meaningful peer interactions into classroom activities.

Taken together, positive climate, teacher sensitivity, and regard for adolescent students' perspectives provide a measure of emotional support that is inclusive of the variety of ways emotional support has been conceptualized in the literature.

A comprehensive measure of emotionally-supportive teacher-student interactions is key to this investigation because we are interested in identifying mechanisms to explain consistent findings relating teachers' provision of emotional support to students' self-reported motivation and engagement (Assor, Kaplan, & Roth, 2002; Cooper, 2013; Eccles & Wang, 2014; Patrick et al., 2007; Reyes et al., 2012; Roorda et al., 2011; Ryan & Patrick, 2001; Skinner et al., 2008). The mechanisms we consider are students' experiences in their classroom, specifically experiences targeted to meeting the three needs suggested by self-determination theory (Deci et al., 1991; Ryan & Deci, 2000), which have previously been posited as potential mechanisms to explain the positive effects of emotionally-supportive classroom interactions (Fredricks, Blumenfeld, & Paris, 2004; Skinner et al., 2008).

1.2. Self-determination theory

The satisfaction of an individual's needs for autonomy, relatedness, and competence is critical to the development of self-determination (Deci et al., 1991; Ryan & Deci, 2000), which is the autonomous (and internal) regulation of behavior. When autonomy needs are thwarted, an individual's behavior is neither governed nor initiated by the self. A desire for control over one's activities becomes increasingly salient during adolescence (Eccles et al., 1993; Kegan, 1994; Pianta & Allen, 2008). Social actors and contexts play a critical role in the satisfaction of these needs. Meeting autonomy needs can lead to the adoption of positive motivational states, including mastery achievement goals (Ames, 1992) and intrinsic motivation (Ryan & Deci, 2000), and autonomy itself is a key facilitator of engagement in self-systems theory (Connell & Wellborn, 1991).

Being in an autonomy-supportive environment is associated with psychological well-being, learning, achievement, and positive development (see Reeve, 2009 for a review). Autonomy support is associated with students' observed and self-reported *engagement* (Assor et al., 2002; Benita, Roth, & Deci, 2014; Hafen et al., 2012; Jang, Reeve, & Deci, 2010; Reeve, Jang, Hardre, & Omura, 2002; Skinner & Belmont, 1993; Skinner et al., 2008) and their motivation to develop and improve their competence (i.e., *mastery motivation*; Ciani, Middleton, Summers, & Sheldon, 2010; Greene, Miller, Crowson, Duke, & Akey, 2004; Ryan & Grolnick, 1986).

The need for relatedness (Ryan & Deci, 2000) is foundational to optimal human development (Baumeister & Leary, 1995; Hartup, 1982) given that interpersonal relationships can buffer against stress and are instigators of positive motivational states (Martin & Dowson, 2009). *Peer* relationships take on a heightened significance in adolescence (Hartup, 1982; Martin & Dowson, 2009; Wentzel, 2005). Adolescents' feelings of relatedness with classroom peers, including the sense that one belongs to the classroom community (Goodenow, 1993), are associated with perceptions of the classroom motivational climate (Anderman, 2003), achievement motivation (Anderman & Anderman, 1999; Nelson & DeBacker, 2008), school interest (Wentzel, Battle, Russell, & Looney, 2010), prosocial goal pursuit (Wentzel, 1998; Wentzel, Baker, & Russell, 2012), self-efficacy

beliefs (Nelson & DeBacker, 2008; Ryan & Patrick, 2001), expectancies for success (Goodenow, 1993), and behavioral and emotional engagement (Furrer & Skinner, 2003). Students who feel less connected to their peers report low emotional engagement in school (Furrer & Skinner, 2003). Promoting positive peer interactions may be beneficial to adolescents' engagement and motivation because peers support students' pursuit of their academic and social goals (Patrick et al., 2004; Wentzel, 2005).

The need for competence is satisfied when one experiences their behavior as effectively enacted (Niemiec & Ryan, 2009). Competence shares similarities with self-efficacy (Bandura, 1997), which is one's *belief* that they can enact desired behaviors successfully. In this study we measure students' beliefs about their academic competence, which is enhanced when students feel a sense of peer belongingness and respect (Nelson & DeBacker, 2008; Ryan & Patrick, 2001; Sakiz, Pape, & Hoy, 2012), when teachers support their autonomy (Greene et al., 2004) and encourage mastery learning goals over performance goals (Fast et al., 2010; Greene et al., 2004), and when teachers provide emotional or affective support (Fast et al., 2010; Murdock & Miller, 2003; Patrick et al., 2007; Sakiz et al., 2012).

1.3. Mediators of teacher emotional support on student motivation

Motivation research consistently connects teacher emotional support with students' motivation and engagement (Assor et al., 2002; Cooper, 2013; Eccles & Wang, 2014; Patrick et al., 2007; Reyes et al., 2012; Roorda et al., 2011; Ryan & Patrick, 2001; Skinner et al., 2008). This research has not explicitly sought to explain this association, but in the case of engagement, some posit that emotionally-supportive teachers provide students with more opportunities for autonomy, greater interpersonal connectedness, and feelings of competence (Fredricks et al., 2004; Skinner et al., 2008). Indeed, other research finds that emotionally-supportive instruction is associated with students' reports of their opportunities for autonomy, feelings of relatedness, and their self-efficacy (Assor et al., 2002; Fast et al., 2010; Patrick et al., 2004, 2007; Pianta & Allen, 2008; Reeve, 2006; Reeve & Jang, 2006; Sakiz et al., 2012; Stefanou, Perencevich, DiCintio, & Turner, 2004; Wentzel et al., 2010).

In this study, we bring these strands of motivation research together to explicitly test whether emotionally-supportive teachers motivate and engage their students because students in such classrooms have autonomy-supportive experiences, experience stronger beliefs in their own academic abilities (competence), and have experiences that promote positive and supportive peer relationships. Real-world educational implications of motivation research are addressed through rigorous (cross-informant, longitudinal) multilevel mediational analysis of teacher-student interactions (rated by observers using a highly-validated measure) as they link from students' reports of autonomy, relatedness, and competence experiences to engagement and achievement motivation growth over the course of a school year.

The motivation and engagement outcomes we examine are linked with adaptive learning behaviors and academic achievement. Our motivation outcome originates in achievement goal theory (Dweck & Leggett, 1988; Nicholls, 1984), specifically a *mastery* achievement goal, in which a student's aim is developing competence and understanding of learning tasks. Mastery motivation is linked to increased effort, higher self-efficacy, and greater persistence in learning activities (see Kaplan & Maehr, 2007 for a review). *Engagement* refers to

behavioral engagement, which is participatory involvement in academic contexts (e.g., responding to teacher questions, paying attention, and doing assigned work; Fredricks et al., 2004), and strongly predicts academic achievement (Fredricks et al., 2004; Lee, 2014; Reyes et al., 2012).

2. Methods

2.1. Participants

Participants were drawn from the classrooms of 68 different teachers (63% middle school) in 12 public schools (8 middle schools) in a mid-Atlantic US state. Teacher experience was 8 years on average (range 0–34). Teachers were predominantly female (approximately 64%) and white (approximately 84%, 8% African American, 6% mixed ethnicity, and 3% other). Each teacher selected one of their classes for participation in the study. Classes were split across Math (32.7%), English (32.4%), History (20.6%), and Science (14.3%).

In total 960 students consented to participate in the study (62% in middle school). Students were racially and ethnically diverse (63.2% white, 29.4% African American, and 7.4% Hispanic, Asian American, or mixed race). The sample was economically diverse with 34.8% of students qualifying for free or reduced lunch (family income $\leq$ 200% of the federal poverty line). On average, 14 students consented per classroom ($SD = 4.46$), and 80 students per school in the 12 study schools ($SD = 68.23$).

2.2. Procedures

Data come from the first year of a randomized field trial of a coaching intervention for teachers. At study outset, a university team presented the research to teachers in each school district. Teachers voluntarily consented to participate in a study of one-to-one professional coaching targeted to increase the quality of teachers' emotional, instructional, and organizational interactions with their students. Teachers were randomly assigned to treatment (coaching intervention) or control (business-as-usual professional development). The coaching intervention included electronic communications and structured meetings (average of eight times during the school year) between teachers and university-based coaches to help teachers improve their interactions with students in ways aligned with the CLASS-S. While we control for a teacher's treatment status, it was unrelated to teachers' emotionally-supportive interaction in the fall and end of year student outcomes examined in this study.¹

Teachers received a modest monetary compensation for completing surveys and district-issued professional development credit for their participation. Parents of students in target classrooms provided informed consent and students provided assent if they were willing to voluntarily participate in the study. Approximately 78% of students consented to participate. As part of the design, study teachers submitted 40-min video recordings of target classrooms for CLASS-S coding at two-to-three week intervals and administered student surveys early in the year (*fall*), at mid-year (*winter*), and at the end of the year (*spring*).

¹Effects of the coaching intervention on teachers' interactions with their students did not appear until the spring of the year *after* teachers received coaching (Authors, 2012).

2.3. Fall observations of emotional support

Each time a teacher submitted a video recording, the video was split into two segments, each 20 min long. Pairs of raters coded 20-min segments on the 11 dimensions CLASS-S (Pianta et al., 2011). The rating scale ranged from 1 (very low quality interactions) to 7 (very high quality interactions). Scores were averaged across raters and the two segments for each time point. Coders were a team of 10 advanced undergraduate and graduate students who were trained to rate the CLASS-S dimensions during a two-day training. At training's end, coders had to pass a reliability test (required score within one point across five master coded video clips on 80% of their codes). Coders regularly met to jointly code master recordings in order to maximize reliability. The inter-rater reliabilities of the double-scored segments ($ICC = .64-.78$) were consistently in the adequate to good range (Cicchetti & Sparrow, 1981). Approximately 81% of all rater codes were within one point of each other.

Specific behaviors that coders look for vary across dimensions, and some examples of behaviors coders are trained to identify in each dimension of the Emotional Support (ES) domain that was the focus of this study are shown in Table 1. A dimension score is assigned based on whether the teacher and *very few* (low 1–2), *some* (mid 3–5), or *most* (6–7) of the students are having specified interactions (Table 1). Specific guidelines further assist coders in the assignment of a value within these ranges. The point value of a mid-range score depends on whether one or two behavioral indicators fall in the low range (score of 3), all fall in the mid-range (score of 4), or one or two indicators fall in the high range (score of 5). An ES score for each video was calculated from the average of the three dimension scores, and the *fall ES variable used in analyses* was the average of a teacher's ES values on the first three recordings (September–December).

2.4. Student reports of classroom experiences

Autonomy—Students reported on the degree to which they exercised autonomy in their classroom via a 5-item scale developed for this project that showed good reliability in fall and winter ($\alpha = .75$ and $.80$, respectively). The five items included “Students often get to make decisions about how the class is run”, “Students often get choices about how to do projects or assignments”, “We have a lot of lively discussions”, “Students often feel like they get to help lead the class”, and “The teacher changes what's planned to make it more interesting for students.” Responses were on a 5-point Likert scale from *not at all true to very true*. Previous research demonstrated this measure's predictive validity with both observed student engagement and students' self-reported engagement (Hafen et al., 2012).

Relatedness—Students answered four questions in the fall and winter ($\alpha = .67$ and $.71$, respectively) from a scale validated and developed by Mikami, Boucher, and Humphreys (2005) assessing whether their classroom *peers* interacted with them in a supportive, positive, and respectful manner. Items included “How many students in this class respect you and listen to what you have to say”, “How many students in this class do you not get along with”, “How many students in this class tease you, put you down, or pick on you”, and “How many students in this class do you get along with”. Student responses were arranged on a 5-point Likert scale, and while the exact wording of the responses varied according to the item, the responses ranged from *everybody to nobody*.

Competence beliefs—We assessed students' general beliefs about their academic competence via a 3-item scale drawn from the Patterns of Adaptive Learning Survey's (PALS) academic efficacy measure (Midgley et al., 2000), with responses on a 5-point Likert scale (1 = *not at all true* and 5 = *very true*). Reliability for this measure was acceptable in both fall and winter ($\alpha = .65$ and $.76$, respectively). The three items include “I can do almost all the work in a class if I don't give up”, “I'm certain I can master the skills taught in class this year”, and “Even if the work is hard, I can learn it.”

2.4.1. Measurement model

Because the measures in section 3.4 have not been used together in prior research, we tested a three factor measurement model with latent variables representing classroom experiences of autonomy, relatedness, and competence beliefs explaining items from the appropriate scale. Separate fall and winter measurement models that were corrected for clustering of students within teachers showed excellent fit to the data (Fall: $\chi^2_{(51)} = 101.03$, $p < .001$, CFI = .96, RMSEA = .03, SRMR = .04; Winter: $\chi^2_{(51)} = 110.21$, $p < .001$, CFI = .96, RMSEA = .04, SRMR = .05). We further tested for longitudinal measurement invariance in the three constructs by specifying equal factor loadings (metric) and intercepts (scalar) for the indicators across the two time points. Model fit of the strong invariant longitudinal model was very good ($\chi^2_{(243)} = 66.86$, $p < .001$, CFI = .97, RMSEA = .02, SRMR = .05), and the difference in CFI versus the configural model (i.e., loadings and intercepts freely estimated) was below the .01 threshold recommended by Cheung and Rensvold (2002). A strong invariance test of this sort indicates constructs that are comparable across time – observed changes are true construct changes and not due to measurement error (Little, 2013). We created scale scores of each construct using the unstandardized CFA loadings. In all subsequent mediation models (reported in section 4.1) a latent variable for each construct was specified with a single observed scale score indicator, the variance of which was fixed at each construct's calculated measurement error variance.

2.5. Student reports of motivation and engagement outcomes

Mastery motivation—The degree to which students had a goal to develop competence and understanding of presented learning tasks was assessed in the fall and spring via a 3-item scale drawn from PALS (Midgley et al., 2000). The scale showed good reliability in the fall ($\alpha = .73$) and spring ($\alpha = .81$). Items included “One of my goals in class is to learn as much as I can,” “It's important to me that I improve my skills this year,” and “It's important to me that I thoroughly understand my class work”. Responses were on a 5-point Likert scale (1 = *not at all true* and 5 = *very true*). The intraclass correlation coefficient (ICC), or amount of variance in students' mastery motivation attributable to the classroom was .06.

Behavioral engagement—A 5-item scale drawn from Wellborn's (1991) behavioral engagement and disaffection scales showed good reliability in the fall ($\alpha = .68$) and the spring ($\alpha = .76$). Scale items included “I try hard to do well in this class”, “When I'm in this class, I participate in class discussions”, “I pay attention in this class”, “When I'm in this class, I listen very carefully”, and “In this class, I do just enough to get by”. Responses were on a 5-point Likert scale (1 = *not at all true* and 5 = *very true*), and the ICC was .11.

2.6. Analytic approach

Analyses were conducted using MPlus 7.11 (Muthén & Muthén, 2013). Full-information maximum likelihood estimation was utilized, and prior to estimation we assessed whether missingness was due to specific teacher or student characteristics. Incomplete data varied depending on the source. Complete video data was available for 63 of the 68 study teachers. Of the remaining teachers, four of five completed at least two recordings and one teacher did not complete any recordings. Analyses with and without this latter classroom included did not alter the pattern of results. Fifty-five of the consented students (5.7%) did not complete a student assessment at any of the time points. Because no significant differences were found in mean comparisons between these students and the rest of the sample on gender, poverty status, or ethnicity, they were included in the main analysis.

2.6.1. Model specification—To assess relative changes in motivation and engagement, all models included fall student reports of the three outcomes as controls. We estimated mediation models (see Figs. 1–3) using multilevel structural equation modeling (Preacher, Zyphur, & Zhang, 2010), which allows for the estimation of the size of the indirect path and use bootstrapping procedures for the confidence intervals of the indirect effect when working with nested data (MacKinnon, Fairchild, & Fritz, 2007). In addition to the fall measures of the outcome variables, all models also controlled for a student's *fall measures of the mediator variables* as well as their ethnicity, gender, free and reduced lunch status, and prior year achievement. Classroom-level controls included indicators for whether the teacher was in the intervention group, academic subject, and whether the classroom was in a middle or high school. To test whether results were driven by intervention status, we re-estimated models using multiple group analysis (0 = control classroom; 1 = intervention classroom).

3. Results

Descriptive statistics and correlations among the student-report measures are presented in Table 2, and indicated moderate stability in fall to spring mastery motivation and behavioral engagement ($r = .43$, and $r = .51$, respectively). Students' winter reports of experiences of autonomy, peer relatedness, and competence beliefs were significantly correlated with their spring reports of mastery motivation and behavioral engagement. Winter mediators had slightly higher correlations with behavioral engagement than with mastery motivation, and autonomy showed the lowest overall mean in fall and winter. Baseline models indicated significant associations between observed fall ES ($M = 4.70$, $SD = .51$) and the spring student-reported outcomes.

3.1. Mediation analyses

We estimated multilevel models separately testing the indirect effects of each of the three proposed mediators on students' self-reported mastery motivation and behavioral engagement. In addition to student demographic information and teacher and classroom controls, all models control for the fall measures of the mid-year mediators and end of year outcomes.

3.1.1. Winter peer relatedness as a mediator—Results from the peer relatedness model are shown in Fig. 1 ($\chi^2 = 84.76$, $p < .01$; CFI = .95; RMSEA = .04). Significant direct effects were found between fall ES and winter peer relatedness ($\beta = .16$). Likewise, direct effects between winter peer relatedness and spring behavioral engagement ($\beta = .23$) and spring mastery motivation ($\beta = .21$) were significant. Indirect pathways explaining the prediction of fall ES to spring outcomes through winter peer relatedness were significant for engagement, indirect = .08 [CI = .04, .11] and mastery motivation, indirect = .06 [CI = .02, .09]. After accounting for the peer relatedness indirect pathway in the full structural equation model, only the direct association between fall ES and student-reported behavioral engagement remained significant. In addition to controls for a student's ethnicity, gender, free and reduced lunch status, and prior year achievement, the model in Fig.1 also accounted for whether a teacher was randomly assigned to receive the coaching treatment as part of the original study. To further test whether the indirect effect varies as a function of treatment, we estimated a follow-up multiple group analysis, which indicated no significant treatment-control differences in the indirect effect of peer relatedness.

3.1.2. Winter autonomy as a mediator—Fig. 2 displays results for the model with winter autonomy as the mediator ($\chi^2 = 93.17$, $p < .01$; CFI = .94; RMSEA .07). Direct effects were significant between fall ES and the winter autonomy mediator ($\beta = .15$). Significant direct links were similarly observed between winter autonomy and students' spring reports of behavioral engagement ($\beta = .21$) and mastery motivation ($\beta = .16$). The indirect pathways linking fall ES to spring outcomes through winter autonomy were significant for behavioral engagement, indirect = .06 [CI = .03, .10], and mastery motivation, indirect = .04 [CI = .01, .07]. When modeling all indirect and direct effect pathways simultaneously with covariates, only the direct association between fall ES and student-reports of behavioral engagement continued to be significant. A follow-up multiple group analysis indicated no significant differences in the indirect effect between classrooms of control and intervention teachers.

3.1.3. Winter competence beliefs as a mediator—Results with winter competence beliefs as the mediator are shown in Fig. 3 ($\chi^2 = 99.58$, $p < .01$; CFI = .93; RMSEA = .08) and indicated a non-significant direct effect between fall ES and the winter competence beliefs mediator ($\beta = .09$). Direct links were observed between winter competence beliefs and spring student-reported behavioral engagement ($\beta = .23$) and mastery motivation ($\beta = .21$). Indirect pathways explaining the prediction of fall ES to spring outcomes through winter autonomy were non-significant for engagement, indirect = .02 [CI = -.02, .05], and mastery motivation, indirect = .01 [CI = -.03, .04]. The pattern of results did not change in the multiple group treatment-control follow-up.

3.1.4. Post-hoc multiple mediator model—Although not shown, a post-hoc multiple mediation model tested the simultaneous indirect effects of all three mediators on outcomes. Results (available from the first author) indicated that the total indirect effect for both behavioral engagement and mastery motivation was significant, indirect = .09 [CI = .06, .13]. Further, the specific indirect effect for peer relatedness experiences continued to significantly explain some of the impact of ES on behavioral engagement (indirect = .05)

and mastery motivation (indirect = .04), while autonomy support and perceived competence indirect pathways to outcomes were non-significant.

3.2. Robustness of results

The larger intervention project from which data for this study was drawn occurred over two academic years. However, all analyses in section 3.1 were carried out on first year study data. To test the robustness of the results, we re-estimated models in Figs. 1–3 on year two data, when study teachers instructed different groups of students (and were not being coached). Direct and indirect effect estimates were similar in size and significance as those reported for year one data.

We tested the directionality of associations reported in section 4.1 by specifying models in which mediator and outcome variables were reversed. For example, one model specified winter mastery motivation as a mediator of the pathway from fall ES to spring autonomy support. If mastery-motivated students report higher autonomy support, we would expect to find that winter motivation fully accounts for any association between fall ES and spring autonomy and relatedness. This was not the case either for mastery motivation or behavioral engagement. The year two and reverse directionality results provide greater confidence in the findings.

4. Discussion

Building on prior research on the role of teacher emotional support in motivating and engaging students (e.g., Eccles & Wang, 2014; Patrick et al., 2007; Reyes et al., 2012; Ryan & Patrick, 2001; Skinner et al., 2008) we tested whether these associations are explained by classroom experiences targeted at meeting autonomy, relatedness, and competence needs. Students' mid-year reports of their classroom experiences of autonomy and peer relatedness partially accounted for positive academic year changes in students' mastery motivation and behavioral engagement in highly emotionally-supportive classrooms. This mediational pathway was not found for students' competence beliefs.

4.1. The positive academic effects of positive peer relatedness experiences

The importance of peers and peer relationships cannot be overstated (Hartup, 1982; Martin & Dowson, 2009; Wentzel, 2005). While peer influence is often viewed in terms of more negative outcomes (e.g., drinking, risky behavior, or deviance), a long line of research suggests that the values espoused by one's peers and the sense of connection one feels to peers relate to positive social pursuits and goals (Wentzel, 1998, 2002), school interest (Wentzel et al., 2010), and motivation (Anderman & Anderman, 1999; Nelson & DeBacker, 2008; Ryan, 2001). Peers may help support one's pursuit of positive academic and social goals through encouragement, leading by example, and emotional support when failure arises (Patrick et al., 2004; Wentzel, 2005). Accordingly, teachers may want to harness the power of peers for promoting positive aspects of students' academic experiences. In the present study we found that through their emotionally-supportive interactions with students, teachers create experiences that lead students to perceive that their peers are supportive, positive, and respectful. Untested is whether the more affective aspects of peer relationships

(e.g., caring, warmth) play a similar mediational role in educational settings. Future research on the influence of classrooms on students' motivation should not undervalue the role of peers and peer relationships in promoting positive outcomes.

4.2. The uncertain role of competence beliefs

Despite direct associations between students' mid-year competence beliefs and changes in the two outcomes, the mechanism through which emotionally-supportive teacher-student interactions promote students' engagement and mastery motivation was unrelated to teachers' ability to create experiences that promoted their students' competence beliefs. Competence beliefs might be more influenced by teachers' instructional interactions with students, as opposed to the socio-emotional interactions measured here. Competence beliefs might also be more difficult to change than perceptions of autonomy and relatedness, requiring both relevant environmental influences and direct evidence that one is more competent than initially believed.

Skinner et al. (2008) examined the need components of self-determination (self-systems) theory as mediators of the effect of teacher emotional support (student-reported) on students' engagement. Because competence was not separate from autonomy and teacher relatedness in their analysis, it is unclear which of the three needs most strongly influenced engagement. Our post-hoc analysis suggests that experiences targeted toward promoting positive peer relatedness might play a critical role, but we do not feel firm conclusions should be made from this analysis. Pitting the three types of experiences against each other in a multiple mediation framework is not the best way to address this question. Focusing on factors like emotional support that increase students' experiences of both peer relatedness and autonomy (but not competence beliefs), rather than factors that increase just one of these processes, is beneficial.

4.3. The importance of multiple methods for measuring classroom processes

The vast majority of the literature reviewed for this paper used student surveys to measure students' experiences of classroom instruction. This reflects the view that one's own perspective is the primary determinant of behavior (Fraser & Walberg, 1981). However, because students report on their unique experiences, considerable variability in the prevalence of measured instructional practices is found in survey research. And while of substantive interest (e.g., Kuklinski & Weinstein, 2001; Weinstein, 2008), this variability undermines the reliability of surveys to measure classroom instruction "objectively," or in aggregate (Lam, Ruzek, Schenke, Conley, & Karabenick, 2015; Lüdtke et al., 2008; Miller & Murdock, 2007). Comprehensive approaches to identifying the effect of classroom processes on student outcomes require objective *and* subjective measures (Ruzek & Pianta, 2015).

In this paper, we examined relations between independently-observed classroom climate and students' subjective experiences. Doing so addresses the understudied question of how teachers' interactions with students influence students' perceptions of the classroom (Turner & Meyer, 2000; Urdan & Schoenfelder, 2006). Whereas a handful of studies suggest that observed emotionally-supportive instruction is associated with student engagement (Eccles

& Wang, 2014; Reyes et al., 2012), this study suggests the *particular student experiences* that lead to engagement in such classrooms. Students are more behaviorally-engaged (and motivated) in emotionally-supportive classrooms partially because they get more opportunities to act autonomously and have experiences that promote positive peer relationships. By tracking how “objective” classroom climate manifests in students' unique experiences we illuminate the process by which adolescents become behaviorally-engaged and mastery-motivated across an academic year.

4.4. Limitations

Because we allowed teachers to choose when to record their instruction, the range of ES scores might be restricted if teachers only submitted their best clips. If true, our direct and indirect estimates may be slightly conservative. Despite the fact that our mediation models fit well and had significant direct and indirect pathways, it is worth noting that the analyses here are the first to show these particular mediated effects, and further data should be employed to replicate these results in other samples. Although the present analysis was carried out on data from an intervention study, a number of checks were made to ensure our results were not a function of treatment assignment. Our mediators measure the extent to which students have classroom experiences targeted at meeting their needs for autonomy, having positive peer relationships, and having strong self-perceptions of their competence. Accordingly, this study does not directly test self-determination theory's conception of need fulfillment as a mediating mechanism. Future research in this area could shed light on whether it is students' experiences or need satisfaction that is most strongly associated with changes in motivation and engagement.

4.5. Conclusion

The approach we take to understanding processes by which emotional support engages and motivates students at school is twofold: 1) use self-determination theory to guide choices about the relevant student experiences that might promote engagement and motivation; and 2) pair objective observations of the classroom with students' subjectively-reported experiences. This approach led us to firstly confirm that adolescent students report being more engaged in classrooms where teachers are observed to be more emotionally-supportive (Eccles & Wang, 2014; Reyes et al., 2012; Skinner et al., 2008), and become more motivated toward competence in such classrooms. Secondly, we identified the motivationally-salient experiences that students in these classrooms report having. Students are afforded more opportunities to exercise autonomy in their day-to-day activities and are more likely to report having positive and supportive relationships with their peers, but do not report higher levels of competence beliefs. The autonomy and peer experiences account for, in part, associations between teacher emotional support and students' changing engagement and mastery motivation. Results suggest a suite of practices that teachers can employ in their classrooms to motivate and engage their adolescent students.

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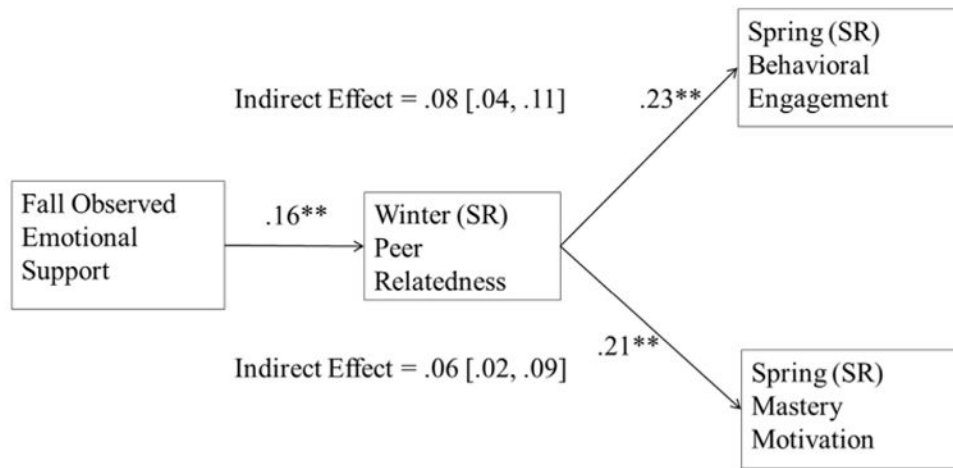


Fig. 1.

Winter peer relatedness experiences (student-reported [SR]) as a mediator of emotionally-supportive teacher instruction on SR engagement and motivation. Control variables include fall mediator and outcome measures and demographic and prior achievement measures. ** $p < .01$.

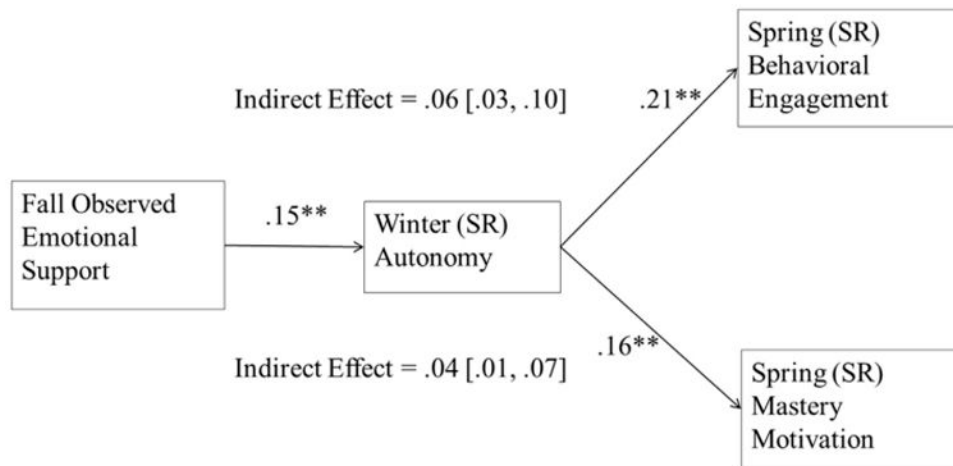


Fig. 2.

Winter autonomy experiences (student-reported [SR]) as a mediator of emotionally-supportive teacher instruction on SR engagement and motivation. Control variables include fall mediator and outcome measures and demographic and prior achievement measures. ** $p < .01$.

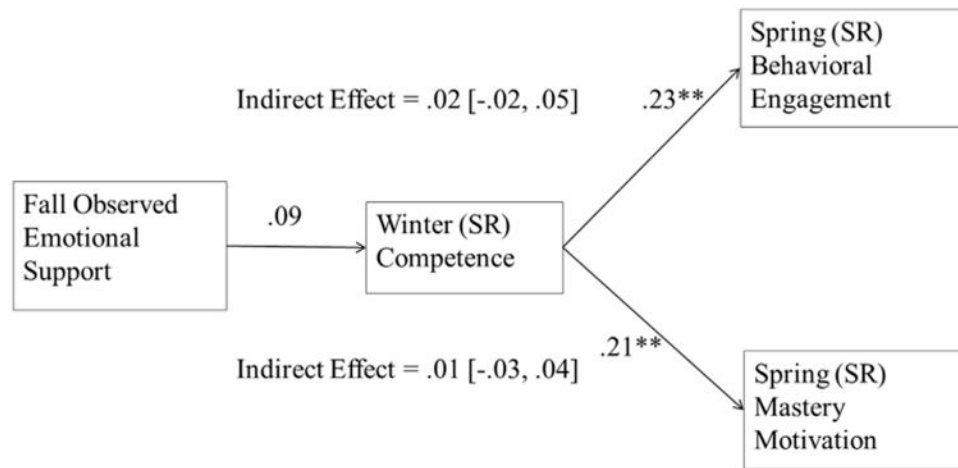


Fig. 3.

Winter competence beliefs (student-reported [SR]) as a mediator of emotionally-supportive teacher instruction on SR engagement and motivation. Control variables include fall mediator and outcome measures and demographic and prior achievement measures. ** $p < .01$.

Table 1

Example behavioral indicators in the emotional support CLASS-S dimensions.

Positive climate	
	Shared positive affect
	Enthusiasm
	Positive comments
	Listening to each other
Teacher Sensitivity	
	Notices student difficulties
	Acknowledgment of student emotions
	Student questions and problems are resolved
	Students seek the teacher's help, support, and guidance
Regard for Adolescent Perspectives	
	Encourages student ideas and opinions
	Connects content to students' life
	Relaxed structure for movement about the classroom
	Peer sharing and group work

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Table 2

Means, standard deviations, and correlations among student-report variables.

Variable	1	2	3	4	5	6	7	8	9	M	SD
1) Fall autonomy	–									2.87	.87
2) Fall peer relatedness	.13*	–								4.11	.66
3) Fall behavioral engagement	.20*	.23*	–							3.96	.66
4) Fall mastery motivation	.17*	.19*	.51*	–						4.43	.7
5) Fall academic competence beliefs	.18*	.22*	.47*	.40*	–					4.23	.71
6) Winter autonomy	.47*	.10*	.16*	.16*	.19*	–				2.87	.95
7) Winter peer relatedness	.14*	.46*	.15*	.17*	.16*	.17*	–			4.03	.7
8) Winter academic competence beliefs	.13*	.23*	.35*	.22*	.50*	.27*	.28*	–		4.21	.8
9) Spring behavioral engagement	.20*	.21*	.51*	.35*	.31*	.25*	.28*	.45*	–	3.89	.8
10) Spring mastery motivation	.12*	.21*	.40*	.43*	.29*	.17*	.25*	.40*	.68*	4.27	.87

Note. N = 960 students.

*
p < .01.



CHAPTER 9

*Autonomy and Autonomy Disturbances in
Self-Development and Psychopathology: Research on
Motivation, Attachment, and Clinical Process*

RICHARD M. RYAN, EDWARD L. DECI, and MAARTEN VANSTEENKISTE

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INTRODUCTION

Autonomy, Growth, and Psychopathology

Autonomy, defined as self-regulation and integration in acting, is central to healthy psychological development and functioning. Classic organismic and dynamic theories have long considered the movement toward greater autonomy and integration to be a hallmark of optimal development (e.g., Hartmann, 1947/1964; Jahoda, 1958; Loevinger, 1976; Piaget, 1971; Werner, 1948), a focus that continues in developmental psychologies today (see Sokol, Grouzet, & Muller, 2013). Because of the importance of children developing capacities for autonomy and integrated behavioral regulation, support for autonomy is recognized as a central aspect of optimal *parenting* by many theorists (e.g., Bretherton, 1987; Grolnick, 2002; Grusec & Goodnow, 1994; Hmel & Pincus, 2002).

Issues of autonomy and integration are in fact frequently implicated in the development of psychopathology (Ryan, Deci, Grolnick, & La Guardia, 2006). Historically, clinical literatures have highlighted that many forms of behavioral and mental disorders are characterized by autonomy disturbances (e.g., Shapiro, 1981; Winnicott, 1965). In many disorders, people's behaviors, emotions, and thoughts are experienced as pressured, compelled, or controlled, or alternatively uncontrollable (Ryan et al., 2006). For example, people can feel unable to regulate specific behaviors (e.g., some addictive and impulsive disorders). In other pathologies there is highly controlled, intentional behavior (e.g., restrictive eating, obsessive rituals) that is not well integrated or reflectively self-endorsed, whereas in other forms of psychopathology, usually involving considerable trauma at the hands of others, behaviors are enacted without being intentionally mediated by the self (e.g., dissociative disorders). In still others the motivation

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for pursuing intentions and goals is absent or depleted (e.g., some forms of depression). In short, compromised autonomy is entailed in a wide range of pathologies, from those involving a lack of behavior regulation to those that entail rigidly enforced self-controls and compulsive behaviors. Corresponding to this, caregivers' obstruction of children's autonomy in conjunction with genetic vulnerabilities has been shown to foster a broad range of negative effects on development and is thought to contribute to the onset of varied disorders (e.g., Bruch, 1973; Depue & Lenzenweger, 2001; Ryan, 2005).

Given the role played by autonomy (or its absence) in both optimal development and developmental psychopathology, it is not surprising that autonomy support is emerging as an important, indeed critical, element in successful treatments for psychopathology (e.g., Mansour et al., 2012; Zuroff et al., 2007). In fact, most current behavioral and psychological intervention approaches attempt to support autonomy, albeit through different means, and with more or less explicit foci (Ryan, Lynch, Vansteenkiste, & Deci, 2011). In some treatment approaches, support for autonomy is seen as important in its own right for building essential inner resources that can buffer vulnerabilities and enhance adjustment (e.g., Ryan & Deci, 2008). Yet even when capacities for autonomy are not a focus, enhancing autonomous motivation for treatment enhances clinical success and engagement in behavior change over time (e.g., see Ng et al., 2012; Savard, Joussemet, Pelletier, & Mageau, 2013; Zuroff, Koestner, & Moskowitz, 2012).

Recognition of the importance of autonomy for healthy development and wellness has contributed to a fast-rising number of empirical studies on the topic of autonomy and its developmental dynamics. New research is coordinating phenomenological, functional, and mechanistic viewpoints in understanding autonomy and what influences it. Salient within this research is the power of social contexts (e.g., parents, teachers, coaches, peers) to facilitate the development and expression of autonomy and capacities for self-regulation in children. Salient as well is how the thwarting of autonomy, through either excessive control, conditional regard, or lack of empathy, disrupts development, and especially in vulnerable individuals, leads to dysregulation and ill-being. Indeed, autonomy thwarting plays an important etiological role in many forms of psychopathology.

In this chapter we review the growing body of research on autonomy and autonomy disturbances primarily through the lens of *Self-determination theory* (SDT; Deci & Ryan 2000; Vansteenkiste, Niemiec, & Soenens, 2010). SDT is an empirically grounded theory informed by philosophical, clinical, and cross-cultural analyses of

autonomy. SDT argues that among the predominant factors that foster resilience in development are opportunities to satisfy people's *basic psychological needs*, namely those for autonomy, competence, and relatedness (Ryan, 1995). Briefly, the need for autonomy refers to the necessity of experiencing a sense of volition; competence refers to the experience of effectiveness; and relatedness refers to the experience of warmth and reciprocal care. Support for the satisfaction of these needs is said to promote growth and well-being. Indeed, when social conditions support these psychological need satisfactions, individuals develop inner resources that allow them to better cope with adversity and flourish in their adult development. Interestingly, even individuals who do not explicitly value or desire these need satisfactions benefit from their fulfillment (Chen et al., in press). In contrast, the thwarting and frustration of these basic psychological needs is conducive to maladjustment and psychopathology (Ryan & Deci, 2000; Vansteenkiste & Ryan, 2013).

As an organismic theory, the principles informing SDT are fully consistent with a developmental psychopathology perspective (e.g., Cicchetti, 2006; Cicchetti & Toth, 2009). In particular, SDT focuses on nonclinical, subclinical, and clinical populations, connecting the conditions conducive to optimal psychological development with depriving and thwarting conditions that redirect developmental energies into self-protection, defense, and maladaptive coping. SDT sees the pervasive experience of having basic psychological needs frustrated during development as setting the stage for later difficulties and deficits in one's capacity for self-regulation of action and experience, often through cascading negative effects (Vansteenkiste & Ryan, 2013). In short, SDT suggests that the very same mechanisms, namely the satisfaction and frustration of people's basic psychological needs, accounts for substantial variance both in situational motivation and wellness and in developmental trajectories in self-regulation, well-being, and psychopathology.

In addition, and again in line with both developmental psychopathology (Cicchetti & Toth, 2009) and organismic perspectives more generally, SDT sees multiple pathways to both health and illness. By identifying the resources associated with integrative tendencies and psychological resilience, SDT allows for considerable flexibility and equifinality in development (Ryan, 1993), and conversely identifies many pathways of harm leading to diverse outcomes. Conditions affecting basic psychological need satisfaction versus frustration range from biologic to cultural, and the consequences of need supports are manifest at every level of analysis, from physiological to phenomenological. SDT additionally seeks to coordinate

these varied levels of analysis within its empirically driven framework, an aspiration that also characterizes the field of developmental psychopathology (e.g., Cicchetti, 2006; Cicchetti & Toth, 2009).

Chapter Overview

This chapter consists of three major sections. First we define autonomy as it is classically understood and currently applied within the SDT perspective. In doing so, we not only specify what autonomy entails, but also distinguish it, both theoretically and operationally, from other developmental constructs with which autonomy is often confounded. These include the constructs of independence (Silk, Morris, Kanaya, & Steinberg, 2003; Smetana, Campione-Barr, & Dadis, 2004); individualism (e.g., Iyenger & Devoe, 2003); individuation (e.g., Blos, 1979); and emotional autonomy (e.g., Steinberg & Silverberg, 1986). Next, we elaborate on the type of social environments that are conducive to autonomous regulation via the satisfaction of individuals' psychological needs and those that have been found to obstruct and undermine autonomous regulation by eliciting need frustration.

Then we discuss the different healthy manifestations of autonomy, thereby reviewing in greater detail its developmental origins. Using research from both SDT and attachment theory, we begin by highlighting that secure attachments in childhood are developed through autonomy supportive and involved caregivers, who not only hold and protect (i.e., provide security) but also stimulate the budding initiative and self-expression of the infant (i.e., support autonomy), setting the stage for developing further capacities for mature self-regulation (e.g., Miklikowska, Duriez, & Soenens, 2011; Whipple, Bernier, & Mageau, 2009). Apart from being conducive to *secure attachments*, autonomy supportive relationships support the integrative functions of the self that allow for greater internal psychological coherence and more effective behavioral regulation. Exemplifying this, we then turn to evidence concerning how autonomy supportive contexts facilitate developmentally relevant integrative processes including: (1) intrinsic motivation; (2) *internalization* and integration of social regulations; (3) the development of emotion regulation; and (4) the formation of identity. We pay particular attention to how socializers, especially parents, either facilitate or thwart the developing child's autonomy, thereby supporting or hindering the individual's inner resources for successfully negotiating each of these developmental lines.

These reviews of autonomy in psychological development, and of parental nurturance versus thwarting of autonomy, provide the foundation for examining

autonomy disturbances in varied types and presentations of psychopathology. The next section focuses on psychopathology is twofold: we consider autonomy depriving and thwarting environments as an *etiological factor* in psychopathology; and we highlight how autonomy frustrations are often a *symptomatic factor* in various disorders and sometimes a by-product of other cascading effects. Moreover, we identify three general types of psychopathology in which autonomy is differently implicated. These are *internally controlling disorders*, in which there is excessive self-control or internal compulsion; *impairments of internalization*, reflecting both impoverished development of self-regulation capacities or lack of value for social regulations; and finally *fragmented self-functioning*, which we relate to chronic or traumatic need thwarting. We conclude this section by considering implications not only for clinical interventions, but also for the design of social institutions such as schools and workplaces that can support persons vulnerable to psychopathology. Finally, we provide a summarizing overview and discuss a number of critical future research directions.

AUTONOMOUS REGULATION AND FACILITATIVE ENVIRONMENTS

Autonomous Regulation of Behavior

Before proceeding to the intricacies of autonomy in development we begin with some basic definitions and distinctions. The term autonomy is derived from the Greek words *autos* (self) and *nomos* (rule). Autonomous actions are thus those that are self-ruled or governed by the self. The opposite of autonomy is heteronomy, when one's behavior is regulated or ruled by forces experienced as *heteron* or alien to one's sense of self.

Phenomenological analyses suggest that, when people act autonomously, they feel a sense of ownership of their actions (Pfander, 1967/1908). When autonomous, people are willingly engaged in activities. Accordingly, their actions are characterized by an *internal perceived locus of causality* (de Charms, 1968; Ryan & Connell, 1989). This quality of self-endorsement indicates that autonomous actions are informed by, and reflective of, individuals' abiding preferences and values and are congruent rather than discordant with their sense of self (Ryan Legate, Niemiec, & Deci, 2012; Shapiro, 1981; Weinstein, Prybylski, & Ryan, 2013). In contrast, when behaviors are heteronomous they are experienced as *controlled*. The actor experiences a sense of external or internal control, compulsion, or pressure to enact the behavior (Deci & Ryan, 2000). In attribution terms, people have an *external*

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perceived locus of causality with respect to controlled behaviors. Interestingly, the functional effects of autonomy can be detected from early development and a sense of initiative and ownership of action is apparent from early infancy (Stern, 1985).

Although the concept of autonomy refers to integrated regulation by the self, autonomy is nonetheless a relative concept insofar as actions vary in their degree of autonomy. Autonomous functioning reflects the extent to which ongoing behaviors, thoughts, and feelings match with one's interests and values. Since most actions are both multiply motivated and more or less congruent, autonomy is inevitably a dimensional concept, and differentially associated with different types of motives. It is therefore basic to our view that autonomy is a *quality* of behavioral regulation, which is characterized by and requires an open processing of possibilities such that ongoing behaviors and underlying experiences are maximally integrated and volitional. This quality of behavioral regulation is relevant across the life span, even as the contents and focus of activities and values change with development.

Phenomenological analysis also points to the relationship between autonomy and integration in functioning. When autonomous, people are wholeheartedly behind their actions, and this is reflected in the coherence and lack of internal conflict involved in those actions. Yet to varying degrees behavioral regulations can represent compartmentalized or defended motives, or can be enacted because of external or internal pressures without reflective ascent or full endorsement. Thus the experience of autonomy is directly related to the relative integration of one's motivations and valuing (Ryan & Deci, 2008).

Although SDT's definition and understanding of autonomy is relatively unique within empirical psychology, it is strongly informed by philosophical treatments of the topic (e.g., Dworkin, 1968; Friedman, 2003). It can also be related to psychodynamic (e.g., Schafer, 1968; Loevinger, 1976; Shapiro, 1981) and humanistic (e.g., Rogers, 1963) traditions that have considered autonomy and integration to be highly important. Whether addressed in terms of self-endorsement, congruence, self-actualization, authenticity, will, or operating from the true self (see Ryan et al., 2006) many of these prior thinkers were addressing a shared idea, which is termed autonomy within SDT.

In addition, both the underlying sensibilities (e.g., recognition of values or interests in acting) and abilities (e.g., reflective capacities, goal selection, self-regulation skills) entailed in autonomy must develop, and accordingly there are individual differences in autonomous functioning (Deci & Ryan, 1985a; Weinstein, Przybylski, & Ryan, 2012). Yet autonomy is also situational, in part because social

contexts differ in the extent to which they are autonomy supportive, controlling, or amotivating. This is true at all levels of development as parents, teachers, coaches, managers, and spouses for example, can all facilitate or stifle autonomy in an individual, with significant mental health consequences. Yet whether due to dispositional or proximal supports, people evidence fuller functioning and more positive behavioral and psychological outcomes when more autonomous, including more sustained persistence, enhanced creativity, and higher quality performance (Vansteenkiste & Ryan, 2013).

Although phenomenologically autonomy is characterized by the experience of actions as being self-organized and volitionally supported, in terms of the quality of behavior, autonomy is manifest at varied levels of analysis. For example, evidence is emerging concerning the distinct neural basis of autonomous functioning relative to controlled, nonautonomous, motivational processes (e.g., Lee & Reeve, 2013; Murayama et al., 2014). In general terms, autonomy depends on the coordination between prefrontal cortical regions and subcortical striatal-thalamic areas that promote or inhibit motivation as well as on inputs from the hippocampus and amygdala that can provide contextual and affective information (e.g., Bradley, 2000; Chambers, Taylor, & Potenza, 2003). Autonomy requires supervisory and selective functions that are fully informed by affective and memory related processes (Di Domenico, Fournier, Ayaz, & Ruocco, 2013; Ryan, Kuhl, & Deci, 1997). Impairment in the development of prefrontal areas and interconnections with limbic structures produces vulnerability to autonomy disturbance (e.g., Bechara, Tranel, Damasio, & Damasio, 1996).

Interestingly, under autonomy-supportive conditions people appear more capable to recruit and use self-regulation strategies associated with executive functioning, a fact with important implications for development. For example, Bernier, Carlson, and Whipple (2010) examined whether maternal sensitivity and autonomy support were related to toddlers' capacity for executive control, which was assessed via a set of cognitive indicators involving flexible goal setting, impulse control, and planning. After controlling for children's cognitive capacity and maternal education, both sensitivity and maternal autonomy support, assessed when children were 12–15 months old, related to executive control at 18 and 26 months, with maternal autonomy support emerging as the most consistent predictor of enhanced executive control.

In fact, exposure to particular social contexts shapes the use of neurological resources required for autonomous functioning. For example, Di Domenico et al. (2013) argued, based on SDT, that people's abilities to develop

and act from a coherent sense of self are facilitated by satisfaction of the basic psychological needs. Using functional near-infrared spectroscopy (fNIRS), they examined the effect of need satisfaction on activity in the medial prefrontal cortex (MPFC), an important brain region for integrative processing of information about the self (Ryan et al., 1997). Participants engaged in a task involving a series of forced choices expressing personal preferences. Decisional conflict (i.e., choice difficulty) between the response options was manipulated using participants' previously collected preference ratings. Findings revealed that need satisfaction predicted elevated MPFC activity during high-conflict situations, suggesting that need satisfaction may facilitate access to and utilization of self-knowledge.

To summarize, autonomy is integrated self-regulation, and it is accompanied by a phenomenological experience of self-organization and volition, which is described in attribution terms by an internal perceived locus of causality (Deci & Ryan, 2000). Autonomy thus involves an experience of regulation by the self, and it is contrasted with actions experienced as pressured, controlled, or caused by sources external to the self. These later experiences are central to many forms of psychopathology, and can increasingly be mapped to neurological underpinnings.

Distinguishing Autonomy From Independence

An important distinction, particularly relevant to development, is that between *autonomy* and *independence*. Although autonomy and independence have been clearly distinguished in philosophical analyses, theorists in developmental psychology have often equated or conflated these concepts (e.g., Silk et al., 2003). *Dependence* is reliance on others for resources or guidance, so independence is not relying on others. Autonomy, by contrast, connotes willingness or volition. Given this, in the SDT view individuals can be autonomously dependent or autonomously independent, depending on circumstances. They can also sometimes be controlled or pressured into dependence, as when they feel forced to rely on others because of illness or financial hardship, or they can be heteronomously independent, as when pushed away from relying on others, who are unavailable or unwilling to provide assistance.

SDT suggests that autonomous forms of dependence (for example, when a teenager willingly turns to parents for guidance) are often quite beneficial, a view that stands in contrast to some developmental perspectives that have equated autonomy with separation or independence (Ryan & Lynch, 1989). For instance, Blos (1979) portrayed normative development in terms of an increasing relinquishing of both dependency on, and attachment to, parents.

He viewed moving away from parental supports as indicative of increasing *individuation*. Based on Blos, Steinberg, and Silverberg (1986) developed a construct labeled *emotional autonomy* that was intended to be a marker of individuation. Scale items assessing emotional autonomy made reference to "not using parents as resources," "disagreeing with parents," and "being different when not with parents."

Working from the SDT lens, Ryan and Lynch (1989) reexamined the emotional autonomy scale, suggesting that it captured a detached relationship with parents rather than autonomy and they argued that such detachment or separation from parents is neither a necessary nor ideal pathway of development. They also suggested that such detachment might be more likely in adolescents who did not have autonomy-supportive parents. They therefore predicted that emotional autonomy as thus measured, rather than being indicative of positive maturation, would predict poorer adjustment. Consistent with this reasoning, findings indicated that adolescents high in emotional autonomy were those feeling less accepted by their parents and less lovable. These teens also evidenced poorer well-being outcomes overall. Ryan and Lynch (1989) interpreted these findings as highlighting the need to differentiate independence or nonreliance from autonomy.

Extending SDT's distinction between autonomy and independence, Van Petegem, Beyers, Vansteenkiste, and Soenens (2012) directly examined adolescents' level of independence, as well as their motives for both independent and dependent functioning. They found that autonomous (i.e., volitional) and controlled (i.e., pressured) motives for both independence and dependence played a more significant role in predicting adolescents' psychosocial functioning than did their level of independence as such. More autonomous forms of motivation for either dependence or independence were strongly associated with greater well-being and less problem behavior, whereas the level of independence was less predictive of these outcomes.

Because of the widespread interest within the developmental literature in assessments of autonomy and independence, Van Petegem, Vansteenkiste, and Beyers (2013) undertook a comprehensive study of 15 prevailing measures in adolescent psychology relevant to these constructs. Using higher order factor analyses, Van Petegem et al. (2013) showed that two basic dimensions provided the most parsimonious summary of the existing heterogeneity across available measures. A first dimension denoted the degree of *distance versus proximity* in the parent-child relation; a second dimension represented *volition versus pressure* in the relationship. The crossing of these two dimensions gives support for SDT's distinctions between autonomy and independence. For example, the

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emotional autonomy scale (Steinberg & Silverberg, 1986), characterized by Ryan and Lynch (1989) as reflecting more detachment than autonomy, fell in the quadrant tapping pressured distance. In contrast, a scale of *emotional reliance* (Ryan, La Guardia, Solky-Butzel, Chirkov, & Kim, 2005), tapping adolescents' willing reliance on parents, fell in the volitional proximity-seeking quadrant. Van Petegem et al. (2013) further showed that the dimension of distance (versus proximity) was positively related to both avoidance and anxiety-based forms of attachment, whereas the dimension of volition (versus pressure) was negatively related to these insecure attachment styles. Such studies thus support the SDT literature in strongly distinguishing, both theoretically and empirically, autonomy from independence.

The distinction between autonomy and independence is critical to developmental psychology not only in childhood and adolescence, but also across the life span. For example, with advanced age people inevitably become more reliant or dependent on others. Nonetheless, there are important differences in wellness outcomes as a function of whether an older person's reliance on others feels autonomous and volitional or forced upon them (e.g., V. Kasser & Ryan, 1999; Vallerand, O'Connor, & Hamel, 1995). When elderly individuals can feel volitionally dependent and still experience a sense of choice in everyday living they remain more vital and resilient.

This distinction is also critical to cross-cultural psychologies. Various scholars have suggested that, because collectivist cultures emphasize duty and obligation to the group, autonomy is not very important for their members (e.g., Iyengar & Devoe, 2003; Markus, Kitayama, & Heiman, 1996). Yet this is a misinterpretation of the concept of autonomy, as it assumes people cannot autonomously engage in a duty, willingly comply with their parents' choices, or, with full volition, adhere to collectivistic cultural norms. In a direct examination of the distinction between autonomy and independence in the cross-cultural area, Chen, Vansteenkiste, Beyers, Soenens, and Van Petegem (2013) demonstrated that both Chinese adolescents' volitional reliance on parents as well as their volitional independent functioning yielded unique well-being benefits. Overall then, considerable data suggest that across cultural contexts, support for autonomy matters in both the internalization of ambient practices and in fostering individuals' overall wellbeing (Chirkov, Ryan, & Sheldon, 2010).

Finally, it should be noted that the concepts of independence and autonomy yield a different relation to individuals' development of relatedness and intimacy. Excessive strivings for independence often come at the cost of the

development of trustful and warm relations, suggesting that, for individuals to develop most optimally, they need to balance their strivings for independence and relatedness. Yet, from the SDT perspective, the experience of volition and autonomy does not necessarily stand in conflict with the development of warm relations, because as one volitionally relies on another, a sense of intimacy can be maintained without giving up one's autonomy. Thus, instead of autonomy development extracting a price in terms of increased relational distance or tension, in SDT's view autonomy and relatedness optimally stand in a mutually reinforcing relation to each other (Hodgins, Koestner, & Duncan, 1996; LaGuardia, Ryan, Couchman, & Deci, 2000). Indeed, parental support for children's autonomy enhances parent-child relatedness, a pattern that persists across the age-related changes in types and foci of dependencies.

Facilitating Environments: The Key Role of Need-Supportive Socialization

As an organismic theory, SDT endorses a transactional-ecological conceptualization of development (e.g., Cicchetti & Valentino, 2006), in which growth and competencies, as well as impairments and liabilities at earlier stages of development impact the direction and quality subsequent development. Within such an organismic model a critical issue concerns the necessary nutrients for optimal development, which for SDT are represented by the satisfaction of the needs for autonomy, competence, and relatedness (Ryan, 1995). That is, individuals are prepared to optimally develop psychologically and socially when their caregiving environments support these basic needs. When these needs are thwarted, people are prepared with other protective, even defensive, responses, and both the healthier and the more defensive processes can have cascading developmental consequences (Vansteenkiste & Ryan, 2013).

Already in the earliest SDT parenting research (Grolnick & Ryan, 1989), three distinct parenting dimensions were identified as being critical for satisfying children's basic psychological needs and thus fostering more integrative development and wellness (Grolnick & Pomerantz, 2009; Soenens & Vansteenkiste, 2010). Specifically, these dimensions are parental *autonomy support*, parental *structure*, and parental *involvement*. Environments that supply these three core nutrients for basic psychological need satisfactions energize healthy self-development. SDT's focus on the satisfaction of children's psychological needs and facilitation of intrinsic growth tendencies is relatively unique in the prevailing parenting literature because few models are clear about the exact processes

that underlying children's growth. At the same time, SDT maintains that the very blocking and direct thwarting of these needs not only prevents children from growing but also can even elicit maladjustment and psychopathology. Children's psychological needs will get more readily frustrated when parents are *controlling*, *chaotic*, and *neglectful*. In what follows we discuss the SDT model of parenting in detail, comparing it with alternative perspectives and contrasting constructs.

Parental Autonomy Support and Control

Being autonomy supportive literally means that one person is supporting the other's self-management or self-rule. Research has identified a number of elements in interpersonal interactions that enhance experiences of autonomy. Most important, in being autonomy supportive a parent (or other caregiver) attempts to understand and acknowledge the child's perspective. Critical to taking the children's frame of reference is an authentic curiosity from the side of the caregiver, who is sincerely interested in what is going on for the child. When this occurs, one is in a position to be responsive to whatever issues are salient. In addition, autonomy support entails using minimal controls to foster behavior, and instead providing a meaningful rationale for behavioral requests and limits where possible to help anchor internalized motivation. Autonomy support requires respecting the children's pace of development, so demands can be volitionally and effectively engaged, and providing opportunities for choice and voice when possible, all facilitate autonomy. In contrast, being controlling involves parents pressuring the children to do what they want or value, emphasizing obedience and compliance (Grolnick, 2002; Soenens & Vansteenkiste, 2010) and, in more extreme contexts, using punishments and physical threats. Dozens of studies have convincingly shown that autonomy-supportive parenting yields various benefits, including greater teacher-rated competence and grades (e.g., Grolnick & Ryan, 1989), more personal well-being (e.g., Chirkov & Ryan, 2001; Lokes, Gingras, Philippe, Koestner, & Fang, 2010), and better social adjustment (e.g., Soenens & Vansteenkiste, 2005).

Importantly, much like the experience of autonomy cannot be equated with independent functioning, the *support of autonomy* in SDT does not denote the *promotion of independence*. This was demonstrated in four studies by Soenens and colleagues (2007), who showed that parental promotion of independence and parental autonomy support were only moderately positively correlated. Moreover, while both independence promotion and autonomy support were positively associated with psychosocial functioning at the correlational level, when the

two competed for variance in predicting these outcomes, only autonomy support was a significant predictor. In other words, the aspect of parenting accounting for better outcomes was autonomy support rather than the promotion of nonreliance. Soenens, Vansteenkiste, and Sierens (2009) subsequently showed that adolescents who perceived parents as allowing volitional dependence reported better psychosocial functioning than those who felt parental pressure toward either independence or dependence.

Rather than working from their children's perspectives, controlling socializing agents alter, minimize, or deny the children's perspectives, thereby projecting their own wishes and standards upon the children and pushing the children in the parent-desired directions. SDT's formulation of controlling parenting can be further differentiated into two categories (Soenens & Vansteenkiste, 2010). Parents can be controlling using *externally controlling* methods, such as the reliance on controlling reward or punishment contingencies. Externally controlling methods can be explicitly stated, but often the controlling contingencies are implicit and learned over time. A second subtype of controlling parental practices is *internally controlling* practices. This style of parenting has some overlap with *psychological control* as discussed in the frameworks of Schaefer (1959), Barber (1996), and Steinberg (2005). In this case, parents attempt to instill in the child positive and negative self-related feelings contingent upon compliance with parental standards and goals.

Internally controlling parental practices have been a concerted focus of research within SDT, especially through work on parental conditional regard. *Parental conditional regard* (PCR) describes parents or other caregivers using their attention, affection, and love to control their children's behavior (Assor, Roth, & Deci, 2004). As a socializing method, PCR is a widely used and sometimes advocated parenting practice (e.g., Sears, Maccoby & Levin, 1957; Fu & Markus, 2014). Yet from the SDT perspective PCR is theorized to be controlling and therefore to have both subtle and more manifest detrimental effects on self-functioning. Indeed, parents who use conditional regard are essentially pitting the children's needs for relatedness and autonomy against each other. The message conveyed is essentially "to get my love you need to give up your autonomy." To maintain positive relatedness, the children have to comply, irrespective of the fit of the parental demands with their own developing interests, skills, or values. Yet, even when complying, children who experience PCR do not feel accepted but instead evidence resentment, because what is conveyed is that they are not being accepted for who they are but instead for whether they live up to their parents' demands. As such, the use

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of PCR with children serves to thwart the needs for both relatedness and autonomy, with resulting decrements in adjustment and well-being (e.g., Assor, et al., 2004; Roth & Assor, 2012).

Parental Structure and Parental Chaos

Apart from parental autonomy support, SDT also highlights the critical role of parental *structure*, which concerns the degree to which parents or other caregivers create the necessary conditions for children to begin developing a sense of mastery and provide ongoing assistance to optimize competence development (Farkas & Grolnick, 2010; Grolnick & Pomerantz, 2009; Reeve & Halusic, 2009). Structure entails the provision of an environment that makes optimal demands on children's expanding skills. Structuring parents provide guidance and scaffolding upon which the unfolding processes of development can climb. Specifically, provision of structure by parents includes: helping to adjust environments so that they can be mastered by the children without excessive anxiety; conveying consistent and clear expectations; providing guidance about the contingencies between behaviors and outcomes; offering meaningful informational feedback as the children engage in activities; and other elements of support focused on promoting the children's feeling of effectance in acting. In the research by Grolnick and Ryan (1989), parental structure predicted children's understanding the sources of control over outcomes in their lives, enhancing both the children's sense of predictability, and of competence or efficacy. In the educational domain, Mouratidis, Michou, Vansteenkiste, and Lens (2013) showed that competence need satisfaction largely accounted for the relation between perceived teacher structure and children's wellness and use of self-regulation strategies.

Although structure aids the building of competence, this process might be more or less facilitated depending on whether an autonomy-supportive or controlling style is used when introducing and maintaining the structure (Soenens & Vansteenkiste, 2010). Specifically, the competence-enhancing impact of structure is likely strengthened when the structure is communicated in an autonomy-supportive way and diminished when done in a controlling way.

The differential impact of providing structure in autonomy supportive versus controlling ways was demonstrated early within SDT research, most notably in an experimental study by Koestner, Ryan, Bernieri, and Holt (1984). In a school setting first- and second-grade children came individually to an art room to do a painting project.

An experimenter set limits on their behaviors, advocating neatness and organization, either in a controlling or autonomy-supportive way. The autonomy-supportive method was based on SDT and included a rationale, an expression of empathy, and a clear limit. The controlling method simply directed the child to follow the limit. It was found that the controlling limits undermined the enjoyment of painting and creativity relative to autonomy-supportive limits.

Overall then, structure is in no way antithetical to support for autonomy; on the contrary, the two often go hand in hand (Stipek & Seal, 2001). Yet this conceptual point can easily be lost if parental structure is described as, or equated with, parental control. That is, if parental structure involves parents exerting pressure and control over children's functioning, that parental structure would indeed stand in contradiction to parents' encouragement of children's volitional functioning. Similarly, if parents are permissive, granting unmitigated freedom rather than specifically supporting autonomy, this would be contrary to providing structure. Parental autonomy support, in fact, can and optimally does involve parents introducing and maintaining structure, and does not entail avoiding all guidance and scaffolding (Grolnick & Pomerantz, 2009; Soenens & Vansteenkiste, 2010). SDT also expects that structure can be imposed in controlling ways, with less beneficial outcomes. Thus, the concepts of autonomy support and structure allow for a clearer differentiation between critical dimensions needed in parenting.

Consistent with this reasoning, Jang, Reeve, and Deci (2010) showed that structure and autonomy support were modestly positively (rather than negatively) correlated and independently contributed to positive educational outcomes. Along similar lines, examining a broad set of components of parental structure, Farkas and Grolnick (2010) found parental structure and autonomy support to yield unique positive associations with seventh- and eighth-grade children's perceived competence and actual grades. Overall, then, past research has found structure and autonomy support to be positively related to each other rather than antagonistic, and often each has yielded unique associations with a host of different outcomes. Moreover, by distinguishing the two concepts, one can assess the meaningful combinations between them, with expectations that controlling structure will have negative effects on development, whereas autonomy-supportive structure will be more positive. In fact, a number of studies in the domains of education (e.g., Vansteenkiste et al., 2012) and sports (e.g., Curran, Hill, & Niemiec, 2013) indicate that

the most optimal outcomes are attained under conditions of high autonomy support and high structure.

Parental Involvement and Parental Neglect

SDT also suggests that more than structure and autonomy support are needed to facilitate development. In addition, *involvement*, especially autonomy-supportive involvement is also helpful. Involvement refers to a parent's dedication of attention and caring, which both supports the child directly and conveys relatedness and connection as he or she faces developmental challenges (Grolnick & Ryan, 1989). Parental involvement has long been found to have positive effects on children's behavioral regulation and well-being (e.g., Baldwin, 1955). In the Grolnick and Ryan (1989) study, assessment of involvement included the time parents spent with their children in interactive ways, their knowledge of their children's day-to-day life, and the warm tone of interpersonal contact. Parental involvement and in particular the mothers' involvement predicted children's achievement and grades in school, and was negatively correlated with teachers' ratings of children's acting out behaviors. Subsequently, Grolnick, Ryan, and Deci (1991) found that parental involvement, along with autonomy support, predicted children having greater inner resources for school engagement, especially greater feelings of autonomy and competence. Further, Cheung and Pomerantz (2011) found that in both U.S. and Chinese samples, involvement predicted engagement and achievement in schools. In both nations, when such involvement was accompanied by autonomy support children also had greater perceptions of competence and better emotional functioning.

More recently, Grolnick (in press) looked at parents' motivation for their involvement with children. This is a particularly interesting area of investigation because parents can be involved both out of controlling motivations such as introjection or external pressures or because of value and interest in their children. Grolnick found that the more autonomous the parental motivation, the higher the level of involvement. Moreover, identified regulation was especially predictive of child outcomes one would expect from such willing involvement, such as more positive academic self-concept and better school grades.

These and related findings speak to the ways parents are involved, which can vary considerably. For example, much like the dynamic involved in conditional regard, parents can make their involvement (i.e., their devotion of time and resources to the child) dependent on obedient behavior, which SDT suggests will come with a cost. Consistent

with this idea, Weiss and Grolnick (1991) studied the relations of parental involvement and autonomy support to adolescents' internalizing and externalizing symptoms. Adolescents rated their mothers and fathers on dimensions of involvement and autonomy support and completed a self-report profile of symptoms. Analyses indicated that parents who were perceived to be both highly involved and autonomy supportive had children who reported very low levels of either internalizing or externalizing symptoms. Yet there were significant interactions between perceived parental involvement and autonomy support on both types of symptoms, indicating that the combination of high involvement and low autonomy support yielded a high level of symptoms.

This general pattern of findings has been observed in other studies. Wouters, Doumen, Germeys, Colpin, and Verschueren (2013) found that high parental responsiveness strengthened the relations between psychologically controlling parenting and contingent self-esteem in university students. Aunola and Nurmi (2004) found in a three-year longitudinal study among 5–6-year-old children that parents' exertion of controlling practices slowed children's progress in mathematics, a trend that was exacerbated in cases where parents displayed high affection. Interestingly, the combination of high parental control and responsiveness appeared not only to yield a personal well-being cost but also to generalize to young adults' empathic responses. In this context, Kanat-Maymon and Assor (2010) showed that parental control related positively to the child perceived distress when their romantic partners were in need, whereas parental control was negatively related to empathic responding as reported by the partners, both effects being strengthened when parents were experienced as highly responsive.

It thus appears that feeling close to very controlling parents can be detrimental to a developing child's personal and social well-being, presumably because these children's psychological needs for autonomy and relatedness are insufficiently met. That is due to the high yet controlling involvement of parents, which may leave the children feeling as if they have no other choice than to connect with their parents by complying with their demands. Similar to the dynamics characterized by enmeshed families, however, the children's connections are likely to be fueled with feelings of internal conflict and pressured loyalty, thereby causing heightened emotionality and self-preoccupation, which may interfere with their capacities to respond empathically to others (Kanat-Maymon & Assor, 2010). In short, the combination of high parental control and high

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responsiveness may create confusion because parents are sending conflicting messages to their children (Aunola & Nurmi, 2005).

Parent's Psychological Needs: Contextual and Reciprocal Influences

Thus far, our focus has been on how parents affect children's development and problem behavior through the nurturance or undermining of children's psychological needs. Yet parents themselves are subject to influences that can either support or thwart their capacities to support their children's development. That is, to the extent that parents engage in need-satisfying activities in their own lives, they are likely to have more energy available to be involved with their children, thereby being better attuned to the children's perspectives and, hence, being more capable of supporting children's unfolding interests, values, and skill development. To the extent that parents' psychological needs get thwarted, their energy levels would be more readily eroded so they would become more self-centered rather than open and receptive for their children's concerns and interests. Such self-centered preoccupation may either manifest through a direct withdrawal and involvement from the children or, to the extent that they are involved, parents would be more easily enforcing their own viewpoint or be unpredictable and inconsequent. This reasoning is graphically displayed in Figure 9.1, in which parents own

need satisfaction and need frustration are part of the proximal determinants of their approach to their children. In an examination of this dynamic, De Haan, Soenens, Dekovic, and Prinzie (2013) found need satisfaction as reported by the parents in the parent-child relationships relate negatively to the adolescents' reports of negative parental styles (e.g., overreactive or controlling).

At the same time, a variety of more distal factors, either pressuring or facilitative, will impact on parents' experiences of need satisfaction and need frustration. Pressures on parents can come from their children's behaviors in the interactions of the parents and children. That is, there are both *reciprocal influences* from the children and proximal and distal social and economic pressures on parents from other sources that impact their resources (Deci & Ryan, 2012). For example, research on child temperament suggests that children with difficult temperaments may make it harder for parents to refrain from controlling behaviors. Within the SDT literature, Grolnick, Weiss, McKenzie, and Wrightman (1996) found that parents who perceived their adolescents to be more difficult in temperament were also more controlling. In addition, it has been found that when children evidence poorer performance or get poorer grades in schools, parents often become more controlling (Aunola & Nurmi, 2005; Grolnick, Gurland, DeCoursey, & Jacob, 2002). In a particularly interesting study, Pomerantz and Eaton (2001) found that a child's low achievement was

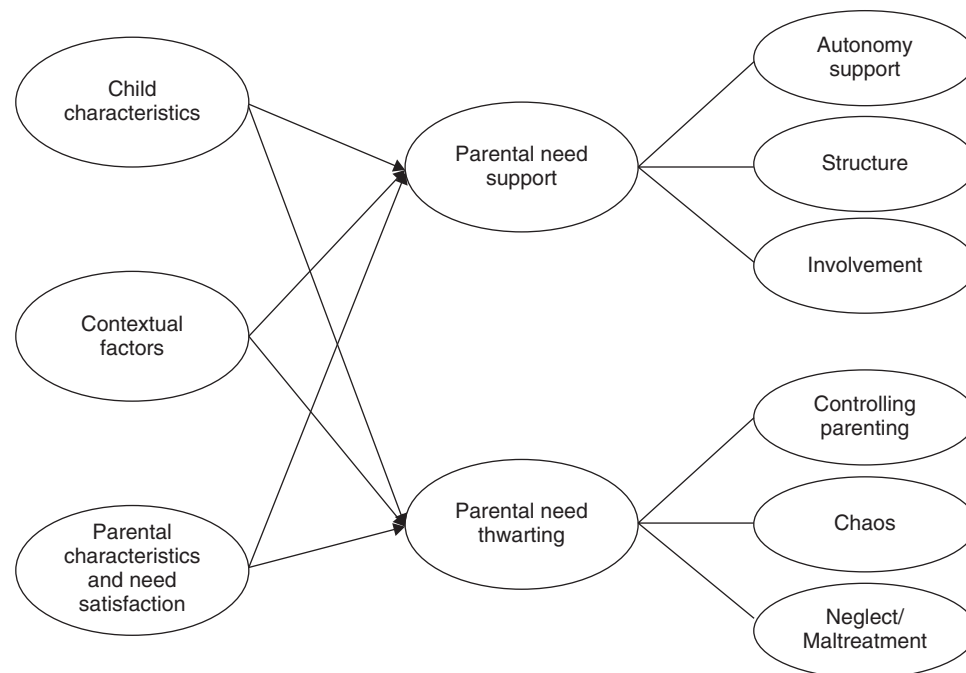


Figure 9.1 Graphic overview of the role of antecedents of parental need support and need thwarting.

associated with increased maternal worry, and worry predicted more controlling behavior, which in turn negatively affected the child's achievement. Similarly, adolescents' defiance against parents' moral rules elicited a more controlling parental approach over time (Vansteenkiste, Soenens, Van Petegem, & Duriez, 2014).

The parents' own supports can also bear on their capacity to nurture their children. For instance, Landry et al. (2008) showed that mothers who experienced greater social and partner supports were more able to trust the developmental process and thus support their children's autonomy. Similarly, Bouchard, Lee, Asgary, and Pelletier (2007) found that fathers' involvement and satisfaction in parenting was related, not only to their own perceived competence, but also to their perceptions that their partners placed confidence in their parenting abilities. In addition, Assor et al. (2004) found that many parents display the same parenting approaches (e.g., conditional regard) they were exposed to as children, thus exhibiting the intergenerational transmission of parenting styles.

Also parents often face a host of contextual pressures, which lead them to adopt a more controlling approach toward their children. Economic strain (Kasser, Ryan, Zax, & Sameroff, 1995), stressful life events (Grolnick, Bridges, & Connell, 1996), and experimentally induced stress (Grolnick et al., 2002) have all been associated with controlling parenting behavior. In one illustrative experimental study, Grolnick, Price, Beiswenger, and Sauck (2007) examined the effects of situational pressures on mothers' autonomy support, relative to control, in the social domain. The authors had 60 mothers work on a laboratory task with their fourth-grade children, presumably in preparation for meeting new children. Mothers in an evaluation condition were told that their children would be evaluated by other children and that based on this, the researchers would determine how much each child was liked and accepted by their peers. In the no-evaluation condition, mothers received no mention of peer evaluation. Results revealed that mothers in the evaluation condition spent more time giving answers to their children, especially mothers with more controlling parenting attitudes, and they also exhibited more controlling behaviors. In addition, mothers with high social contingent-self-worth who were in the evaluation condition exhibited the most controlling behaviors.

Apart from contextual pressures, internal forms of pressure, such as anxieties and worry, have also been associated with more controlling parent behaviors, especially when the worries concern their children. Gurland and Grolnick (2005), for example, examined mothers' perceptions of

environmental threat regarding such issues as future economic instability and resource scarcity. Perceptions of future threat were positively associated with more controlling behaviors exhibited during parent-child tasks. In turn, these controlling behaviors were negatively associated with children's volitional motivation. Moreover, the relation between perceived threat and children's motivation was mediated by controlling parenting.

As can be noticed in Figure 9.1, parents' own personality functioning may also lead them to rely on certain parenting strategies more than others. Critical in this respect is parents' organismic trust in the development of their children (Landry et al., 2008), with parents high in organismic trust being more relaxed in their expectations regarding milestones and engaging in fewer social comparisons. Landry and colleagues showed that such organismic trust led mothers to rely on different parenting strategies during a play session where they and their 12–13-month-old infants were given problems to solve together. Mothers' autonomy support and structure were assessed using ratings of the extent to which the mothers took the children's perspectives, followed the children's pace, and structured the situation to be fitting with the children's skills. Autonomy thwarting behaviors were also measured, including tallying empathic failures and interfering in the children's pace, among other indicators. Results revealed that organismic trust, even when controlling for parental income and education and children's temperament and level of development, was significantly associated with greater autonomy support as opposed to autonomy thwarting.

Other personality factors within parents are also relevant. For example, Deci and Ryan (1985a) early on reported that persons with a stronger control orientation were less prone to support autonomy in others. The reason that parents with a stronger controlled orientation are more likely to use controlling techniques is because they more easily hinge their own self-worth upon their children's achievements. Thus, control oriented parents extend their ego-involved function to their offspring, thereby measuring their own success and worth versus failure and shame as a parents through their children's accomplishments (Wuyts, Vansteenkiste, Soenens, & Assor, in press). Further, Soenens, Vansteenkiste, Duriez, and Goossens (2006) hypothesized that parents who have high separation anxiety may perceive expressions of their children's autonomy as threatening, and may be more likely to restrain autonomous behavior through controlling techniques. In addition, they argued that self-critical perfectionism in parents would lead them to project higher demands

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on their children, thereby pressuring toward specified outcomes. Their results supported these hypotheses.

Together such findings underscore that parenting behaviors are themselves influenced by a variety of factors both external and internal—from the socioeconomic pressures on parents that stretch their resources and lead to insecurities, to internalized social pressures to make their children achieve. Pressures on parents in the form of threats thus interrupt organismic trust, and capacities for nurturance. On the other hand, it is important to highlight that most parents, because of their inherent attachment and love for their children, naturally seek to provide support and guidance so that even their controlling behaviors are often, despite their negative consequences, expressions of their parental caring (e.g., see Chua, Wong, & Koestner, 2014).

Summary

SDT is primarily focused on nurturing, facilitating environments that support the growth of the self. The theory specifies three operationally distinctive nutritive dimensions, namely, autonomy support, structure, and involvement. These parenting dimensions are systematically related to the satisfaction of children's basic psychological needs and allow for greater specification of optimal parenting relative to mixed constructs such as Baumrind's (1996, 2012) construct of authoritative parenting and confrontive power (see Grolnick, 2002, 2012). Further, in discussing the need-thwarting role of parents, we especially emphasized the role of controlling parenting, with conditional regard being the most studied controlling practice within SDT. Finally we suggested that parent behaviors do not occur in a vacuum. Parental stress, sense of threat, and ego involvement can all lead to controlling behaviors and can detract from positive involvement and capacities for autonomy support.

AUTONOMY AND AUTONOMY SUPPORT IN MAJOR DEVELOPMENTAL PROCESSES: ATTACHMENT, INTRINSIC MOTIVATION, INTERNALIZATION, EMOTION REGULATION, AND IDENTITY FORMATION

Having elucidated the critical parenting dimensions fostering growth, in this section we elaborate the role of autonomy in development and personality functioning. First, we focus on the relations between autonomy and *attachment security* (Bowlby, 1969). SDT suggests that autonomy support is an underemphasized yet critical predictor of secure attachment experiences (e.g., Whipple et al., 2009).

Even more, we argue that security provision is insufficient in accounting for healthy self-development, which requires the more active notion of autonomy support. We then turn to a review of research on four critical developmental processes in which autonomy figures heavily, namely, intrinsic motivation, internalization, emotion regulation, and identity formation, and we explicate the role of autonomy and the impact of contextual supports for it.

Autonomy and Attachment Security

Connections between autonomy and relatedness have been hotly debated in both developmental and social psychologies. Some authors see autonomy and relatedness as largely orthogonal if not antithetical constructs (e.g., Blos, 1979; Ingeyar & DeVoe, 2003; Jordan, 1992). As noted already, SDT differs, viewing autonomy and relatedness as being interrelated and, indeed, integral to one another. This is so from the earliest phases of life, in which the strength and security of attachment is, according to SDT, in very large part a function of the autonomy support afforded by caregivers.

Attachment and Autonomy in Infancy

It is particularly difficult to think about autonomy without its foundations within relatedness during the child's first years of life and vice versa. During early development, establishing a core self is a primary agenda for the infant (Stern, 1985). Although the self that is consolidated within the first six months does not take the form of a conscious representation, it can manifest as coherence and volition. Yet because infants are highly dependent on caregivers—not only for biological necessities such as food and temperature regulation but also for interpersonal necessities such as love, contact, and comfort—these earliest experiences of the self as initiator of action typically occur within the context of close parent-child relationships.

Bowlby (1969) and later theorists elaborating his attachment theory framework (e.g., Mikulincer & Shaver, 2007) have argued that early social relations with primary caregivers shape both the security of attachment and the corresponding working models of self and others that will organize future social relations. Perhaps the most emphasized feature within attachment theory that contributes to security of attachment is caregiver responsiveness or *sensitivity* (Ainsworth, Blehar, Waters, & Wall, 1978). Sensitivity is defined as the provision of contingent, appropriate, and consistent responses to the child's signals and needs (Lamb & Easterbrooks, 1981). Sensitivity thus conveys that caregivers are responsive to the child's initiations

in ways that are empathic and appropriate to the child's needs. In our view, sensitivity is part of autonomy support, though by no means encompasses that construct.

Within SDT it has been suggested that when one unpacks the kind of parenting that fosters growth and security, chief among them will be autonomy support (e.g., Ryan, 1993; Ryan, Brown & Creswell, 2007). As noted, in autonomy support what one is being sensitive to are the child's initiations, strivings, and the needs of the developing self (rather than the caregiver's agendas or projected needs). Indeed, Bretherton's (1987) description of sensitivity as "maternal respect for the child's autonomy" (p. 1075) captures the essence of such active responsiveness. The sensitive caretaker responds to the initiations, cues, concerns, and needs that emerge from the child, and this contingent responsiveness gradually strengthens the child's inner sense of agency and coherence, and thus the meaningfulness of the child's self-initiated action and expression. When responded to, the child experiences a sense of safety and interconnection that is lacking for one whose biddings and expressions have been neglected.

Autonomy support is thus a critical component of early parent-child relationships, for it facilitates not only the solidity of attachment but also self-development more generally. Numerous past studies support this perspective by linking sensitivity or autonomy support to more curiosity, effectance, initiative, and adjustment (e.g., Stevenson & Lamb, 1981; Waters, Wippman, & Sroufe, 1979; Yarrow, Rubenstein, & Pederson, 1975). Specifically applying SDT, Grolnick, Frodi, and Bridges (1984) found that mothers rated as autonomy supportive had 1-year-old infants who both explored more and were more persistent at a play task than infants of mothers rated as controlling. Further, Frodi, Bridges, and Grolnick (1985) reported similar results for the persistence and competence at 20 month of age. Such studies suggest that in early stages of development, parental attunement and support for autonomy are enhancing the child's inner resources for self-regulation.

We suggest, in fact, that autonomy support is an aspect of caregiving that is far too underemphasized in attachment theory's foundational focus on security, protection, and responsiveness. Underscoring this argument, Whipple, Benier, and Mageau (2011) drew from SDT in using observational assessments of maternal autonomy support during infant (15 months) exploration. They also assessed maternal sensitivity with a 90-item measure of the quality of maternal behaviors during a home visit and security of attachment using an observational Q-sort method. Results showed that not only sensitivity but also autonomy support explained independent variance in attachment security.

This shows how autonomy support is not encompassed by traditional conceptions of sensitivity.

This interrelation between autonomy support, attachment, and self-development is nonetheless consistent with some of Bowlby's (1969) speculations concerning infant exploration and mastery motivation. Bowlby postulated that to the extent that a child experiences security (i.e., caregiver accessibility and responsiveness in times of need), then the child will feel enabled to venture forth to explore with interest. Yet SDT would suggest, beyond Bowlby, that security is much more than protection and comfort; it is in fact responsiveness *to the self* of the child that fosters secure relationships, not simply reliable protection (Ryan, Brown, & Crewell, 2007).

It is worth noting in this regard that for Bowlby, attachment was first and foremost about safety and protection rather than facilitating growth and development. As Kobak, Cassidy, and Zir (2004) stated, attachment is a "behavioral system activated by appraisals of danger and accompanying signals of fear" (p. 388). Adult attachment theorists concur, arguing that "the goal of the system is a sense of protection and security" (Mikulincer & Shaver, 2007, p. 5). Without doubting the importance of protection and the value of reducing anxiety in moments of danger, one can question whether this is a sufficient foundation for a full theory of self-development (see Ryan et al., 2007). Although moments of dangers and strangers can be salient, they are episodic, and comfort following them may be a necessary, but not a sufficient, condition for the interpersonal support for self-development. Even among the object-relations theorists in Bowlby's time, figures such as Winnicott (1965) more strongly pointed to the importance of ongoing positive supports for the nascent self to not only feel safe, but to develop and flourish. Winnicott highlighted not only a safe haven but also active empathy and having spontaneous initiations amplified through mirroring and responsive care. Like Winnicott, SDT argues that support and nurturing relationships in infancy extend well beyond security and protection to the *active facilitation* of self-functioning. Indeed, security and protection are likely key to prevent experiencing of need frustration, yet, for children to experience autonomy, competence, and relatedness, more active support of these needs is required. In fact, as we turn to other developmental processes such as intrinsic motivation, internalization, emotion regulation, and identity formation, the role of caregivers' support for the child's psychological needs, including autonomy, emerges as a critical facilitator of self-development.

This brief analysis of the role of autonomy and relatedness in infancy thus suggests that autonomy support is

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a critical component of caregiving in infancy that shapes both the experienced quality of relatedness (as reflected in the security of attachment) and the consolidation and vitality of the self (as reflected in both well-being and mastery motivation). Caregiving that is low in autonomy support, by contrast, will set the stage for attachment disturbances and impoverished agency.

More recent studies have begun to examine the independent role of parental autonomy support and attachment security per se in young children's development. For instance, Verschueren, Doumen, Vervoort, and Vansteenkiste (2013) showed in a longitudinal sample of preschool children that both a secure attachment and maternal autonomy support, as observed during a problem solving task, related to higher achievement on a standardized language and mathematics test taken at the end of the first elementary school year, through partially distinct pathways. Attachment security in preschool was related to greater closeness in the teacher-child relation in the first school year, whereas maternal autonomy support related to both greater teacher-child closeness and more learning based in interest and enjoyment (i.e., intrinsic motivation), which in turn predicted greater actual achievement. These findings suggest that a secure and autonomy-supportive child-parent relationship promotes a more successful transition from preschool to elementary school, with need-supportive interactions generalizing to new socialization figures.

Attachment and Autonomy in Adolescence and Beyond

There is increasing evidence that at whatever age attachment security is assessed, the provision of autonomy support from attachment figures will be a critical predictor of attachment security. Adolescence, for example, is a critical period of life in which teens are rapidly developing capacities for independence, while still needing considerable support and nurturance. As noted previously, in SDT's view, rather than individuating *from* parents, healthy adolescent development is characterized by continued attachment and dependence along with autonomy. In fact, evidence suggests that security of attachment and reliance on parents in this age is quite important for well-being and that these are facilitated by caregivers' support for autonomy.

First, several studies support the view that adolescents' continue to benefit from secure attachments to parents rather than by the detachment that Blos (1979) advocated. Ryan, Stiller, and Lynch (1994) investigated the contributions of felt security with parents, teachers, and friends to the motivation, adjustment, and self-esteem of early

adolescents. They found that felt security with parents and teachers, as well as utilization (reliance on) these figures, predicted adjustment. Further, they found evidence that felt security with parents predicted security with both teachers and peers, and appeared to have priority among working models. Similarly, Bober and Grolnick (1995) assessed adolescents' felt security with and emulation of parents. Adolescents who displayed internalizing symptomatology reported low levels of felt security with parents yet emulated them. Adolescents with externalizing symptomatology reported low levels of felt security and low emulation of parents.

Ryan and Kuczowski (1994) examined felt security with parents as it relates to the emergence of *private audiences* in the cognitive development of adolescents. Following Elkind (1967), they argued that the private-audience phenomenon initially represents a heteronomous influence on behavior for most adolescents, who become more self-conscious and more prone to conformity. Yet with self-development the salience of private audiences has been hypothesized to lessen. Ryan and Kuczowski (1994) predicted and found that whereas felt security with parents was unrelated to the strength of private audiences in early adolescence (when it is a normative aspect of development), it was more strongly related in later adolescents. Adolescents experiencing insecurity with parents remained more preoccupied with private audiences, showing one pathway through which the growth of autonomy is hampered.

Ryan and Lynch (1989) examined the issues of autonomy and attachment in early, middle, and late adolescent samples. They argued that autonomy is typically *facilitated* by secure attachment to, and dependence on, parents rather than by detachment and nonreliance on them. They further suggested that among the primary reasons that adolescents are insecure with or detached from parents is that parents are overly controlling. Their studies confirmed that adolescents with more secure attachment to parents were, in fact, better adjusted, and had parents who were more autonomy supportive. These findings have been well replicated, including recent studies of both referred and nonreferred youth and their mothers, in which parental autonomy support related to lower anxiety-based attachment, while parental responsiveness and sensitivity related to lower avoidance-based attachment (Brenning, Soenens, Braet, & Bal, 2012; Karavasilis, Doyle, & Markiewicz, 2003).

The importance of autonomy supports for secure attachments extends to early adulthood. La Guardia, Ryan, Couchman, and Deci (2000) studied the attachment experiences of college students with multiple social partners such

as their mothers, fathers, best friends, and romantic partners. They found, as classical attachment theory predicts, that individual differences in security of attachment were a moderately significant predictor of patterns of security of attachment across social partners. Yet they also hypothesized and found significant variability in students' security of attachment with these different social partners as a function of the different qualities of interpersonal supports provided within each relationship. In three studies, La Guardia and colleagues applied multilevel modeling to reveal that within-person variability in attachment security was systematically explained by relationship-specific autonomy support. In fact autonomy support was an especially consistent predictor of felt security, relationship satisfaction, and willingness to rely on that person.

In a more recent study of adult attachments, autonomy support, and emotional reliance, Lynch (2013) collected daily data on autonomy support and security of attachment to predict patterns of *emotional reliance*—that is, the individual's willingness to turn to another person for emotional support (see Ryan et al., 2005). It has been assumed by attachment theorists that secure attachments would be associated with positive abilities to recruit support from others when distressed (e.g., Belsky, 2002). Yet Ryan et al. (2005) argued that autonomy support was also particularly crucial in facilitating such emotional reliance, as people are less prone to rely on others who are controlling. Lynch (2013) therefore allowed measures of both attachment security and autonomy to compete at both trait and state levels in predicting emotional reliance. At the trait level both security of attachment and trait autonomy predicted greater tendencies to emotionally rely on others. At the within-person level, results showed, as predicted by SDT, that people were specifically more willing to turn to those people whom they perceived to be autonomy supportive. Noteworthy is that at both within- and between-person levels of analysis, emotional reliance was more strongly linked with autonomy than with attachment security.

Summary

SDT and attachment theory thus concur that attachment security is associated with higher well-being and ability to rely on others. SDT additionally maintains that autonomy support is critical to experiencing attachment security, including primary attachment figures. Moreover, through the more active nurturance of explorative behaviors, emerging interests and personal values, autonomy-supportive agents do more than provide comfort; they promote children's healthy development.

Intrinsic Motivation: A Spontaneous Expression of Human Autonomy

Intrinsic Motivation: Definition

Perhaps the most direct catalyst of empirical research on autonomy within both social and developmental psychologies has been interest in the phenomenon of intrinsic motivation. *Intrinsic motivation* is defined as motivation derived from the inherent satisfactions of an activity—it applies when actions are experienced as interesting or enjoyable for their own sake (Deci & Ryan, 1985b).

Harlow (1950) was, to our knowledge, the first scholar to employ the term intrinsic motivation. He used it in reference to the persistence of primates, curiously working at mechanical puzzles without reinforcements or rewards. In fact, he was an early observer of an “undermining effect” of rewards, noting that attempts to enhance curious behaviors with reinforcements disrupted such intrinsic motivation. Subsequently, White (1959), drawing on both comparative psychology and developmental studies, argued that this type of interest-driven behavior underlies much of human social and cognitive development. Indeed, this idea of an innate, natural propensity towards the exercise and growth of capacities has been an important postulate in the study of developmental and learning processes (Deci & Ryan, 2013; Flavell, Miller, & Miller, 2002; Koestner & McClelland, 1990).

Intrinsic motivation reflects a natural assimilative tendency, which is evident in the active exploration, manipulation, curiosity, and playful exercise of skills we observe in healthy children. Intrinsically motivated play and activity foster learning and the growth of competencies, as developmental theorists have long argued (Harter, 2012). Also studied as *mastery motivation*, intrinsic motivation is clearly evident in infancy (e.g., Yarrow et al., 1975) and differentiates into more specific interests as children grow (Deci & Ryan, 2013). Numerous studies have linked intrinsic motivation to deeper learning (e.g., Grolnick & Ryan, 1987; Yamauchi & Tanaka, 1997), creativity (e.g., Amabile, 1983), and other indicators of high-quality assimilation.

Social Contexts and Intrinsic Motivation

Although intrinsic motivation is posited to be natural, its unfolding and development is nonetheless viewed within SDT as being dependent on specific social and contextual nutrients (Deci & Ryan, 1985b; Ryan, 1993). A substantial amount of research has therefore explored the effects of various social contexts on intrinsic motivation, and this

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body of research has been described within a specific mini-theory of SDT called *cognitive evaluation theory* (CET; Deci & Ryan, 1985b). In brief, CET argues that intrinsic motivation is dependent on experiences of both autonomy and competence. Social contexts that are either controlling or autonomy inhibiting (Grolnick & Ryan, 1989) or that lack challenges or feedback that supports felt competence (e.g., Abuhamdeh & Csikszentmihalyi, 2012; Mouratidis et al., 2013) are expected within CET to diminish intrinsic motivation. In contrast, environments that support autonomy (e.g., provide choice, are responsive to initiatives) and competence (are well structured, provide positive feedback) are expected to maintain or enhance intrinsic motivation. Finally, in contradistinction to social-cognitive approaches (e.g., Bandura, 1989), CET holds that that intrinsic motivation requires autonomy satisfactions; self-efficacy alone will not sustain this spontaneous form of activity.

Studies testing CET have been done with toddlers to adults, allowing us to draw inferences about some fundamental, age-invariant aspects of intrinsic motivation. One type of evidence comes from experimental studies. In the typical paradigm children or adults work on an activity under different conditions that vary in terms of contextual factors affecting perceived autonomy, perceived competence, or both. Subsequently, intrinsic motivation is assessed by a free-choice behavioral measure. Participants are given a postexperimental period without demands, in which the target activity is available along with alternative activities (e.g., reading a magazine). The time participants spend spontaneously engaging the target activity is recorded and used as the *free-choice measure of intrinsic motivation*. Ratings of how interesting and enjoyable participants find the task are a complementary measure of intrinsic motivation.

One interesting factor affecting intrinsic motivation is external rewards. CET postulates that because rewarded participants are more likely to see the impetus or cause of their activity as stemming from external sources, when they are offered rewards for acting they are vulnerable to losing an internal perceived locus of causality and sense of autonomy. When originally proposed (Deci, 1971), this CET hypothesis was provocative because many psychologists then held a view, based in operant psychology (Skinner, 1953), that all behavior was controlled by external contingencies of reward and punishment. CET not only assumes this is not the case, but moreover suggests that some types of rewards that are very effective in shaping behavior can at the same time yield detrimental effects on intrinsic motivation, precisely because of their negative effect on

autonomy. In contrast when rewards are not controlling, but rather provide more *informational* (or competence relevant) feedback, they can be more motivationally positive (Ryan, Mims, & Koestner, 1983).

Danner and Lonky (1981), combining Piagetian and CET frameworks, presented a classic study illustrating some of the developmental implications of this undermining effect of rewards on intrinsic motivation. Children were classified with regard to their level of cognitive development using a Piagetian assessment. They then worked on additional cognitive tasks either explicitly for, or without, externally offered rewards. Subsequently, children were given a free choice period in which they were allowed to select activities during a play opportunity. Children who did not receive external rewards gravitated to tasks that were optimally challenging—those stretching their assessed cognitive capacities. In contrast, children who had been externally rewarded sought easier tasks and avoided challenges during free play. These results illustrate how attempts to enhance development through controlling rewards can backfire.

Another example comes from studies of young children's intrinsic interest in helping others, which many argue is a deeply evolved human propensity (see Ryan & Hawley, in press). To demonstrate that early altruism constitutes an intrinsic or a natural inclination Warneken and Tomasello (2008) created situations where 20-month-old toddlers could help adults (e.g., pick up dropped objects). In one condition they gave children a concrete reward every time they helped, whereas children in another condition did not get rewards. In a second phase, they found that children previously rewarded for helping were less helpful than those never rewarded. Presumably, the reward undermined children's spontaneous, intrinsically motivated tendency to be helpful, a finding paralleling adult findings (e.g., Weinstein & Ryan, 2010). This experiment is notable in finding the effect in children before they can cognitively weight or discount the motives underlying their behavior, ruling out so-called overjustification explanations of this effect (e.g., Lepper, Greene, & Nisbett, 1973).

Despite a plethora of studies documenting undermining effects, debate about the undermining effect was resparked by Eisenberger and Cameron (1996), who presented a meta-analysis of reward effects that seemingly contradicted previously published summaries and meta-analyses on the topic. In their analysis they surprisingly found no evidence for an undermining effect by rewards, and they labeled the undermining effect a myth. Their null findings were immediately heralded by many behaviorists. Yet detecting serious methodological problems, Deci, Koestner, and

Ryan (1999) reanalyzed these experimental data, taking care to include all studies summarized by Eisenberger and Cameron (1996). The reanalysis, presented in *Psychological Bulletin*, not only confirmed this well-known undermining of intrinsic motivation by rewards, but more importantly, supported the differentiated pattern of reward and feedback effects on intrinsic motivation predicted by CET. Data indicated that controlling reward contingencies undermined intrinsic motivation, whereas noncontrolling and informational rewards did not.

Many studies continue to document this important effect. One study of particular interest focused on neurological supports for intrinsic motivation (Murayama, Matsumoto, Izuma, & Matsumoto, 2010), providing a new way of demonstrating the undermining effect of rewards on intrinsic motivation. These researchers had participants engage in an interesting task under reward and no-reward conditions, tracking activations with fMRI. The no-reward group found the task interesting and cognitively engaging, and these inherent satisfactions were associated with meaningful striatal and lateral prefrontal cortical activity. For the reward group, Murayama et al. (2010) provided a performance-contingent monetary reward, and as predicted both striatal and lateral prefrontal cortical activity increased significantly, suggesting that the reward added to task motivation and engagement. Yet in a second phase of the study, participants repeated the task, but in this phase no rewards were offered. The researchers again examined the striatal and lateral prefrontal cortical activity the task generated. For participants in the prior no-reward condition, striatal and lateral prefrontal cortical activation were essentially stable; the task remained just as rewarding and engaging as before. Yet for those in the reward condition, striatal and lateral prefrontal cortical activity declined—the task now failed to generate pleasure (striatum) or cognitive engagement (lateral prefrontal cortical), as predicted by CET.

SDT scholars do not question the power of rewards to control behavior. However, SDT emphasizes that, at the same time, the very power of externally administered rewards can also lead individuals away from their intrinsic inclinations. Powerful extrinsic rewards, whether they be tangible rewards or conditional love, can lead people to forego autonomy, forget their values and preferences, and neglect their interests and relationships. That is precisely what unhealthy regulation and alienation is all about (Ryan & Deci, 2000a). Not only can controlling rewards undermine intrinsic motivation, so can motivational tactics such as controlling praise (e.g., Ryan, 1982); threats of punishment (e.g., Deci & Cascio, 1972); salient

surveillance (e.g., Enzle & Anderson, 1993; Plant & Ryan, 1985); controlling-directive language (e.g., Hooyman, Wulf, & Lewthwaite, 2014; Reeve & Jang, 2006); and grades (e.g., Pulfrey, Buch, & Butera, 2012). These and other frequently used methods of controlling behavior can have a psychological meaning, or *functional significance*, of being controlling, which in turn negatively affects people's experience of autonomy and engagement. To the extent that adults use salient prods, prompts, or pressures to induce children to perform interesting activities, they are likely to disrupt intrinsic motivation and autonomous functioning (Assor et al., 2004).

Effects Across Developmental Periods

Although many experimental studies of intrinsic motivation have been in school and college settings, the effects of autonomy support versus control on intrinsic motivation are robust across developmental epochs and interpersonal settings. We review some examples.

Earlier we cited studies by Grolnick and colleagues (1984; 1985) in which infants and toddlers whose mothers were more controlling evidenced less mastery motivation and persistence than those whose mothers more actively supported their initiations and autonomous play. As another illustration, Grolnick et al. (2002) observed mothers and their third-grade children working together on an assigned task of problem solving and constructing poems. Following the interaction, children were asked to complete similar tasks on their own, without their mothers being present. Children whose mothers interacted with them in a more controlling manner had performed just as well as other children when with their mothers, but, when completing tasks on their own, they were less accurate in problem solving, and wrote less creative poems.

Deci, Driver, Hotchkiss, Robbins, and Wilson (1993) looked at maternal autonomy support and control with five- to seven-year-olds. They recorded mothers' vocalizations during an interactive-play period, and had raters code the interactions for autonomy supportive and controlling contents. After sessions in which mothers were rated, children's intrinsic motivation was assessed using persistence observations during solo play. Children whose mothers were rated as more autonomy supportive were more intrinsically motivated.

The significance for development of this general effect concerning autonomy support and control on intrinsic motivation cannot be overstated. Children's exploration, challenge seeking, and curiosity are inherent and natural resources for cognitive and emotional development, and a wellspring from which specific competencies derive.

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Also, when led by curiosity and exploration, children gradually learn to discover their interests, a first step toward pursuing their interests and gradually building their skills. Yet this resource is curtailed by controlling environments. Intrinsic motivational tendencies that support growth can be stifled by even well meaning caretakers as they attempt to elicit development through reinforcement or control.

The significance of intrinsic motivation, and the impact of social contexts on it, has been documented in various domains, including education, exercise, and work. For example, within schools Deci, Schwartz, Sheinman, and Ryan (1981) collected teacher's reports about their classroom motivational strategies before they met their students for the year. Several weeks into the school year Deci et al. (1981) returned to assess student motivation and well-being. They found that students assigned to teachers who were oriented toward supporting autonomy displayed higher levels of curiosity, perceived cognitive competence, and self-esteem than those assigned to teachers espousing more controlling orientations. Ryan and Grolnick (1986) reported parallel results using elementary school children's perceptions of their teachers. Notably, even in an "elective" domain such as sport, O'Rorke, Smith, Small, and Cumming (2012) found that young athletes' autonomy for playing sport was related to the motivational climate created by parents. Parents focused on mastery motivation with little ego-involvement had children with higher levels of autonomy and intrinsic motivation for sport. A prospective analysis over the course of a sport season showed, in fact, that ego-involved parents had children whose autonomy for playing decreased over the season.

Indeed there is now an extensive literature that continues to document the beneficial effects of autonomy-supportive socialization, including their generalizability across cultures. For example, Chirkov and Ryan (2001), studied Russian and U.S. high school students, finding that perceived autonomy support from parents and teachers was associated with more internalized academic motivation and better mental health in both samples, to comparable degrees. Jang, Reeve, Ryan, and Kim (2009), in a prospective study of South Korean high school students found that teacher autonomy support predicted greater intrinsic motivation in school. Jang, Kim, and Reeve (2012) extended these findings in a multiwave longitudinal study of more than 500 South Korean students, testing a complex path model. As expected, teacher autonomy support enhanced student need satisfaction and engagement, resulting in better achievement. But reciprocal effects were also apparent, such that when students' need satisfaction was high,

teachers were influenced to be less controlling. This kind of longitudinal approach reveals the complex dynamic effects between autonomy support and autonomous motivation, which are truly interpersonal and in which influences can be reciprocal.

Intrinsic motivation is quite contextually sensitive, fluctuating over time with perceived autonomy support. For example, Tsai, Kunter, Ludtke, Trautwein, and Ryan (2008) showed that German public school students, followed over multiple days in three different required courses, showed considerable lesson-to-lesson variability in interest. Yet the fluctuations were systematic: they were directly associated with variability in teacher autonomy support. On days when the teacher was more controlling students' interest waned. These findings were extended by Mouratidis, Vansteenkiste, Lens, and Sideridis (2011). Rather than following daily variations in perceived teaching behavior, they instructed teachers to randomly build in autonomy supportive segments within their more typical teaching approaches. In classes where the strategies were inserted adolescents reported enjoying the class more and feeling more vital and energized. Moreover, these effects from inserting autonomy-supportive strategies were specifically accounted for by students' reports of autonomy need satisfaction.

Factors that support a person's autonomy can, of course, enhance interest and intrinsic motivation. For example, a meta-analysis by Patall, Cooper, and Robinson (2008) showed that in general the affordance of meaningful choices to people has an enhancing effect on intrinsic motivation (see also Katz & Assor, 2007). Autonomy support is also conveyed by taking the person's *internal frame of reference*, or understanding their point of view (Deci & Ryan, 1985b; Koestner, et al., 1984). In fact, Patall, Dent, Oyer, and Wynn (2012) found that teachers' perspective taking and provision of choice were both autonomy-enhancing factors for high school students. Such studies indicate that providing choice and acknowledging perspectives can enhance intrinsic motivation, as these events leave individuals feeling more autonomous.

Summary

Experiments and field studies in diverse domains, including parenting, teaching, and coaching suggest that social contexts that are experienced as *controlling* (i.e., as pressure to think, feel, or behave in specific ways) undermine autonomy, resulting in diminished intrinsic motivation and more negative self-related emotions. In contrast, contexts that are *autonomy supportive* (i.e., that consider

the individual's frame of reference, provide choice, and encourage self-initiation) have positive effects on intrinsic motivation and persistence.

Internalization: Assimilating Social Regulations and Values

The Internalization Continuum

Intrinsic motivation is a prototype of autonomous motivation that occurs spontaneously, as an expression of our active, assimilative human nature. Many behaviors, however are not intrinsically interesting, but parents, school systems, or other authorities believe them to be in children's best interests and therefore important for them to acquire. Although parents and teachers, as primary socializing agents, attempt to motivate children to perform such activities, the methods they use vary. Some may be controlling and authoritarian, forcing the child to conform to norms or expectations; others may be autonomy supportive, influencing through reasoning, modeling, and guidance of choices. SDT predicts that whereas controlling methods foster at best short-term compliance, autonomy support, structure, and involvement in conjunction enhance the *internalization* and *integration* of behavioral regulations.

Ryan, Connell, and Deci (1985) defined internalization within SDT as the means through which individuals can become more autonomous in performing an activity that was initially externally prompted. In this view internalization is an active process of selecting and transforming ambient regulations into personally endorsed values or motivational propensities. Through internalization, people acquire values and behaviors that allow them to be effective, connect with others, and experience volition—that is, to get their psychological needs met. When functioning optimally, the internalization process results in values and regulations that are more self-endorsed, that is, are fully integrated within the self.

SDT further hypothesizes that supports for autonomy, competence, and relatedness are necessary for such optimal, integrated internalization (Deci & Ryan, 2000; Ryan, 1993). Unfortunately, these ideal contextual conditions are not widely prevalent, and full integration of regulations is not often attained. Instead, when socializing agents are controlling or uninvolved, internalization results in values and regulations that are only poorly internalized. SDT therefore places importance on distinguishing between types of internalization for predicting the nature and quality of behavioral and psychological functioning. Specifically, SDT specifies a continuum of regulatory styles that spans from low to high autonomy for acting.

At the low end is *external* regulation, which describes extrinsically motivated behavior that is initiated and maintained by external rewards or punishment avoidance. A child who does chores to avoid parental nagging would be externally regulated, as would one who does them to get tangibly rewarded. External regulation is characterized by a lack of internalization, and although external rewards and punishments can be powerful motivators, externally regulated behavior is poorly maintained in the absence of direct control.

Somewhat more autonomous is regulation based on *introjection*. Introjected regulation is motivated by feelings of self-worth and loveability for acting as one should, and guilt or self-disparagement for failing to meet the standards or goals. Introjected regulation is thus often rigid and accompanied by feelings of internal pressure and tension. A child who does chores because she feels pressured to avoid feeling guilty and to feel like a “good girl” is displaying introjection. Indeed, introjection supplies the developmental basis for *internally controlling* regulation, as exemplified in ego involvement (Ryan, 1982), contingent self-worth (Deci & Ryan, 1995; Kernis, 2003), and self-critical perfectionism (Frost et al., 1993; Soenens, Vansteenkiste, Duriez, Luyten, & Goossens, 2005). Accordingly, research has related introjection to rigidity, anxiety, self-derogation, and other maladaptive patterns (e.g., Assor, Vansteenkiste, & Kaplan, 2009; Weinstein, Deci, & Ryan, 2011).

Still somewhat higher on this continuum of autonomy is *identified regulation* of behavior. In this type of regulation the person consciously identifies with a value or behavioral goal—accepting it as his or her own. It is therefore enacted with less resistance and conflict, and often with persistence, diligence, and efforts based in valuing. Children who clean their rooms because they understand that a clean room allows them to more easily find what they need have concurred with the importance of cleaning, that is, they have more fully internalized the value and reason for cleaning. Finally, *integrated* regulation represents the most autonomous form of internalized regulation, as it indicates that an identified value and its accompanying regulatory process have been reciprocally assimilated with other values and important personal goals. Various identified values may be more or less challenging to integrate, but if integrated, are wholeheartedly endorsed and performed.

These four modes of extrinsic regulation lie along a continuum of relative internalization and autonomy, where external regulation represents the least internalized and autonomous mode and integrated regulation represents the most internalized and autonomous mode of extrinsically

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motivated behavior. Intrinsic motivation is also on the high autonomy end of this dimension, yet does not require internalization of regulation as the behavior already spontaneously manifests when people act out of enjoyment and interest. Considerable evidence backs up the continuum nature of this array. Ryan and Connell (1989) provided the initial studies assessing children's external, introjected, identified and intrinsic regulatory styles, and their data confirmed that these were reliably ordered along a continuum of increasing autonomy. Moreover, the more autonomous forms of regulation (identified and intrinsic) were positively correlated with positive affect and proactive coping, whereas the less autonomous forms (external and introjected) were correlated with negative affect and maladaptive coping. Introjection, in particular, was associated with anxiety and anxiety amplification following failure, highlighting the inner stress and tension associated with this internally controlling form of regulation.

Enhancing internalization and integration is a valuable goal in its own right, yet when students have more autonomous forms of motivation they also tend to more deeply process the learning material (Sobral 2004; Yamauchi & Tanaka, 1998), to be more fully absorbed in the task at hand (e.g., Abuhamdeh & Csikszentmihalyi, 2012), and to perform better. For example, De Naeghel, Van Keer, Vansteenkiste, and Rosseel (2012) examined elementary students' motives for reading, both in school and in leisure time. They found that more internalized, autonomous motives not only related positively to teacher-rated engagement in reading, but also to children's scores on a standardized reading comprehension test. At the other end of educational development, Kusurkar, TenCate, Vos, Westers, and Croiset (2013) found that autonomous motivation is positively associated with the use of a deeper study strategy and better GPA in medical students. In fact, a recent meta-analysis by Cerasoli, Nicklin, and Ford (2014) supports this pattern of findings, with intrinsic/autonomous motivation predicting both better quality and quantity performance, while incentives related only to better quantity performance.

The relations of internalization and autonomy to higher quality behavior are not limited to learning and achievement domains. For example, Ryan and Connell (1989) found that more autonomous regulation in the prosocial domain was associated with greater empathy, more mature moral reasoning, and more relatedness. Blais, Sabourin, Boucher, and Vallerand (1990) assessed adults' reasons for maintaining their primary relationship, finding that regulatory styles representing lower autonomy were negatively associated with dyadic adjustment and relationship

satisfaction. Ryan, Rigby, and King (1993) examined the internalization of religious values, finding that introjected regulation of religious behaviors was positively associated with symptoms of depression, anxiety, and low self-esteem, whereas identified regulation was negatively associated with these indicators of ill-being. Neyrinck, Vansteenkiste, Lens, Hutsebaurt, and Duriez (2006) found that greater internalization of religious activities was associated with a more open and flexible interpretation of doctrines, stronger adherence to beliefs, and greater well-being. In the health care domain, Williams, Rodin, Ryan, Grolnick, and Deci (1998) showed that patients who had more strongly internalized the self-importance of taking their medication were more likely to effectively take them. Finally, although parents constitute primary socialization figures in the transmission of values, only the autonomous agreement with parental values relates positively to well-being, even after for controlling for the degree of parent-child agreement as such (Knafo & Assor, 2007). Across these domains and others, findings consistently show that the more autonomous people's motives, the more effective their functioning and psychological experiences.

Social Contexts and Internalization

Given these benefits of fuller internalization, the developmental conditions that foster or facilitate internalization and autonomous regulation are an important focus of research. Although like intrinsic motivation, internalization is hypothesized within SDT to be a natural process (Ryan & Hawley, in press), it too requires specific nutrients and supports from the social context. In fact, all three needs are critical to foster the full integration of socially prescribed norms and values. That is, a sense of competence is an important yet not sufficient condition for fuller internalization of an activity, as one can feel fairly competent, yet externally pressured to do the activity. Similarly, a sense of relatedness is conducive to taking in the behavioral regulation, yet a sense of internal conflict can still be underlying the behavior if it is emitted to avoid feelings of disloyalty and guilt vis-à-vis the socialization figure. For full internalization to occur, a sense of autonomy is critical. Consistent with this idea, Markland and Tobin (2010) showed that the satisfaction of the three needs maps in theoretically meaningful ways to the different types of regulation for exercising. Whereas relatedness satisfaction yielded a unique positive association with introjected regulation, it is only when all three needs were fulfilled, that the exercisers identified with the importance of exercising.

To promote autonomy need satisfaction and subsequent internalization, the use of control has been found

to be harmful, whereas provision of autonomy support has been shown to be critical, a finding that generalizes across cultures (e.g., Ahmad, Vansteenkiste, & Soenens, 2013; Barber, Stolz, & Olsen, 2005; Chirkov et al., 2011; Jang et al., 2009). There are many elements to autonomy support, but they all start from an empathic grasping of an individual's perspective so as to better understand why the person refuses to engage in the noninteresting activity. By taking the frame of reference of the that person, the socializing agents can provide a more relevant and meaningful rationale, provide additional competence-enhancing information, if needed, and offer choices concerning how and when an activity is carried out. Along with support for relatedness, provision of such autonomy support and structure deepens internalization and contributes to social integration and wellness.

The critical role of need-supportive socialization for children's internalization has been documented in dozens of studies. For instance, in the study by Grolnick and Ryan (1989), parents who were rated as more autonomy supportive from interviews had children whose motivation for schoolwork was more fully internalized. Notably, many parents who were rated as controlling were clearly involved in their children's lives, and many were well intended, some highly invested in their children's success (Wuyts et al., in press). Yet in attempting to control the children to ensure that they attained certain outcomes, they often failed to promote their children's ownership of these goals or the children's personal investment in achievement, instead creating a reliance on external regulation.

As noted, the practice of *parental conditional regard* (PCR), or the degree to which a parent shows more attention and affection after compliance or success, and less affection and attention after noncompliance or failure, has received increasing recent attention. For instance, Assor et al. (2004), studying four domains (i.e., academics, sports, prosocial behavior, emotion regulation), showed that student perceptions of PCR, assessed separately for mothers and fathers, predicted compliant behavior that was largely based in introjection and inner compulsion. PCR appeared also negatively associated with identification and feeling a sense of choice about the activities, whereas PCR was positively related to contingent self-esteem, shame, guilt after failure, and short-lived satisfaction after success—all variables one would expect to be associated with introjection. Most tellingly, students who experienced more PCR also reported more anger and resentment toward their parents.

Interestingly, the negative repercussion of PCR may not only manifest at the personal, but also at the interpersonal

level. Moller, Roth, Niemiec, and Deci (2014) found that late adolescents who experienced parents as being higher on PCR not only reported less secure attachments with them; they also reported more conditional regard and less secure attachments with their current romantic partners and best friends. The experience of being conditionally regarded thus appears to generalize from experiences of parents to other close relationships. Along similar lines, Soenens, Vansteenkiste, Goossens, Duriez, and Niemiec (2008) found that parental psychological control, which compromises conditional regard as one of its central components, was associated with more physical aggression and poorer peer relationships.

Conditional regard, as a form of internally controlling parenting, can be differently valenced—it can take a more seductive form of *positive parental conditional regard*, involving the provision of more attention and affection than usual in case of desirable child behavior, and a more punitive form of *negative conditional regard*, involving the withholding or even withdrawal of attention and affection in case of undesirable child behavior. Although most theorists might expect negative PCR to be problematic, some approaches (e.g., many social learning and cognitive approaches) might argue that positive PCR is an effective form of parenting. Indeed, some theorists appear to justify and even advocate tiger mom tactics that involve the display of PCR (e.g., Fu & Markus, 2014). Unfortunately, it appears the also positive PCR comes with a cost. For instance, Roth, Assor, Niemiec, Ryan, and Deci (2009) showed that parents using positive PCR to promote academic success had adolescents who reported internal compulsion to do school work rather than a sense of autonomy, and their teachers' reported them to be grade-focused. In addition, extending Assor et al.'s (2004) findings, these adolescents' reported greater resentment toward parents. Negative PCR was also related to resentment of parents, and was related negatively with school engagement. Thus negative PCR does not promote internalization (not even introjection) although years earlier Sears et al. (1957) had proposed that it would. Most likely the parents who used love withdrawal in their samples also used positive conditional regard, and it may have been the positive PCR that led to their proposal. In a second study by Roth et al. (2009), positive PCR was compared to autonomy support as parenting methods for children's school achievement. Results showed that both mothers' and fathers' positive PCR were positively related to the child exhibiting grade-focused engagement, and negatively to interest-focused engagement. Further, these relations were mediated by the experience of internal compulsion

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(i.e., introjection), as predicted. In contrast, autonomy support from each parent predicted interest-focused engagement, a relation that was mediated by a sense of choice.

While internally controlling strategies, such as conditional regard, may elicit partial internalization of parental demands through introjection, parents' reliance on external controls is likely to merely elicit external regulation, representing a complete lack of internalization of the behavioral regulation. Even more, in response to external controls, children may be noncompliant or even reactive. In an illustrative observational study among Mexican children, Brunstein (1994) showed that parents' engagement in externally controlling practices (e.g., orders, reprimands, and threats) related positively to both children's observed inattentive obedience and their passive and rather blunt resistance to comply with parents' requests. More recently, Talwar and Lee (2011) conducted a field experiment comparing two West African schools, which strongly varied in terms of their use of physical punishment as a discipline practice. Specifically, 3–4-year-olds of the one school, who were very frequently exposed to the physical punishment, were 12 times more likely to lie during a toy game and to conceal their lies.

Thus, for socializing agents to promote internalization and ownership of regulations, a controlling approach would best be avoided. Yet the absence of control does not imply the absence of guidance, as would be the case with a laissez-faire climate. What is critical for children to begin to internalize societal expectations is that prescribed behaviors and limits need to be clearly communicated; in other words, sufficient structure and guidance need to be provided. Furthermore, in communicating and monitoring these limits, an autonomy-supportive style is essential.

Consistent with this, Vansteenkiste, et al. (2014) showed that the style of introducing prohibitions to adolescents affects their acceptance of (i.e., internalization) versus oppositional defiance against the prohibitions. Specifically, their one-year longitudinal study revealed that a more autonomy-supportive style of introducing and monitoring prohibitions elicited greater identification with and ownership of the limits, while a perceived controlling style predicted either increases in externally enforced compliance with the prohibitions or oppositional defiance against them. Notably, these effects were found to be reciprocal such that a virtuous positive cycle unfolded when autonomy support was salient, and a vicious negative cycle was instigated in the case of a controlling style. These effects occurred regardless of whether the prohibitions had a more personal character (e.g., friendships) or were moral in nature.

Summary

A crucial task for socializing agents is to transmit norms, values, and regulations, such that children and adolescents will not stick to these norms out of strict, slavish obedience but rather out of volitional commitment, presumably because they have come to fully own (i.e., internalize) the norms. Whereas controlling socialization practices, such as positive PCR from parents, can produce compliant behavior, it is often at the cost of a sense of volition to behave. Negative PCR and more externally controlling practices may even be more counterproductive, eliciting at best externally driven obedience, and, at worst, anger and resentment as well as blunt defiance against requested norms. What is needed to foster full internalization of norms is an autonomy-supportive approach in combination with clear communication of expectations (structure) and involved guidance.

Emotion Regulation

Distinguishing Different Styles of Emotion Regulation

Similar to the process of internalization, the development of emotional self-regulation can be conceptualized as movement from reliance on outside sources to identify, modulate, and regulate affect, toward a growing capacity for autonomous, flexible, and adaptive regulation (Cicchetti, Ganiban, & Barnett, 1991; Grolnick et al., 1996). Deci and Ryan (1985b) early on drew from Greenspan (1979) in referring to the development of regulatory processes for autonomously managing emotions as *integration at the internal boundary*. This was contrasted with the development of regulatory processes for engaging in behaviors deemed important by the social world as *integration at the external boundary*. Although these two developmental functions, referred to, respectively, as the development of emotion regulation and internalization, are distinct, they are similar in many respects. Both involve gaining the capacities to regulate oneself with respect to behavior that is not intrinsically motivated and both entail a developmental progression in which the child gradually relies less on cues and structures from the social context and more on internal cues and structures. Equally clear, deficits in the regulation of emotion and the ability to use emotions to appropriately inform or guide behavior are cardinal features of most forms of psychopathology. Accordingly, we turn now to this critical issue of emotional regulation and its healthy development.

We begin with acknowledging the complexity of emotions, and the multiple dimensions that impact upon their regulation and expression (see Cacioppo, Bernston,

Sheridan, & McClintock, 2000). In particular, there are salient individual differences in people's tendencies to experience emotions (e.g., Gable, Reis, & Elliot, 2000) based on both genetic and temperament-based factors and their interactions with early environmental events. Individual difference factors make the problem of emotional regulation and integration much more formidable for some persons, whose sensitivity or lack thereof make the task of accessing, modulating, expressing, and using emotions much more challenging (Assor et al., 2004). Nonetheless, any reasonable summary of that complex literature makes clear that even given such individual differences or tendencies, social environments play a significant and interactive role in fostering healthy emotion regulation (Vansteenkiste & Ryan, 2013). To more concretely understand what it is about social environments that can facilitate versus debilitate a growing person's capacities for emotional awareness and regulation first requires a clear conception of what healthy emotion regulation involves.

SDT's conceptualization of healthy emotional regulation begins with the assumption that emotions are *informational* inputs essential to guiding action and growth (Deci & Ryan, 1985b). In this view, specific emotions are neither good nor bad; they simply provide organismically valuable guidance (Deci & Ryan, 2000; Parrott, 1993). A similar view is expressed by Levenson (1999), who suggested that emotions provide organisms with a built-in feedback system that signal them to inspect, explore and evaluate their environment and act in accord with that evaluation.

SDT views wellness in terms of a person being fully functioning—being able to exercise potentials, connect with others, find meaning, and experience vitality. This *eudaimonic* view (Ryan, Curren, & Deci, 2013) suggests that rich access to both positive and negative feelings, a capacity to express them, and the ability to integrate and use them to inform one's behaviors and goals is optimal. This in turn supports personal growth, self-acceptance, and abilities to intimately connect with others.

To capture this quality of emotional regulation we distinguish *emotional integration* as an autonomous form of emotional regulation from notions of *emotional control* and *emotional dysregulation*. Specifically, emotional integration involves a differentiated awareness of one's emotional states and the capacity to use this sensitivity and awareness in the volitional regulation of action. Autonomous behavioral functioning is dependent on emotional integration, because emotions, when openly received, supply essential information that guides one in setting goals and adjusting them toward the fulfillment of psychological needs (Ryan et. al 2006). Healthy emotional integration is

thus characterized by an allowing of and interest in inner experience, rather than the control or stifling of emotions (Deci, Ryan, Schultz, & Niemiec, in press).

Yet emotions can be experienced as more than just information; they can be experienced as evaluative and controlling, as when affect overwhelms self-regulation or automatically drives action. Even the etymology of the term emotion conveys this idea of a force that propels motion. Alternatively, emotions can be so overcontrolled such that people lose access to them, and in such cases the emotions can fail to move the individuals when they should. Controlled emotional regulation is manifest through the ignorance, suppression, or denial of emotions and, as we will see later, is implicated in specific forms of psychopathology and ill-being. Accordingly any conception of healthy or integrated emotional regulation is based neither on emotions controlling people nor on people controlling (e.g., suppressing) their emotions. When the self can access feelings without being controlled by them, the opportunity for autonomous self-regulation is maximized. This of course is a capacity that only develops over time and that requires contextual supports, in the form of guidance and need satisfaction.

Indeed, the process of increasingly integrating one's emotions and regulatory capacities is a continuation of the work a child does in gaining regulatory capacities with respect to emotions, but it represents a mature version of that process. Whereas emotional regulation is concerned with the modulation of emotional experience and expression, emotional integration is concerned with the flexibility and choice people feel in the regulation of emotions and emotion-related actions. Individuals high in emotional integration are more likely to be receptive to emotional signals, to take interest in them, and to experience them as valuable inputs to actions. In contrast, if regulatory processes are rigidly introjected and thus in conflict with the emotions, people are likely to suppress the feelings and thus ignore their personal meaning.

Consistent with the idea that integrative emotional regulation allows for a more open and nondefensive processing of emotion-related stimuli, Roth et al. (in press) showed that, after having seen a fear-eliciting movie, individuals high in emotional integration were more likely to make use of self-referenced words, to make use of causal language and to write in the past tense, all indicative of a more open and full processing of the emotional event. In contrast, individuals high in suppressive regulation made use of fewer self-referenced and past tense wording, while at the same time using less negative emotional words, all indicative of the avoidance and lack of processing of the negative event.

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This capacity for integrative emotion regulation of one's fear and sadness has also been found to promote a greater ability to support a romantic partner's difficulties in handling negative emotions (Roth & Assor, 2012). In contrast, suppressive regulation or dysregulation of fear and sadness was found to compromise individuals' capacity for intimacy. Individuals who tended to suppress fears and sadness reported more difficulties in disclosing negative emotions vis-à-vis their romantic partner, as well as feeling less capable of providing emotional support to their partner. Individuals who tended toward emotion dysregulation equally reported being less able to support their partner emotionally, presumably because they were so overwhelmed by their own negative emotions. Brenning, Soenens, Van Petegem, and Vansteenkiste (in press) further showed that self-esteem is affected by emotion regulation. They reported that increases in integrative regulation covaried with increases in self-esteem among young adolescents over a one-year interval. In contrast, increased use of suppressive regulation predicted increases in depressive symptoms.

Autonomy as an Antecedent of Emotional Integration

A number of studies have examined whether greater autonomy would be associated with more effective emotion regulation, and better long-term coping with negative events. For instance, Weinstein and Hodgins (2009) had participants view an emotionally distressing movie twice, at least a day apart. The film was a graphic Hiroshima–Nagasaki documentary that was challenging to assimilate. In an initial study they showed that participants with greater trait autonomy, when given an opportunity to express emotional reactions, later had more positive well-being, energy, and memory after the second viewing. In a second study they created situational motivation by priming autonomy and control. Results showed that dispositionally controlled individuals received the same benefits as autonomous individuals, but only when primed with autonomy and encouraged to express emotions. Weinstein and Hodgins (2009) coded the contents of the emotion expressions and found that the positive outcomes associated with autonomy were mediated by nondefensive processing, as reflected in varied indices such as more self-referencing, more words reflecting internal cognitive processes, and lower use of concrete words. In short, their results suggest that autonomy facilitates ownership and expression of feelings, enhancing emotional integration over time.

Koestner, Bernieri, and Zuckerman (1992) explored the relation of autonomy to the integration and synchrony

of emotions, cognitions, and behavior. They separated participants into a more autonomy-oriented group and a more control-oriented one (Deci & Ryan, 1985a) and then explored the consistency of behaviors, attitudes, and traits within each of these two groups. In the first of two experiments, they found high correlations between behavioral persistence and self-reports of intrinsic interest within the autonomy-oriented group, but no significant correlations within the control-oriented group, suggesting less congruence in the latter. In a second study, Koestner et al. (1992) had participants complete a measure of conscientiousness, and then gave them an opportunity to behave conscientiously in succeeding days. Participants' self-reported conscientiousness and their actual conscientious behaviors were significantly more highly correlated within the autonomous group than the controlled group. Self-ratings and peer ratings of conscientiousness were also more highly correlated for the autonomy oriented. Together these studies provide support for the proposition that autonomy is associated with greater congruence among traits, behaviors, and feelings, reflecting greater integration in personality functioning.

Related to the issue of emotion regulation and integration is that of people's *open* versus *defensive* functioning. Openness versus defense can be manifest in various ways, but in social interactions it entails being honest, transparent, trusting and receptive, whereas defense in contrast entails concealment, distrust, and often self-distortion of experience (Hodgins & Knee, 2002). Investigating openness versus defensiveness using a diary methodology, Hodgins et al. (1996) found that people with a more autonomous orientation evidenced more disclosure, trust in others, and honesty in their daily interpersonal interactions, whereas those with a controlled orientation showed lower honesty and openness.

Another indicator of openness versus defensiveness concerns the alignment or *congruence* between implicit and explicit attitudes and motives. Thrash and Elliot (2002) found that persons higher in trait autonomy had lower discrepancies between implicit (projective) and explicit (self-report) assessments of achievement motivation. Hodgins, Brown, and Carver (2007) found that control-primed individuals evidenced greater discrepancies between explicit and implicit self-esteem. Weinstein, Ryan, and colleagues (2012) found that children of controlling parents showed a greater discrepancy between their implicitly assessed sexual attractions to same sex others and their self-reports of sexual orientation. This discrepancy, in turn, related to greater hostility toward gay targets, indicative of *reaction formation* (Freud, 1966). In other words,

parental autonomy thwarting can foster incongruence, and the defensive behaviors it spawns. Indeed, the mere priming of a controlled orientation has been sufficient to elicit defensive responding, as indexed by the use of hostile humor (Weinstein, Hodgins, & Ostvik-White, 2011), the avoidance of negative experiences (Hodgins, Yacko, & Gottlieb, 2006), or avoidance of emotionally distressing information (Weinstein, Deci, et al., 2011; Weinstein & Hodgins, 2009). Across these studies of emotional integration and congruence it seems clear that controlled people show less integrity, whereas autonomy is conducive to more integration in both attitudes and less defensive and more open functioning.

Social Contexts: Developing Emotional Integration

The development of capacities to regulate and integrate emotions in flexible and autonomous ways is assumed within SDT to be supported by responsive, need supportive caregivers. Grolnick, Bridges, and Connell (1996) explored this with 12- to 32-month-old children. They observed toddlers in two stressful situations: waiting to play with an attractive toy (or to eat a food) and having a brief separation from mother. The children's emotionality (upset) and strategies to regulate this upset were coded. Results supported an autonomy continuum in that the more autonomous strategies were associated with the least upset, whereas the more controlled or passive strategies were associated with the most upset. Further, there were increases with age in the use of autonomous, proactive strategies, indicating development of emotion regulation through these toddler years.

As noted, the regulation of emotions and impulses can be done in a fairly controlling way. Some children, when in a negatively arousing situation such as being asked to delay gratification, exert great effort, forcing themselves to push emotions out of their minds. But controlling themselves in this way requires attention and energy, which can diminish the capacity for adaptive engagement with the environment. When used as a chronic way to deal with distress, it leads children to experience being controlled by their own harsh thoughts and to display nonadaptive engagement. In contrast, other children in the same stressful settings may be more flexible (i.e., less rigid and pressured) in dealing with the situation, for example by doing alternative activities or expressing their disappointment or frustration, signifying that they have developed more adaptive capacities for both accessing and regulating emotion.

This developing capacity for emotional regulation is not just a function of time and maturation. In fact, it is very much an *interpersonal* process. It is in the

interpersonal realm, within which caregivers regulate children's expressed emotions more or less responsively and effectively, that children learn to regulate their own emotions. Autonomy-supportive interpersonal contexts are theorized within SDT to afford access to and expression of emotional experience, and to facilitate more reflective engagement and executive guidance of subsequent behavioral regulation (Grolnick et al., 1996; Gross & John, 2002). Calkins and Johnson (1998) found evidence for this in demonstrating that mothers' use of positive guidance (akin to an autonomy-support approach) was associated with greater use of distraction and constructive coping in emotion inducing situations. On the other hand, children of mothers who used high levels of negative control during free play spent more time orienting to a desired but forbidden stimulus. They used less self-distraction and were less physiologically well regulated during a waiting situation relative to those of mothers who used less negative control.

Grolnick, Kurowski, McMenamy, Rivkin, and Bridges (1998) also examined strategies mothers use to help their young children regulate distress. Children of mothers who maintained their active assistance beyond what the children needed were less able to regulate their distress when on their own. Thus, while responsiveness to distress was important, parents who took responsibility for regulating children's distress and did not allow the children opportunities to self-regulate appeared to undermine children's self-regulatory capacities. Because the capacity to effectively modulate distress is so integral to mental health and the prevention of psychopathology, an environment supporting this capacity is of crucial importance.

More recently, Roth, Assor, et al. (2009) showed in a sample of ninth-grade adolescents that parents who made use of conditional regard when adolescents expressed negative emotions (e.g., showing less acceptance and positive regard) had children who more frequently engaged in *suppressive regulation* of emotions, reported greater dysregulation of emotions and more resentment vis-à-vis the parents. In contrast, both mother and father autonomy support related to children showing greater *integrative regulation* of negative emotions. These adolescents allowed their emotions to be more fully experienced and could then, with a greater sense of choice, decide whether and how to express them. Along similar lines, Roth, Ron, and Benita (2009) showed that parents' use of conditional regard related to reduced disclosure of difficulties at school among 14–16-year-old teenagers. Presumably, with contingently regarding parents, children tend to keep the encountered problems for themselves rather than opening up, as they anticipate critical reactions from their

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mothers. A longitudinal study of adolescents by Brenning et al. (in press) further supported these associations. They found that parental autonomy support predicted increases in emotional integration and decreases in suppressive emotion regulation, whereas higher levels of emotional dysregulation were related to lower perception of parental autonomy support.

Further, Roth and Assor (2010) showed that the costs of a controlling parenting approach are apparent by the ages of five or six. Parents reported the degree to which they used both conditional regard with their children to socialize them regarding regulation of sad emotions. These parent reports were then related to various assessments of their children's emotional skills. Results indicated that parental use of conditional regard was related to children being less aware of sad feelings in themselves, less able to recognize sad feelings in other children, and less empathic in responding to other children who felt sad.

Although parents' display of contingent regard for showing negative emotions may lead them to suppress their negative emotions, it is also often the case that some parents may pressure their children to express (rather than withhold) negative emotions (Roth & Assor, 2012). Although such a practice may seem benign at first sight because negative emotions get shared, the pressure to share negative emotions to gain parental appreciation may come at the cost of adequate emotion regulation. Consistent with this, late adolescents experiencing conditional regard to express negative emotions reported more emotional dysregulation, which hampered their capacity for intimate relations with romantic partners. In contrast, an autonomy-supportive approach was related to more integrative emotion regulation.

Summary

Developing the capacities for respecting others and delaying gratification represents a central agenda from toddlerhood through adulthood; it involves learning when and how it is reasonable and appropriate to express one's feelings and being able to use that information in a way that enhances the autonomous regulation of behavior. Thus, emotional regulation entails children internalizing caregiver-provided values and regulatory structures to manage their internal urges—a process that, similar to the internalization of behavioral regulations for uninteresting tasks, is facilitated by supports for the children's basic psychological needs. Although differences in autonomous functioning contribute to a greater congruence between felt emotions, held thoughts, and enacted behaviors, differences in contextual need support also played a role.

Previous studies suggest that controlling parental practices regarding emotions, whether involving pressure to keep negative emotions to oneself or to express them before one is ready to do so, come with costs. In contrast, need-supportive parents respect the children's rhythm and pace of expressing emotions, displaying an active interest and concern with what is emotionally salient for them. They also set appropriate limits on behavior while allowing adequate expression of feelings. This facilitates the children's attunement to the social world, and acceptance of self in the process of adapting to it.

Identity Formation

An SDT View of Identity and Self

Identity formation is among the most formidable of developmental challenges (Kroger & Marcia, 2011; Soenens & Vansteenkiste, 2011). This is especially so in modern cultures within which apparent options for identities are greater than ever before and in which there are fewer of the explicit vertical constraints that have historically channeled people into preordained roles and identities (Ryan & Deci, 2011). For many scholars this fluidity and opportunity for choice represents a potential for persons to be better matched in their life roles with their interests and sensibilities (see Appiah, 2005), whereas other scholars emphasize the psychological burdens that such latitude and choice present to developing individuals (e.g., Schwartz, 2000). Both positions have substantial evidence in their favor.

Identities are self-representations—they are what and who people understand and describe themselves to be. Once adopted, maintaining and defending identities can be a strong motivator of behaviors, and can orient people's learning, behaviors, and friendships (Vallerand, 2010). Different types of identities can be distinguished (Vignoles, Schwartz, & Luyckx, 2011), with some being more personal (e.g., personal interests), others being social in nature (e.g., roles), and still others being collective in nature, thereby reflecting the groups and institutions with which we are affiliated, and supplying varied venues through which people can be recognized and valued.

Particularly during adolescent and young adult years, a challenging task is to form a meaningful identity that will serve to organize and guide an adult life. This is a period when people are particularly vulnerable to external forces. With the emergence of adolescent egocentrism and self-consciousness (Elkind, 1967), teens tend to see themselves in ways they imagine others see them, and they show a greater tendency to conform in an effort to be accepted by others. Thus, as they are attempting to formulate a sense

of their own identity, they are also struggling with real or imagined social pressures from many sources including, not only peers but also parents, teachers, role models, and advertisers. As adolescents develop they must work to explore, try on, and accept or reject possible identities, sometimes painfully. During this process, pressures from parents and other socializers can detract the young people from smooth identity formation insofar as the offered identities are incongruent with their developing and abiding interests and sensibilities. Indeed, all people, but perhaps especially adolescents, are today exposed to the wide reach of media, which attempts to orient them toward particular types of identities and affiliations (Dittmar, 2011; Kasser, 2002). Advertisers work to have people define themselves in terms of the brands they purchase and the media cultures they engage.

Central to the process of forming identities is people's inherent desire to experience solid connectedness to individuals, groups, or cultures. By accepting the values, mores, missions, attitudes, and behaviors of others, people do not feel alone. Rather, they feel part of a group, experiencing a sense of relatedness to others and a place in the social order (Baumeister & Leary, 1995; Ryan, 1993). Further, identities can also support the need for competence. Often people orient toward identities—perhaps being a painter or physicist, for example—that require skill acquisition, offer optimal challenges, and allow them to feel effective. Finally, the formation of identities can fulfill people's need for autonomy if they engage the relevant activities with a sense of choice and as an expression of their own values and interests. In short, people tend to gravitate toward those identities that allow maximal satisfaction of their basic psychological needs (Luyckx, Vansteenkiste, Duriez, & Goossens, 2009).

Need satisfaction then serves as the energetic basis for anchoring identities within one's sense of self. Thus, although the terms *identity* and *self* are often used interchangeably in the identity literature, they get clearly differentiated within the SDT perspective. That is, although we have multiple identities, each is more or less internalized and integrated within the self (Soenens & Vansteenkiste, 2011; Ryan & Deci, 2011).

Anchoring Identities Within the Self

SDT suggests that there are two interrelated means through which identities form and become integrated to different degrees within people's self-functioning: (1) through the discovery and differentiation of intrinsic interests and talents; and (2) through the internalization of values and self-representations.

People manifest individual differences in their competencies, interests, and inclinations. Some children seem inclined toward music, others toward physical activity. The forms that such inclinations take in people's lives is a function of their interactions with the social world, but having the inclinations—for music, or sports, for example—does increase the likelihood that related activities will become important parts of identity (Deci & Ryan, 1985b). Their inclinations lead them to explore different options and, over time, to gravitate toward others with similar interests, such that the activities, values, and relationships associated with those interests become central aspects of their lives and come to define who they are. They also are likely to experience greater competence, further enhancing their interests in the activities. In other words, people are fortunate when they adopt identities that engage intrinsic motivation (Krapp, 2002).

Still, for identities to develop out of intrinsic interests often requires both enduring affordances and social supports. A child who is naturally inclined to be physically active but who has no access or opportunities to play sports might not develop an identity as an athlete. In short, the development of an identity depends to some extent on the cultural affordances available to the person (Erikson, 1994). Further, to form an identity as an athlete will require the experience of need supports in relation to the engagement of sport activities. Supports for autonomy, competence development, and relatedness in sport will be critical in facilitating identity formation as an athlete. This is the same for identities in every domain, whether it be academic, religious, family, or career related.

Few identities are sustained solely out of intrinsic interests. Instead most are taken on or elaborated through processes of internalization. Importantly, however, much like behavioral regulations, identities can differ in the degree to which they are integrated with the self. When identities are adopted within the context of pressure and control, it is likely that they will be introjected. That is, people will take them on as “shoulds”, or as identities they must enact, which essentially means that they will be identity deficits. Often in college settings, for example, there are individuals who identify as pre-med because they have always been told they will be a doctor, regardless of their interests or predilections. In fact, the students' sense of worth and esteem may depend heavily on the enactment of such an introjected identity, leading to a defensive adherence to identity and inner conflict when failing to engage in identity-consistent behaviors. Nonetheless, for identities to be not just adopted, but also autonomously engaged, the individuals will need to integrate the identities with

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their other available identities, values, beliefs, behaviors, and interests, which will allow them to be both authentic and vital in their pursuit.

Soenens, Berzonsky, Dunkel, Papini, and Vansteenkiste (2011) assessed late adolescents' identity commitments, and their autonomous and controlled motives for committing to particular identities. Even after controlling for the strength of identity commitments per se, those commitments that were autonomously motivated were associated with more positive adjustment, whereas controlled identity commitments were predictive of poorer adjustment. Thus, although adolescents could commit themselves to particular self-representations (e.g., musician, basketball player), such commitments must be accepted and integrated to ensure adjustment.

Fostering Identity Development: The Role of Need Support

Given that identities may involve intrinsic motivation, and may be anchored by either introjected or more integrated regulations, it becomes clear how a need-supportive environment is important in the process of identity formation (Soenens & Vansteenkiste, 2011). As Assor (2012) pointed out, parents vary in the extent to which they foster inner valuing and allow adolescents to explore different interests and values, thereby nurturing self-discovery. To the extent such need supportive practices are provided, children and teenagers are more likely to develop an *inner compass* when making critical identity-related decisions. In contrast, finding life roles and self-definitions that are congruent with interests and integrated values is more difficult in controlling contexts. Consistent with this, Luyckx, Soenens, Vansteenkiste, Goossens, and Berzonsky (2007) showed that college students who perceived their parents as using psychologically controlling strategies were more inhibited in making identity-related decisions and in truly endorsing and identifying with the identity decisions being made.

Importantly, the development of an integrated set of regulations is presumed to be critical for subsequent need satisfaction, such that a positive spiral would develop. Evidence for such a model was obtained in longitudinal research on high school and college students by Luyckx et al. (2009), who focused on the extent of exploration, commitment, and ruminative thought these students displayed with regard to the directions and identities they were adopting. Results showed that satisfaction of SDT's basic psychological needs was in general positively related to making and identifying with particular identities, and to enhanced breadth and depth of identity explorations. Those with less consolidated identity commitments and those associated with more rumination had lower basic need satisfaction.

Moreover, cross-lagged analyses provided evidence for reciprocal relations—need satisfaction both facilitated more positive identity formation, and more positive identity formation facilitated greater need satisfaction.

Although there are clear advantages to integrating identities, some identities are socially stigmatized, and some may conflict with other identities or roles to which a person aspires. Such identities often remain poorly integrated. These identifications can be resisted, or remain relatively isolated or compartmentalized, as opposed to being integrated with other identities, needs, and value attachments of the self (Ryan & Deci, 2011). For instance, suppose in his political considerations a man identifies with an ideology that is oppressive to certain minorities, and yet in his religious considerations he endorses being a generous and loving human being. Both might be values that he deems important, but their inconsistency requires that he keep them compartmentalized. Advocating harm to others might catalyze guilt or uncertainty when he is in his more religious identity. Yet integrating these might require change in one or both identities, and the psychological threat or loss of relatedness that might accompany such change.

The more autonomy supportive one's social context, the more easily the person can integrate identities and self-characteristics. For example Weinstein, Deci, et al. (2011) examined how autonomous versus controlled motivation, operationalized through either individual differences or the semantic priming of autonomy versus control, facilitates or inhibits the integration of positive and negative past identities. Results of their studies showed that more autonomously motivated participants felt closer to, and were more accepting of, both negative and positive past characteristics and identities, whereas more control-motivated participants were closer to and more accepting of only their positive, but not negative identities and characteristics. Moreover, defensive processes, as reflected in the use of nonpersonal pronouns and stronger escape motives, mediated these effects, indicating that lower defensiveness allowed fuller integration of negative identities. Finally, results demonstrated that when participants did more fully integrate both positive and negative past identities, they exhibited greater vitality and sense of meaning.

Toward Qualitatively Different Types of Identities

Finding identities that are need satisfying is often a struggle, as many social contexts pressure individuals to adopt identities that may or may not befit their interests or talents. Social contexts also can reject or demean other identities and roles. Thus, identities can be adopted for

controlled reasons, with the predicted negative outcomes for both well-being and persistence.

Identities can also be motivated as a response to need thwarting. SDT argues that, when needs are strongly thwarted in development, persons may adopt need substitutes referred to as *extrinsic aspirations*, such as those involving the pursuit of materialism, an appealing outer image, or ideas of fame and popularity (Kasser & Ryan, 1996). These identity pursuits often serve a defensive function, blocking feelings of vulnerability, and often are pursued to compensate for a lack of support and acceptance from others during development. In line with this, Kasser, Ryan, Sameroff, and Zax (1996) predicted that identities focused on materialistic life goals might be associated with (and compensating for) experiences of autonomy and relatedness thwarting from caregivers. Using a longitudinal dataset, they showed that adolescents whose mothers were less warm and autonomy supportive when the children were 14 years old were more materialistic at age 18.

Adolescents who experience need thwarting may be especially vulnerable to extrinsic ideals promoted within the media and advertising, which often suggest that the pursuit of extrinsic ideals will yield the confidence, love, or self-esteem such teens do not feel. For example, women high in autonomy frustration may be more susceptible to ambient extrinsic ideals for thinness and self-objectification. Mask and Blanchard (2011) examined this by having individuals differing in general levels of autonomy watch and react to a video depicting the thin ideal. After watching the video, women low in autonomy reported greater pressure to be thin, more dissatisfaction with their bodies, and increased concern with the quantity of food they ate. In contrast, women high in autonomy became more concerned with the quality of the food they ate, but they did not feel increased pressure or self-dissatisfaction (see also Pelletier, Dion, & Levesque, 2004). Thus, to the extent adolescents have built up a stronger inner foundation, they can rely on it to more autonomously decide how to handle identity pressures, which suggests that autonomy is an important factor in resilience.

Summary

We have discussed how the formation of identities and self-representations that are well internalized and integrated represents a major challenge for contemporary adolescents. Research suggests that without sufficient contextual need support, adolescents' development of a strong inner compass (Assor, 2012), and the adoption of identities truly grounded in their emerging interests and personally held values, may be forestalled.

AUTONOMY DISTURBANCES IN DEVELOPMENT AND PSYCHOPATHOLOGY

Need Frustration and Psychopathology

The development of the self proceeds most optimally in social contexts where children experience ongoing supports for their basic psychological needs. When needs are supported in domains and activities appropriate to their developmental-level children display increasing amounts of autonomy. The situational and cumulative effects of support for psychological needs are expected to yield inner resources in the developing persons that further contribute to subsequent wellness and adaptation. Yet often development does not proceed optimally, especially when social contexts thwart the children's basic needs and in doing so amplify vulnerabilities and potentiate psychopathology.

Many forms of psychopathology entail *impairments of autonomy*, as failures in organismic integration and in the development of self contribute to a range of dysfunctions. From the perspective of SDT, explicating autonomy impairments involves a consideration of the interplay between the psychological needs for autonomy, competence, and relatedness that support the developmental processes of attachment, intrinsic motivation, internalization, emotional regulation, and identity formation, and the social contexts, such as parent or institutional behaviors, that either support or thwart the satisfaction of these basic psychological needs. In what follows we focus on specific types of disorders, both in terms of a theoretical account of autonomy impairments and a review of relevant research. Specifically we discuss three general categories of psychopathology, all of which involve serious autonomy disturbances but each of which has particular forms of autonomy impairments, leading to one of the categories of pathology, as is graphically illustrated in Figure 9.2.

First, we consider disorders in which *internally controlling regulation* of behavior predominates. These are disorders that, despite their many differences, are characterized by the salience of introjection or rigid internalizations and the associated feelings of anxiety, self-criticism, and threat. We especially focus on obsessive-compulsive disorders, paranoid personality, self-critical depression, and controlled eating disorders (i.e., anorexia and bulimia).

A second type of autonomy disturbance concerns *impairments in internalization* of social values and regulations, characterized by difficulties in the self-regulation of behavior. To illustrate these types of autonomy disturbance, we discuss problems of impulsivity and aggression, including oppositional defiance, conduct, and antisocial

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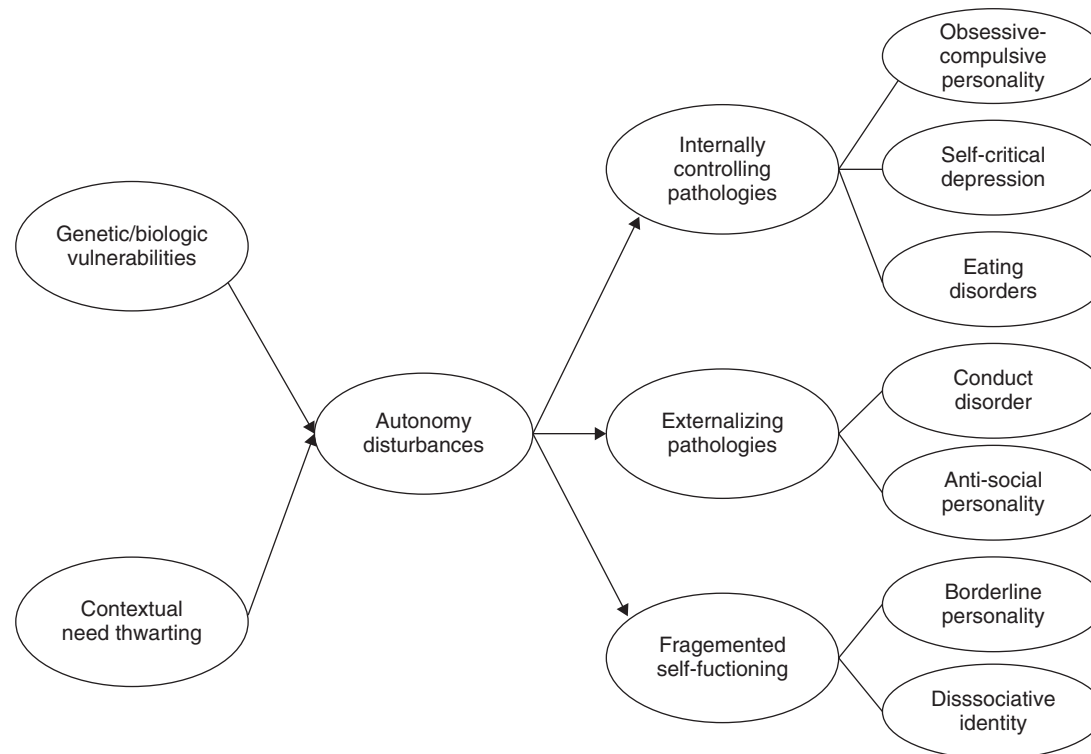


Figure 9.2 Graphic overview of selected psychopathologies reflecting autonomy disturbances.

personality disorders. A third category of autonomy disturbances we discuss are disorders associated with more severe thwarting of psychological needs in development, namely disorders associated with *fragmented self-functioning*. Here we focus especially on persons with borderline personality disorder and dissociative identity disorders, and on the integrative difficulties posed by controlling, inconsistent and intrusive others who thwart basic psychological needs and damage self-development.

In discussing each of these types of autonomy disturbance we address the experience of autonomy within each, and discuss factors relating to the social contexts of development that may contribute to impairments in autonomy and integration. Although it is the case that any factor that disrupts the organizational tendency, whether biological, interpersonal, or cultural in nature, can potentiate disturbances of autonomy, in many cases the sources of disrupted autonomy can be strongly related to deficiencies in the social environment—that is, to its failure to provide appropriate autonomy support, structure, or involvement (Ryan & Deci, 2000b; Vansteenkiste & Ryan, 2013). Yet even in those cases where the causes of the disorder do not lie in need thwarting contexts, the symptoms associated with such impairments can themselves interfere with autonomous functioning, and are

often experienced as not under volitional control. In short, we discuss autonomy issues both as both an etiological factor and as a symptomatic factor, in varied forms of psychopathology.

Disorders Involving Introjection and Internally Controlling States

There are rich and variegated literatures concerning internalizing disorders, in which a person is beset with internal pressures, judgments, compulsions, and other self-directed mandates to act. These disorders, associated with both anxiety and depression, centrally involve a lack of autonomy and volition, as often motivations to act are highly controlled and even coercive. This literature also indicates that caregiver styles characterized by a lack of autonomy support and the presence of controlling or authoritarian strategies contribute to *internalizing disorders*, especially in vulnerable children (e.g., Bayer, Sanson, & Hemphill, 2006; Muhtadie, Zhou, Eisenberg, & Wang, 2013). What SDT's perspective adds to this literature is a rich body of findings concerning how controlling environments foster the development of internally controlling regulations—that is, how such conditions lead to regulation through *introjects* (Deci & Ryan, 1995; Ryan & Deci, 2008).

Introjects are understood within SDT as motivations characterized by internal pressure, enforced by contingent self-worth. Introjection involves an ongoing salience of strict internalized demands. Such demands and standards are introjected in the sense that one's motivation is based largely on internalized self-related emotions and appraisals. In introjection people adopt external standards as their own and determine self-worth based on whether they meet them, without making the standards a part of their integrated sense of self. Often the process of introjection entails a type of *self-deception* in which the people think they want what the authority originally prescribed (e.g., Weinstein, Ryan, et al., 2012). This is akin to what Winnicott (1960/1965) referred to as *false self*, in which cognitive functions gradually lose their grounding in organismic processes. Yet heteronomy is phenomenally manifest in the pressured, have-to nature of experience, backed by threat of anxiety and self-criticism that drives much of the person's behavior. Introjects can indeed be highly motivating, and represent the core driving forces in people's lives. Thus, even when not formally diagnosed, the dynamics of introjection can catalyze significant inner distress. In addition, when rigid, punitive, or overly pervasive, they can be highly dysfunctional. This is particularly true for persons who are diagnosed as having an internalizing disorder.

Although, as we shall stress, the etiology, presentation, and course of internalizing disorders are complex and multidetermined, evidence that caregiver styles can contribute to such problems is also relatively clear. For example, consider that factors such as loss of parents (and thus of attachment supports), depression in parents (and thus low involvement or autonomy support), and excessive parental control (thus thwarting autonomy needs) have all been implicated in the development of childhood depression and self-critical styles (Ryan et al., 2006). SDT more specifically relates the formation of introjects to the thwarting of autonomy and relatedness needs, a process central to a variety of clinical presentations (Ryan et al., 2006). Thus, we look at parental thwarting of autonomy and relatedness as factors in internally controlling disorders.

The Obsessive-Compulsive Disorders

Two separable diagnoses carry the rubric of obsession and compulsion: obsessive-compulsive disorder (OCD) and obsessive-compulsive personality (OCP). These distinct entities share some common features in the dynamics of behavior regulation, but they also differ in meaningful ways.

OCD is characterized by the experience of intrusive thoughts and demands that typically can be alleviated only by engaging in ritualistic, rigid behavior. The thoughts are often ego-dystonic, in that they are unwelcome and anxiety provoking, and thus such thoughts are experienced as having an origin outside the self. Indeed, these thoughts often are inconsistent with the person's conscious values and ideals. An example is an OCD-diagnosed woman who reported continual intrusive thoughts concerning hurting her baby whenever she was near certain objects. These intrusive thoughts raised considerable anxiety precisely because they ran against her strongly held desire to keep her child safe. To alleviate this anxiety she was compelled to check continuously for dangerous objects in her vicinity. OCD is classified as an anxiety disorder precisely because obsessions and rituals often have the function of regulating anxiety, albeit usually with only temporary success.

An important feature of the dissonant thoughts often found in OCD is that they are persistent, unwanted, and difficult to control. From the perspective of the individual the unwanted thoughts befall him or her and are not autonomous or volitional. The person then feels coerced or compelled into ritualistic behaviors; he or she must do them or face dreadful anxiety. The actions that alleviate obsessional thoughts therefore have an external perceived locus of causality. As an aspect of this external causality, compulsive behavior patterns typically are performed under strict constraints—there is an inner demand to engage in actions in rigidly prescribed ways. These orders are experienced as heteronomous, albeit within the person. The cost of failure is guilt, anxiety, and self-disparagement, and in other cases a sense of panic and fragmentation of the self. The regulatory process of compulsive acts is thus accompanied by a sense of inner pressure that we would describe as internally controlling. That is OCD has the regulatory form of introjection, even though it may not always have social roots.

Like OCD, OCP is characterized by living in a very structured and orderly way, which can have both positive and negative consequences depending on how severe it is. In less severe cases, the regulation of behavior is still introjected and thus has the negative psychological consequences associated with introjection. Nonetheless, the order that is manifest from mild OCP can have adaptive aspects, for example in getting homework done or organizing possessions in orderly ways. Yet OCP is often more severe and compromising, with debilitating pressure and anxiety, and behaviors that are rigid and extreme. For example, people's collecting which is likely to be based in mild OCP is likely to become hoarding when the pathology becomes more serious, and their organizing may become

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intensely rigid with threats of self-disparagement and self-punishment hanging over their heads to keep them in line.

Unlike OCD, there appears to be a less robust biological contribution to OCP, even though there are some common symptom dynamics. Supporting the differential role of biology, results by Jenike as early as 1991 found responsiveness among OCD patients to pharmacological interventions, but not among those with OCP. Also OCP, in contrast to OCD, is more a lifestyle than a symptom, and in many ways OCP can be viewed as a continuum from a somewhat rigidly focused set of attitudes to a disorder that interferes with ongoing functioning. Accordingly, many features of this controlled lifestyle are ego-syntonic rather than disturbing (Sperry, 2003). For example, individuals with OCP who organize their possessions and become distraught when things get moved or misplaced might go into treatment not because they view the orderliness as problematic, but because their pattern of living, which seems fine to them is causing interpersonal or vocational difficulties. In addition, as reported by Othmer and Othmer (2002), persons with OCP often display their characteristic drivenness, compulsiveness, and inflexibility when events involving authority, intimacy, or lack of structure trigger them. Nonetheless, the surface structure of these behaviors share similarities with the controlled behaviors so often manifest in OCD.

The internally controlling nature of regulation in OCP can, in some instances, be highly stable and self-sustaining, in part because it can come with ongoing external approval and derivative internal gratifications. For example, Assor and Tal (2012) examined adolescents' perceptions of their mother's use of parental conditional positive regard (PCPR) to motivate them to academically achieve. Those teens whose mothers applied contingent positive regard evidenced more self-aggrandizement following successes yet greater self-devaluation and shame following failures. This hypersensitivity to outcomes in turn predicted compulsive over-investment and maladaptive self-feelings, even when controlling for the effects of conditional negative regard. Thus, it appears that the experience of maternal conditional positive regard to promote school achievement leads to self-esteem dynamics in which the adolescents vacillate between feelings of grandiosity following success and self-derogation and shame following failure, representing significant emotional costs. These general population findings are reminiscent of the distress many OCP patients vividly describe.

It is particularly clear with OCP that the pathology of obsessive-compulsive actions is not always defined by the behavior itself, because as noted the behavior can be

effective and functional. Rather, it is the rigid regulatory processes underlying behavior that are dysfunctional. Persons with OCP, while not acutely afflicted with intrusive thoughts sometimes befalling those with OCD, are often inordinately concerned with carrying out the actual or presumed demands of authority. For example, a person with this personality style can be quite industrious and fastidious in complying with introjected demands, and this may yield high activity and even productivity. However, rigidly controlled workaholics, who are likely to have OCP, tend to evidence a range of ill-being consequences (Van den Broeck et al., 2011). Clearly, the industriousness and rigidity of people with OCP is quite different from the vitality and spontaneity that characterizes autonomously functioning individuals, even ones who work excessively. Ryan and Deci (2008) argued that vitality concerns the free energy a person has at his or her disposal. The internally controlled regulation of an individual with OCP is often experienced as energy draining and without joy. As Sperry (2003) noted, the demeanor of someone with OCP can be "grim and cheerless" (p. 178). Moreover, resistance to inner dictates, when possible, may feel like a gargantuan effort.

There is an interesting point about OCP that highlights an important aspect of its disturbed autonomy. Although obsessive-compulsive individuals often act with determination in carrying out introjected dictates, they also sometimes display confusion and indecision. The problem especially arises when there is no dictate, no established course to follow—that is, when there is uncertainty and one needs to fall back on inner guidance. At such times, the people may be rocked with indecisiveness and ambivalence. This illustrates clearly how dependence on controlling regulations, being unintegrated, leaves one without self-direction. The anxiety of indecision highlights how the seeming determination behind many obsessive-compulsive acts is not autonomous; there is no inner compass to rely on when external direction is lacking.

Although the obsessive-compulsive disorders represent clear instances of psychopathology with disturbed autonomy, it is not clear, nor theoretically necessary that they are exclusively *outcomes* of parental control. Evidence has, in fact, been compelling for robust biologic contributions to OCD, whereas parental factors appear to play a larger role in the development of OCP. Indeed, case literatures concerning OCP have more frequently pointed toward controlling, often intrusive parenting (e.g., Millon, Davis, Millon, Escovar, & Meaghan, 2000). Benjamin (2003) suggested that persons with OCP often come from demanding, even coercive parenting environments. Moreover she argued that the controlling emphasis is more often

on punishment for failures than on acknowledgement for success. Yet, here too, systematic investigation of the social context of development of OCP individuals is not extensive. It does appear, however, that the controlling regulatory styles of those with OCP are more likely to be linked with excessive parental controllingness than is the case for OCD.

***Introjection and Self-Disparagement:
Self-Critical Depression***

At the core of a number of pathologies are introjected demands that organize intentional behavior. Although this type of autonomy disturbance involves conflict and tension, individuals with rigid character are often able to behave intentionally and satisfy their introjects. There are other types of introjected demands, however, that individuals cannot easily attain, and these invariably result in experienced failure and self-disparagement. These forms of disturbed autonomy, like those of rigid character, begin with individuals' introjecting the demands of authorities and basing their self-worth on living up to those demands. But here, the pathology and experience are quite different, for the individuals' predominant experience is failure and worthlessness. Thus, not only is their autonomy undermined by introjects and the social conditions that instilled them, but they also feel incompetent and unloved by significant others. Two such pathologies of introjection are self-critical depression and eating disorders. We focused first on self-critical depression.

Research on depression and its etiology has increasingly pointed toward two distinct pathways to the disorder, each of which can build on biological vulnerabilities (Luyten & Blatt, 2013). The first is concerned primarily with internalization of excessive demands for achievement and is characterized by harsh self-criticism and guilt, and the second is concerned more with the loss of relatedness, love, or attachment. Although both of these vulnerabilities involve self-esteem dynamics, and issues of autonomy and relatedness are intertwined in both, the former, self-critical form of depression is particularly relevant to our discussion of autonomy disturbances, internalization, and internally controlling regulation. We thus focus on the self-critical depression syndrome, which has been labeled variously as a disorder of achievement-autonomy (Neitzel & Harris, 1990), introjection (Blatt, 1974), and autonomy (Beck, 1983).

By whatever label, this syndrome involves a type of disturbed autonomy in which people experience dysphoric affect and lethargy resulting from the belief that they are failures. In this disorder there are rigid standards or

ideals that have been introjected, along with the belief that failure to attain them means they are unlovable and unworthy. Thus, the punitive introjects, with their ties to contingent self-worth, leave people vulnerable to ongoing self-scrutiny. Because with such introjects there is little individuals can do that is good enough, they will invariably experience a sense of worthlessness. In other words, self-disparagement tends to be ubiquitous. Individuals with such introjects are harsher in their self-judgments than in their judgments of others, and these self-judgments often form the precursors to depressive episodes (Beck, 1983). Their harsh self-judgments may even manifest outwardly, through engagement in nonsuicidal self-injurious behaviors, which reflect the scars of the inner critic (Claes, Soenens, Vansteenkiste, & Vandereycken, 2012). Accordingly it is hardly surprising that adolescent depression and low self-esteem are associated with low autonomy (e.g., Noom, Dekovic, & Meeus, 1999).

The phenomenological functioning underlying *self-critical perfectionism* is particularly relevant to the understanding of depression as involving disturbed autonomy. With respect to significant self-goals people see themselves as responsible yet as incapable. Thus, the absence of felt competence to attain internalized goals results in a sense of amotivation (Deci & Ryan, 1985a). At the same time many of the specific demands on the self to achieve or succeed have the character of *have-to* and *must* revealing their phenomenological character as having an external perceived locus of causality (i.e., as being heteronomous with respect to the self). Consistent with such an analysis, self-critical perfectionism has been found to be associated with more controlled functioning (e.g., Miquelon, Vallerand, Grouzet, & Cardinal, 2005) and increased psychological need frustration over time (Boone, Vansteenkiste, Van der Kaap-Deeder, Soenens, & Verstuyf, 2014).

There has been recent interest in the development of perfectionism, a characteristic related to self-critical depression. In line with our argument that such internally controlling characteristics reflect disturbed autonomy, evidence suggests that individuals with high levels of self-critical perfectionism frequently report having experienced harsh and authoritarian parenting (see, e.g., Flett, Hewitt, & Singer, 1995; Frost, Novara, & Rheume, 2002; Kawamura, Frost, & Harmatz, 2002). For example, Enns, Cox, and Clara (2002) found support for a model in which harsh parenting led to maladaptive perfectionism, which in turn was associated with an increased proneness to depression.

Such findings suggest perfectionism as a pathway through which controlling environments might increase

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depressive symptoms. Consistent with this, investigations of the backgrounds of self-critical depressives point to controlling parental styles. In one illustrative investigation, McCranie and Bass (1984) found that women high in self-critical depression had parents who maintained strict control, demanded high achievement, and were inconsistent and contingent in their conveyance of love. Whiffen and Sassville (1991) reported similar results for both males and females. Research based in SDT concurs, with longitudinal data showing that children growing up in controlling families are more likely to adopt self-critical perfectionistic attitudes, which, in turn, relate to elevated depressive symptoms (Soenens, Luyckx, et al., 2008). Moreover, the adoption of self-critical perfectionistic standards in controlling environments may not elicit depressive symptoms but may also involve self-esteem deficits (e.g., Soenens, Vansteenkiste, Luyten, Duriez, & Goossens, 2005).

Empirical findings are thus consistent with our speculations concerning the nature of the social contexts leading to introjection and internally controlling states. In this frame one can view self-critical depression as a chronic and pervasive state of ego-involvement in which one continuously fails to live up to the demands and is thus punished. Unfortunately, self-critical perfectionism appears to get transmitted from the one generation to the other through controlling parenting (Assor et al., 2004; Soenens, Elliot, et al., 2005). Presumably, the contingent love self-critical perfectionists display vis-à-vis their own functioning gets projected onto their children, such that children experience their parents as displaying conditional regard, which subsequently affects their own functioning.

Indeed, such dynamics between parent and child may be mutually problematic. Using a cross-lagged longitudinal design in two samples of middle and late adolescents, Soenens, Luyckx, Vansteenkiste, Duriez, and Goossens (2008) compared three models concerning the role of parental control in depression. Results generally favored a reciprocal model in which controlling parent behaviors contribute to increases in depression, which in turn enhance parents' tendency to control their teenager. This represents a truly maladaptive cycle between parent and child. This bidirectional relationship suggests that more depressive symptoms in an adolescent can elicit less autonomy support from parents over time, even as autonomy support from parents conduces toward fewer depressive symptoms in their adolescents.

Further, Soenens, Park, Vansteenkiste, and Mouratidis (2012) examined whether this association between parental control and depressive symptoms among adolescents

might be culture bound as some cultural relativists have argued, versus whether as SDT suggests, the detrimental effects of psychological control and the loss of autonomy generalize across cultures. Soenens et al. (2012) specifically investigated the relevance of two domain-specific expressions of psychological control (i.e., dependence oriented and achievement oriented) in both Belgian and South Korean adolescents. Analyses showed very similar relations between the psychological control, depressive personality, and depressive symptoms across the two samples, thus supporting the notion that the effects of psychological control generalize across cultures.

In short, there are clear relations between control and these internally controlling forms of depression in which self-critical cognition is salient. Although there is substantial evidence that vulnerability to depression varies, the importance of autonomy thwarting in this expression of psychopathology is becoming ever better documented.

Eating Disorders: Anorexia and Bulimia

In her classic book on the topic, Bruch (1973) described eating disorders as pathologies of autonomy. She argued that these eating pathologies typically involve a struggle for control that takes the form of an obsession with eating and body image, with control over one's body dynamically staving off a pervasive sense of ineffectiveness. Bruch saw people with eating disorders as exemplifying the capacity, as a function of harsh introjects, to manipulate bodily states and desires to preserve the illusion of self-sufficiency and to feel a sense of control with respect to oneself and others. In restrictive anorexia, the introjects around eating and weight are more stable and effective in keeping people's eating behaviors in abeyance, whereas in bulimia there is a more open conflict between rigid controls and akratic eating. Bulimics engage in binge eating—in expressive, uncontrolled consumption—only to be plagued by guilt and self-derogation leading to vomiting or abuse of diuretics.

The psychodynamics highlighted by Bruch were empirically supported in an early study by Strauss and Ryan (1987). They found greater self-oppression and self-rejection in both anorexic and bulimic participants than in a matched control group, suggesting internally controlling dynamics, whereas control-group participants displayed more flexible self-management and self-acceptance. Furthermore, Strauss and Ryan documented a particularly heightened impersonal causality orientation (Deci & Ryan, 1985a) among restrictive anorexics, indicative of an impoverished sense of both autonomy and effectiveness.

Internally controlling forms of regulation are readily apparent in the dynamics of many behaviors entailed in eating disorders, especially those involving restrictive self-control. Whether anorexic or bulimic these patients display inordinate concern with how others view them, and hypertrophied public self-consciousness. As Plant and Ryan (1985) argued, such consciousness potentiates an external perceived locus of causality in which people have to conform to the projected views of others. Although a focus on weight is often paramount, eating disordered patients are typically self-conscious, demanding, and self-critical with regard to many aspects of appearance and behavior. And although restrictive anorexics in particular appear to display a high degree of personal control, the regulatory basis of this control is dictatorial.

Applying SDT to anorexia, Vansteenkiste, Soenens, and Vandereycken (2005) described how a focus on thinness represents an attempt to gain a sense of security and worth, yet the thinness, even when attained, fails to supply the anticipated emotional benefits. The anorexic person is never thin enough, yet they continually work with the belief that positive feelings are a few pounds away. The paradox, however, is that achieving their extrinsic goal is satisfying to some degree, so it further anchors them in this pattern of behavior. These patients often strongly assert that they do feel better when losing weight and believe that the pursuit of weight loss is therefore not the source of distress. Indeed, their own experiences seem to confirm that efforts at weight loss are part of the solution. The transitory nature of relief thus fosters an addictive quality to the internally controlling drive for thinness.

Whereas the restrictive anorexics can display a high degree of control with respect to eating, bulimic patients often find their control overwhelmed by an impulse to binge eat. Binges typically occur at times of high psychological need frustration, thus showing how their introjected regulatory structures are not sufficiently stable to keep the impulse in check. The binge impulse is often a reaction to the experience of need frustration rooted in internal criticism, so it represents an attempt to escape from the painful sense of self that carries the burdensome, introjected standards. For example, Verstuyf, Vansteenkiste, and Soenens (2012) researched the connections between need frustrations and binge eating. In a sample of female adolescents, they showed indeed that an investment in appearance-focused motives led to need frustrations, which in turn predicted increased bulimic symptoms. Along similar lines, a diary study in female adolescents (Verstuyf, Vansteenkiste, Soenens, Boone, & Mouratidis, 2013)

indicated that daily variation in psychological need frustration covaried with ups and downs in bulimic symptoms, suggesting that binge eating serves to compensate for painful experience of need frustration.

It is interesting to note that, as the psychic threat gets greater for individuals with the bulimic disorder, the people's regulatory capacities becomes weakened, whereas in people with obsessive-compulsive personality the regulatory capacity often becomes even more rigid and dominant. The lack of stability of the regulatory introjects in the people with bulimia thus allows for the akratic action, but the self-evaluative introjects invariably result in self-disparagement and feelings of depression for having lost control. It is therefore interesting to note in this regard that the long-term course for many restrictive anorexics is a shift to bulimic patterns of coping.

Although again there are multiple contributors to the development of bulimia and related eating disorders, the role of familial factors in setting up the dynamics of introjection and internal control are quite salient. Bruch (1979) has vividly depicted the role of parents in catalyzing anorexia by depriving their daughter of autonomy and the "right to live her own life" (p. 38). Minuchin, Rosman, and Baker (1978) similarly reported high levels of enmeshment and intrusive control in families of patients with eating disorders. Strober and Humphrey (1987) reported that both anorexics and bulimics experience parents as blaming, rejecting, and critical. Strauss and Ryan (1988) found less mutuality of autonomy in the object representations of both bulimic and anorexic participants, and lower expressiveness within their families. Another more recent study found that late-adolescent women hospitalized for eating disorders reported having more psychologically controlling fathers than a matched sample of women without the eating disorders (Soenens et al., 2008).

Summary

Each of the disorders we have considered thus far begins with rigid, demanding, and critical introjects. These rigid structures take varied forms and are more or less stable and effective in controlling the people's actions. In some cases, most notably obsessive-compulsive personality and anorexia nervosa, the disordered individuals can feel a strong sense of personal control and self-efficacy—the OCP can keep personal affairs orderly and anorexics can keep body urges under control. But these, like the other disorders involving salient introjects, constitute disturbed autonomy and can terrorize people with such contingent self-esteem. Findings in this area also highlight

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the important difference between personal control and autonomy; being self-controlled can sometimes yield desired outcomes yet not be experienced as autonomous or volitional (Muraven, Gagné, & Rosman, 2008).

We turn now to disorders characterized not by the prevalence of introjects, but rather by the relative absence of internalization. These forms of psychopathology involve the lack of adequate regulatory structures that link one effectively to the socializing context.

Impairments of Internalization in Externalizing Disorders

As we argued earlier, the process of internalization is dependent upon certain affordances in the caregiving environment—namely, autonomy support, structure, and involvement—which together facilitate both attachment to caregivers and a readiness to assimilate the values they model. Some caretaking environments, particularly those characterized by coldness and hostility or by neglect conduce toward poor quality of attachments and lessened internalization of social norms and prosocial behaviors (Johnson, Cohen, Chen, Kasen, & Brook, 2006; Joussemet et al., 2008). In addition, those low in autonomy supports, especially the lack of both perspective taking and attunement to needs and interests, are at risk for both low social skills and negative social interactions (Shields et al., 2001). In fact, parenting environments impact on internalization through their effects on need satisfaction (Ryan et al., 2006). Controlling parents not only restrict opportunities for children to develop self-regulatory capacities, they create emotional and need-related frustrations that can fuel negative behaviors.

In the realm of more severe forms of psychopathology, we are also concerned with more extreme forms of need thwarting, including physical, sexual, and emotional maltreatment, which thwart all three basic needs, with irradiating effects across multiple developmental lines. Such parenting conditions may result either in externalizing problems (Gershoff, 2013) such as conduct disorders, or, especially when the thwarting is extreme, in disorders such as dissociative identity.

Illustrating this with respect to externalizing disorders, Shields, Cicchetti, and Ryan (1994) examined the social-competence self-regulation impairments of children who had been maltreated by caregivers. The setting was a summer camp for both maltreated and economically disadvantaged children, allowing for a comparison of these groups. As predicted, children who had endured maltreatment displayed, as rated by observers, less social competence, more emotional dysregulation, and impaired

self-regulation reflected in externalizing disorders as well as internalizing disorders. Indeed, self-regulatory deficits mediated the relations between maltreatment status and social competencies.

In a subsequent study, Shields, Ryan, and Cicchetti (2001) further explored this developmental process by assessing maltreated and nonmaltreated children's representations of the parenting they experienced. They found, as expected, that the representations of parents in maltreated children, as accessed through a projective narrative task, were less coherent and integrated, and more negative and constricted than those of nonmaltreated children. These differences in parental representations were in turn related to the externalizing processes of emotional dysregulation, aggression, and peer rejection in the ecologically valid camp setting.

These issues concerning need thwarting conditions and impairments in self-regulation have particular salience with respect to conduct and oppositional disorders, in both of which internalization, self-regulation, and capacities for relatedness are impaired.

Conduct Disorders and Antisocial Personality

Broadly speaking antisocial personality disorder (APD) applies to persons who lie, steal, manifest an impoverished sense of responsibility, are aggressive and manipulative toward others, and show evidence that these patterns are continuations of behavior disorders earlier in life. Children diagnosed with *conduct disorders*, a frequent antecedent of APD, display control problems, lability, a lack of ability to give and receive affection, and delayed or impaired development of conscience. Further, self-aggrandizement and egocentrism typically characterize their behavior, and their lying about accomplishments highlights their excessive need to be recognized or esteemed by others in an immediate way. Like adults with ADP, these children tend to display a lack of conscience, or deep concern with what is good or right. Related to conduct disorders and APD is the behavioral category of reactive or destructive aggression, the developmental routes of which have been related to those associated with these diagnostic categories.

Etiologic theories of APD have clearly implicated biologic or genetic factors such as poor autonomic reactivity (Burnette & Cicchetti, 2012; Raine, 2013). Yet even with this recognition of potential biologic vulnerabilities, it is clear that such vulnerabilities become amplified in non-nurturing environments. Our contention is that APD is a psychopathology entailing *impaired internalization*, and although internalization may have been compromised by biological factors (Jaffee, Moffitt, Caspi, & Taylor, 2003),

we maintain that these impairments can also be linked to, and are interactive with, deficits in the social contextual factors associated with the basic psychological need supports that are essential for internalization to develop.

An internalization perspective looks toward the family environment for the relational resources that support the internalization of values of a prosocial nature, resources that are frequently lacking in the families of persons developing APD. For example, the empirical evidence supports the idea that prosocial values are most likely to be acquired (or expressed) when caregiving is characterized by warmth (Maccoby, 1980), low power assertive discipline (Hoffman, 1960), and autonomy support (Ryan & Hawley, *in press*).

The experience of growing up in a nurturing, caring, and responsive familial environment undoubtedly facilitates prosocial values both directly and indirectly. A person who grows up in a basic need supportive environment will have been exposed to models of caring and concern about others, from figures to whom they are likely to attach and desire to emulate. Support for this comes from many quarters. For example, Ryan and Connell (1989) reported that children who experience a high quality of relatedness to parents were more autonomously motivated in the prosocial domain. Conversely, a variety of clinical and empirical perspectives have suggested that antisocial personality, oriented towards self-serving, manipulative, and hedonically gratifying acts, has its roots, in part, in cold, inconsistent, and controlling family environments (e.g., Benjamin, 2003). A plethora of studies has also shown that the common backdrop to APD and conduct disorders of childhood includes such factors as maternal depression, loss, high family conflict, other parental pathology, and impoverished conditions of life that fragment the family (Coie & Jacobs, 1993; Loeber & Stouthammer-Loeber, 1986). All of these factors potentiate a situation ultimately lacking in the basic nutrients upon which internalization depends—namely autonomy support, adequate structure and guidance, and concerted, caring involvement.

One limitation of these models of value acquisition, and their implications with regard to the development of externalizing disorders such as APD, is that they do not focus on how or why children might develop nonprosocial or nonmoral attitudes, except as a converse or absence of moral internalization. For example, there are probably very few parents who strive to teach their children to be manipulative, materialistic, or Machiavellian, but there are many children who develop such an orientation. Absence of identification does not explain why one proactively seeks to act in *these* ways. Thus, a fuller model of APD requires

both explaining why internalization fails, and why hedonic, aggressive, self-gratifying values predominate instead.

Directly informative in this regard is a six-year longitudinal study by Joussemet et al. (2008), who followed children from six to twelve years of age. Specifically, they identified developmental trajectories in childhood aggression in which they applied SDT. They found that over these years children on average engage in a lower frequency of aggressive acts, presumably reflecting socialization and development. Yet the slope of that trajectory differs among children, such that while for most there are declines in aggressive acts, for others there are maintained or escalating frequencies of aggression. After controlling for a number of other risk factors for being aggressive (e.g., being male, having a reactive temperament, parental divorce/separation), Joussemet et al. found, as they hypothesized based on SDT, that having a mother who was autonomy thwarting rather than autonomy supportive reliably increased the odds of a high aggressive trajectory.

In fact, some research within SDT suggests that controlling parenting can result not only in poor internalization, but also oppositional motivations. In line with this, parental prohibition of moral misdeeds perceived to be controlling was found to predict increased oppositional defiance (Vansteenkiste, Soenens, et al., 2014). Other studies have established the explanatory role of need frustration in the relation between controlling parenting and oppositional defiance and associated problem behaviors (Van Petegem, Beyers, Vansteenkiste, & Soenens, *in press*). Indeed, it seems that much antisocial behavior can be understood as a reaction to controlling, power-assertive strategies in contexts where attachment security and relatedness is low (Kim, Kochanska, Boldt, & Nordling, 2014).

Ryan, Sheldon, Kasser, and Deci (1996) argued that, to the extent that individuals lack autonomy support and caring involvement (and therefore are deficient in the development of self), they often turn toward extrinsic values to gain and sustain some minimal sense of power, narcissistic importance, and worth, and a corresponding lack of concern with doing for others or contributing to society. In line with this, Kasser et al. (1995), analyzing data from a long term longitudinal sample, found that adolescents who were more materialistic came from homes where both they and their mothers reported that there was less autonomy support, warmth, and security. They also found that more impoverished, high-crime neighborhoods, in confluence with these more controlling and hostile parenting environments, were likely to promote children's placing strong importance on these extrinsic values. Most relevant in this context, Kasser et al.'s analysis of clinical interviews with



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participants in an at-risk population (defined in terms of maternal psychopathology and low socioeconomic status) revealed that those with greater centrality of materialistic values were more likely to be clinically diagnosed as conduct disordered. One important aspect of this work was its clarification that environments that fail to support autonomy and relatedness promote a compensatory emphasis on alienated or substitute needs, such as material acquisitions and visible trappings of worth. These, in turn, activate the so-called antisocial personality, albeit in ways often seen as self-centered. The research also highlights the continuity of motivational dynamics between nonclinical and clinical populations, as caregiving factors associated with materialism, in more extreme forms are associated with conduct disorders. This general pattern of findings is also consistent with Coie and Jacob's (1993) analysis of conduct disorders.

From the perspective of SDT, the development of conduct disorders and a self-focused goal orientation both stem directly from inadequate attachment and failed internalization resulting from an externally controlling, inconsistent, and affection-impooverished social context as they interact with vulnerabilities to poor self-regulation. To the extent that social values (and the economic conditions that structure them) disable, distract, or fragment the caretaking environment, then children will be more oriented to narcissistic goals to gain a temporary sense of worth and importance. This model is applicable not only to conduct-disordered children but increasingly also to American culture more generally (Kasser, 2002; Twenge et al., 2010). Put succinctly, the more we create conditions that disrupt the quality and stability of familial relationships, the more narcissistically oriented and antisocial our culture as a whole may become.

In sum, conditions of need thwarting, particularly threats to and deprivations of autonomy and relatedness satisfactions in childhood conduce to lowered attachment and interpersonal connectedness, to poorer development of self-regulation and thus impoverishment of internalization, and to need substitutes in the form of hedonic and materialistic aims, rather than prosocial ones. While such conditions negatively affect wellness in general (e.g., Kasser et al., 1995) when applied to vulnerable individuals the result is often more entrenched antisocial patterns of behavior.

Severe Need Thwarting in Dissociative Identity and Borderline Personality Disorders

We have argued that essential to the formation of integrated experience and behavioral regulation is support

for autonomy, competence, and relatedness. Dissociative identity disorders (DID) and borderline personality disorders (BPD) represent, in most cases, disorders befalling individuals whose life experiences were characterized by not only deprivation, but also active intrusive thwarting, of both autonomy and relatedness needs. In fact, they represent disorders where there has been a failure in the average expectable environments needed for psychological development. For example, Johnson et al. (2006), using a longitudinal sample, reported that low affection (low relatedness) and punitive (low autonomy support) parenting practices were associated with elevated risk for borderline and other personality disorders. Steinberg and Schnall (2001) reported extremely high rates of early physical and sexual abuse among patients with DID. In the histories of people with either disorder, important others who should have been loving and kind to them were instead hurtful and maltreating, violating of the minds and bodies of the people who needed their support. The compensatory results of this are less integrated functioning and diminished sense of autonomy and connection.

Borderline Personality Disorder

Borderline personality disorders have become a predominant concern in clinical settings both because of their increasing incidence and thus the personal resources demanded in their treatment. Studies of BPD highlight many issues in character pathology generally, and they represent a prototypic example of structural damage to the self that has been associated with caregiver failures to support autonomy and relatedness in early development (Ryan, 2005).

The core feature of BPD is the lack of a cohesive and stable sense of self. Associated with this lack of a consistent and organized self are highly labile emotions, interpersonal relations, and self-esteem dynamics. Borderline individuals show the externalizing attributes of impulsivity, along with some of the features of internalizing disorders such as susceptibility to depression, anxiety, and fragmentation in the face of self-esteem related losses. A cardinal feature of BPD is anger, both self- and other-directed, which can result in destructive actions and magnify relationship volatility and internal feelings of being overwhelmed and disintegrated. More generally, patients with BPD have difficulty differentiating internal needs from external reality, and they are tremendously dependent on concrete supports from others to maintain a sense of self. They lack the internal regulatory processes to modulate anxiety, which can escalate to panic proportions, particularly when no one is available to contain and comfort them.

Persons with BPD also often lack a stable identity or sense of purpose (Meissner, 1988). Patients with this disorder may, however, latch on to something or someone in an effort to derive a temporary feeling of cohesion, but these choices are often inappropriate or destructive. Commitments are difficult because borderline individuals lack a stable and cohesive self that can form the basis for sharing in committed relationships or endeavors. Connected with the lack of feeling of identity, patients with BPD may feel empty and isolated (Westen, 1991). Clearly, there is a diminution of their true self whereby they lose connection to their interests and feelings. Patients with this disorder often report feelings of boredom and may engage in impulsive acts, such as substance abuse, careless spending, and binge eating, to counteract such feelings. Closely related to this is borderline individuals' lack of capacities for reflective awareness, especially when inner urges are strong (Bleiberg, 2004; Ryan, 2005).

Phenomenologically, patients with BPD often report being both controlled and helpless with respect to their behavior. They often feel like a victim of circumstances without a sense of responsibility for the direction of their own fate. One late adolescent patient, for example, reported that prior to self-mutilation he entered into a lost state, where the overwhelming impulse to cut came on him (impersonal perceived locus of causality), while at the same time he felt he could obtain relief and release only from dysphoric self-hate by engaging in such acts (suggesting external causality). In no sense did he feel autonomous and volitional in these acts, but rather driven, desperate, and helpless.

Although there is some evidence of genetic contributions to BPD, in that many appear to have exhibited a difficult child temperamental profile, much of the etiology appears to be associated with care-giving environments (e.g., Silk, Lee, & Hill, 1995). As we discussed in attachment research, formation of a stable and cohesive sense of self depends on nurturance in the form of autonomy support and positive involvement. Yet as Sperry (2003) noted, those with BPD have typically experienced severely impoverished care-giving during these early years, with parents' (particularly mothers) having difficulty allowing the children to move toward self-sufficiency and autonomy. Through being both controlling and inconsistent, parents of individuals with BPD fail to bolster the children's integrated self that is essential for the tasks of emotion regulation and identity formation. Having been exposed to caregivers who did not provide autonomy support and were unable to take the children's perspectives, the children failed to develop the sense of reflective awareness that

would allow them to be in touch with their own internal states or the internal states of others.

Early caregivers of individuals with borderline disorder have often been described as unavailable, inconsistent, and neglectful, with frequent reports of sexual, emotional, and physical abuse (Sperry, 2003; Zanarini, 1997). In one study, 80% of borderline patients were reported to be physically or sexually abused or to have witnessed serious domestic violence (Herman et al., 1989). Explicating more specifically the affect and behavior regulation difficulties of these patients, Linehan (1993) suggested that patients with borderline disorder often come from families that invalidate the affective experience of their children. There is little tolerance for fears or anxieties in their children, and they do not offer soothing or comfort when needed. Without such care, these children have difficulty internalizing the capacity to self-soothe, resulting in emotion regulation difficulties, especially being unable to tolerate feelings of distress.

According to object relations theorists (Masterson, 1985), the disorder has its roots in the mother-child relationship, particularly during the phase of separation-individuation when the child is striving to experience him or herself as separate from the mother. Part of the phase involves a pushing away from the mother. In families of borderline individuals, the mothers are not able to tolerate movement toward self-sufficiency as it brings up their own fears of abandonment. Consequently, the mothers threaten to withdraw nurturance from the children if they move to act as separate autonomous individuals. Given this level of conflict, there is no "good" object that can support the psychological needs underlying a cohesive sense of self.

The problems of borderline patients thus illustrate how lack of empathy and consistent involvement and autonomy support undermine intrinsic interests and tendencies and self-regulatory functions—all aspects of a healthy autonomous functioning (Ryan, 2005). These developmental thwarts are thus critical to the formation of BPD. Sadly patients with BPD thus have ongoing experiences of lack of need satisfaction, as they have difficulty trusting in relationships and often find themselves acting without autonomy, both contributing to inner distress and continuing cycles of dysregulation.

Dissociative Identity Disorder

Dissociative disorders are a particularly important issue within SDT given the theory's focus on autonomy as integration and synthesis. That is, SDT defines autonomy as the integrated regulation of behavior, and dissociative disorders, by definition represent the absence of such integrated regulation. There are two broad senses in which

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dissociative disorders can represent nonintegration. Some dissociative disorders concern a lack of integration between behavior and experience with a sense of self. This is evident in depersonalization symptoms and when there is amnesic or accessibility barrier for certain event or actions. More extreme is the issue of multiplicity, the idea of more than one center of consciousness, expressing distinct motivations, memories, and attributes.

Dissociative disorders thus fundamentally represent a substantial breakdown in self-integration (Ryan et al., 2006). Related by some to an extreme form of BPD, as well as to severe PTSD, most clinicians and researchers also view most dissociative disorders, and particularly dissociative identity disorder (DID) as frequently a product of severe maltreatment or loss (although see Lynn, Lilienfeld, Merckelbach, Giesbrecht, & van der Kloet, (2012) for a contrary perspective.) Dissociation represents a protective or defensive mechanism, originally arising to protect integrity of a self that is beset with trauma. However, when inability to integrate experiences is chronic or severe, fragmentation of self-functioning and increased tendency to use dissociation to cope with threat occur (Carlson, Yates, & Sroufe, 2011).

DID manifests as compartmentalized functioning, in which traumatic experiences are housed in dissociated, often inharmonious, parts of personality. Yet more distinctly, DID symptoms include alterations between distinct identity states, often accompanied by amnesic barriers between them. Given its traumatic origins, symptoms of DID overlap with those of both BPD post-traumatic stress disorder. Yet DID is also commonly related to depression, associated with both developmental deficits and helplessness within the condition. In part this may be related to a common pattern in which, in an attempt to maintain relatedness to an abusing or harsh caregiver, the child internalizes self-critical and self-blaming views (e.g., Westen, 1991). Low self-esteem and depressive affect thus commonly accompany DID and other dissociative disorders.

DID is an autonomy disturbance insofar as autonomy requires cohesiveness and integration, and the violation of self, especially by caregivers, can shatter integrity. The splitting of personality has the function of defensively shielding the core self from pain or harm (van der Hart, Nijenhuis, & Steele, 2006), but the shifts in identity that characterize DID are typically not experienced as within personal control. Indeed, they have an impersonal perceived locus of causality (Ryan et al., 2006). Depersonalization, another symptom associated with DID, also exemplifies this sense of impersonal causality, as if one's body were acting independently of one's will. As autonomy, or self-rule, depends

on a sense of self and an internal perceived locus of causality for behavior, it is clear that autonomy is seriously disturbed when behavior occurs without choice or in a dissociated state.

The perceived lack of personal causation is often part of the despondency and depression these patients report. For example, a patient who came to treatment for depression and for concerns for her memory for events had manifest symptoms of DID. She subsequently revealed repeated sexual abuse by her father that she previously had not reported. Images began to surface, often uncontrollably. As memories unfolded it was also clear that she had been repeatedly threatened if she ever told anyone, a command she had internalized. Various parts of her story, and emotional reactions to it, were represented by different personality systems, each with its own age and makeup, and its own capacity to exert executive control under particular circumstances.

As van der Hart and colleagues (2006) pointed out, whereas healthy personality functioning is characterized by synthetic, coordinated functioning, the defensively precipitated identities in DID are often very simple and focused, and not prone toward integration or harmony with other personality subsystems. Van der Hart et al.'s treatment approach focuses on increasing connectivity between split off parts of personality, using a slow process of exposure and dialog in which compassion and understanding are fostered, along with encouragement to move toward feared or avoided opportunities for self-realization, to further promote such connectivity. Clinicians who have worked with DID know the difficulty of the process approach and the required patience and empathy. Often change requires strong supports and anxiety reduction strategies as well. Adaptation and tools for grounded self-regulation rather than full integration is often an appropriate goal. The goal of course is the recovery more coherent, integrated functioning, and the resumption of self-development to whatever extent possible.

In sum, a fundamental tenet of developmental psychopathology is that the study of both normal and atypical development should inform each other (Cicchetti, 2006; Cicchetti & Toth, 2009). SDT's research into basic psychological needs richly links psychologies of growth with those of pathology. Evidence shows how the psychological nutrients that facilitate optimal development, when neglected or thwarted can have cascading negative effects across development. Moreover, the kind of need thwarting a child experiences can be related to the kind of pathology he or she manifests. We identified three types of disorders reflecting different types of autonomy disturbance:

internalizing disorders, impairments in internalization, and self-fragmentation. Each reflects a varied way the integrated self-regulation and ownership of actions is disrupted, and each also has autonomy thwarting as a featured symptomatic or etiological factor.

Translational Implications: Autonomy and Autonomy Support in Psychotherapy and Intervention Programs

An interesting question concerns the relations between *etiological factors* such as lack of autonomy, relatedness, and competence supports in development to *ameliorative factors* proposed by various treatment approaches to psychological problems. It seems clear that the absence of need-supportive inputs from caregivers can catalyze an array of negative developmental processes, both behavioral and biological, that eventuate in disordered functioning. Reciprocally, in efforts to treat the immediate harms and cascading negative effects of such social etiological factors, SDT suggests that need supportive treatment and intervention contexts are critical.

Ameliorating or treating existing disorders often entails addressing need deficits both *directly*, by providing a need supportive therapeutic context, and *indirectly*, for example by providing people with skills or opportunities to better satisfy needs in their natural environments. In other words, SDT suggests therapy is, in large part, effective through facilitating the individuals' capacities to act with autonomy, and in acting so, to satisfy all three basic psychological needs (Ryan & Deci, 2008).

Autonomy support is of course important to all schools of psychotherapy, especially because volitional motivation is so necessary to therapeutic engagement and success. For example, Ryan, Lynch, Vansteenkiste, and Deci (2011), reviewing approaches to psychotherapy, and behavior change distinguished between outcome and process focused therapies. Outcome focused approaches (e.g., behavioral and cognitive behavioral treatments) tend to promote autonomy through an emphasis on transparency. Patients are told beforehand what is expected and allowed to select in to treatment, or not. Readiness for treatment can also be facilitated through motivational enhancement therapies, such as brief motivational interviewing (MI; Miller & Rollnick, 2002) as adjuncts to outcome-focused interventions to prepare the individual to volitionally engage the therapy. Ryan et al. pointed out that more *process-oriented* schools of therapy (e.g., psychodynamic and existential approaches) conceive of motivation as a focus of treatment itself rather than something that facilitates pre-treatment readiness. Cultivating autonomous

engagement and taking interest in resistances is in fact considered an active and ongoing focus of process-oriented therapies.

Zuroff et al. (2007), drawing on SDT, proposed that autonomy should be considered a common factor in all effective psychological treatments. Supporting their proposal, they reported a study of depressed outpatients who were randomly assigned to receive interpersonal therapy, cognitive-behavioral therapy, or pharmacotherapy with clinical management. Assessments of depression severity were taken before and after treatment, and therapeutic alliance, the clients' autonomous motivation, and therapists' autonomy support were measured at the third session within each group. Zuroff et al. found first, as expected by SDT that therapist autonomy support was associated with greater client autonomous motivation. More strikingly, autonomous motivation was a better predictor of improved outcome than therapeutic alliance across all three treatments. The researchers therefore suggested that the promotion of autonomy is an important factor in treatment across modalities and can be distinguished from therapeutic alliance per se.

Given its focus on facilitating autonomous motivation, not surprisingly SDT has increasingly been used as a guiding framework for clinical interventions and randomized clinical trials in behavior change (Ryan, Patrick, Deci, & Williams, 2008). In fact clinical studies applying SDT attest to the positive consequences of autonomy-supportive treatment climates, including higher treatment attendance, less dropout, less relapse, and enhanced well-being over the course of treatment. Such results have been obtained in various domains such as drug and alcohol dependence (Foote et al., 1999; Ryan, Plant, & O'Malley, 1995; Zeldman, Ryan, & Fiscella, 2004), weight loss (Williams, Grow, Freedman, Ryan, & Deci, 1996), smoking cessation (Williams, McGregor, et al., 2006), general medication adherence (Williams, Rodin, Ryan, Grolnick, & Deci, 1998), HIV-related medication adherence (Kennedy, Gogin, & Nollen, 2004), eating disorders (Van der Kaap-Deeder et al., 2014), and other issues.

Beyond the importance of autonomy for behavior change is its importance in restorative self-development and personality growth. These principles are critical both in psychotherapy and in programs that provide support and training for caregivers. Particularly germane to the issue of motivation in growth-focused settings is a focus on *autonomy support*, which conduces exploration, disclosure, and integration (Weinstein, Przybylski, & Ryan, 2012). Specific behaviors associated with autonomy support include (1) taking the child's or adolescent's internal frame

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of reference and welcoming negative feelings and resistance; (2) providing a meaningful rationale for requests and activities; (3) minimizing external controls such as contingent rewards and punishments or conditional regard, instead nurturing inner motivational resources (e.g., challenge, curiosity); (4) providing opportunities for participation, input, and choice; and (5) following the child's rhythm of progress and development (Reeve, 2009; Ryan & Deci, 2008). In autonomy-supportive contexts, pressure to engage in specific behaviors or express specific attitudes is minimized, and individuals are encouraged to base their actions on their own reflective considerations and values. Thus, autonomy for behavior is facilitated insofar as actors are helped to identify and own their reasons for changing or not changing behaviors, and do not feel pressured toward specific outcomes. This in turn leads to greater internalization and maintenance of change.

In addition to experiencing autonomy, internalization also requires that a person experience the confidence and competence to change. In SDT, *competence support* is afforded when practitioners provide the effectance-relevant inputs of structure and feedback (Jang, Reeve, & Deci, 2010; Sierens, Vansteenkiste, Goossens, Soenens, & Dochy, 2009). Clients are afforded the skills and tools for change and are empathically supported when efficacy-related barriers emerge. In the SDT model of change, gaining a sense of competence is facilitated by autonomy, in that, once people are volitionally engaged and have a high degree of willingness to act, they are then most apt to learn and apply new strategies and competencies (Markland et al., 2005). At that point providing additional challenges and structure can be especially helpful.

Finally SDT considers *relatedness support* as critical in both growth and internalization processes. Unconditional positive regard and helpful, but not intrusive, involvement facilitate relatedness experiences, which support interest and curiosity, as well as the trust and connectedness important to internalization. However, unconditional regard is not merely a technique, and it must be perceived as authentic or genuine to have the functional significance of relational support (Ryan, 1995).

These general principles can be actively applied in programs to train teachers (e.g., Aelterman, et al., in press; Cheon, Reeve, & Moon, 2012) or parents to adopt a more need-supportive approach, as to enhance developmental outcomes and lessen psychopathology. For example, Joussemet, Mageau, and Koestner (2013) studied an intervention program called the *How-to Parenting Program*, which included components meant to enhance provision of structure, greater relatedness and more support

for autonomy. Results indicated the program succeeded in increasing these parenting attributes relative to baseline, and moreover, the level of children's internalizing and externalizing symptoms were significantly decreased, suggesting program effectiveness.

Future translational efforts must also move beyond tertiary efforts at psychotherapy and behavior change, toward more prevention, and this is a goal for which SDT's body of knowledge is uniquely suited. SDT, as an empirically supported framework, points both to general facilitating factors (e.g., psychological need satisfactions), and criteria for testing any specific strategies for enhancing these factors (i.e., measurements of targeted motivational mediating variables). There is thus great promise ahead for both intervention and process studies of behavior change and for creating conditions in families, schools, and communities that build resilience through fostering capacities for autonomy.

SDT AND THE STUDY OF DEVELOPMENT AND PSYCHOPATHOLOGY: CONCLUSIONS AND IMPLICATIONS

Among the central aims of SDT is the explication of the social-contextual conditions that promote optimal development of self. Thus, we have focused considerable attention on specifying the conditions that both facilitate and undermine optimal development. In this way, basic psychological needs are constructs that link SDT's efforts in understanding growth and positive experience, to the study of ill-being and the development of psychopathology. It is our contention that many of the processes that are integral to nonoptimal functioning in normal populations are also central to various psychopathologies. Indeed, we see continuity in the basic psychological needs for autonomy, competence, and relatedness across people's personality differences, developmental epochs, and cultures, suggesting that thwarting of these basic needs, especially when being severe, is a critical component of psychopathology and more normal or transitory maladjustment.

The developmental antecedents of disturbed autonomy are manifold, with genetic, biological, interpersonal, and sociocultural factors all being relevant (Cicchetti & Dawson, 2002; Ryan & Hawley, in press). Genetic and other biological factors enter transactionally into interpersonal relationships, facilitating or forestalling the quality of these social contextual inputs and thus constituting an obstacle or affordance for experienced need satisfaction, and cultural factors both shape and are emergent from patterns of social and familial functioning. Our focus has



been primarily on the social and familial factors, although our aim was not to provide a complete account of the development of autonomy disturbances. Rather, we have attempted to describe the phenomenological significance of autonomy in normal and pathological development and to show empirically and theoretically how interpersonal factors contribute to the etiology of pathologically disturbed autonomy.

Within this approach, we have viewed the development of autonomy as proceeding most effectively in familial and social contexts that provide autonomy support, optimal structure, and interpersonal involvement. In the absence of these necessary social nutrients—in contexts that thwart satisfaction of the needs for autonomy, competence, and relatedness—disturbed self-development is expected, resulting in the emergence of psychopathology. Psychopathology is thus the result of disorganizing influences, of contexts that thwart or forestall personality integration.

We have reviewed a large number of studies indicating that the development of autonomy—that is, the maintenance of intrinsic motivation, the internalization of values and regulatory processes, the integration of emotions, and the formation of identities—is facilitated by the contextual nutrients of caregiver attention and interest, and of encouragement for exploration and self-initiation. Contexts where interpersonal involvement and autonomy support are absent have been found reliably to diminish autonomous regulation and impair the development of self. The contextual elements that have consistently been found in our studies to impair autonomy and development—namely, controlling or uninvolved parenting—have also been emphasized in the clinical literature on the antecedents of disorders that involve either heteronomous introjects or failures of internalization. Thus, there appear to be clear parallels between the results of the empirical explorations of autonomy dynamics in normative development and the conclusions from clinical studies of psychopathology. Indeed, basic psychological needs represent constructs linking our understanding of both growth and pathology in self-development (Vansteenkiste & Ryan, 2013).

Future Directions

SDT focuses on the role of basic psychological needs in both growth and pathology. What is exciting about the convergence between SDT-grounded research results on both healthy populations and those experiencing psychopathology is that it sets the stage for more integrative empirical investigations in which the concepts of autonomy, competence, and relatedness needs figure

heavily. For example, the constructs concerning intrinsic motivation, internalization, and autonomy-supportive relationships all bear on clinical phenomena, and they help us see the continuity of human needs in diverse populations. Whereas theories of internalization have been widely discussed in developmental and clinical literatures by such seminal writers as Freud, Mahler, Erikson, Perry, Piaget, and Kohlberg to name a few, there has been a paucity of empirically-based studies of the process, and little specific theory about factors that facilitate versus undermine internalization in clinical settings. SDT's empirical focus provides testable hypotheses, amenable to both experimental and field methods, concerning both how to measure internalization, and its antecedents, consequences, and neuropsychological correlates.

More detailed work on the antecedents of specific autonomy disturbances within the various disorders will also be important. It is clear, for example, that the lack of autonomy support and genuine relatedness by caregivers are antecedent to the development of a wide range of pathologies (Ryan et al., 2006). Yet why an individual develops anorexia nervosa rather than pervasive self-critical depression in familial contexts that are demanding and critical is an example of the kinds of questions that are important to tackle empirically, and in coordination with epigenetic and neuroscience findings. Although failures of autonomy support appear to supply a generalized stressor to integrated development, how this differentially impacts and interacts with varied diatheses and vulnerabilities is an area for further inquiry. We know far too little about the specific pathways to specific disorders, leaving the study of factors that conduce to or elicit particular pathologies an important agenda for continued research.

The theoretical framework of SDT specifically distinguishes autonomy from independence, and this distinction is one we see as particularly critical to the field of developmental psychopathology, as well as to theories of parenting, attachment, and development more generally. Noting that both independence and dependence can be either heteronomous or autonomous can help future researchers disentangle what heretofore has been a very mixed and confused literature on dependence across the life span. In our view, dependence should be viewed not only as a potential problem but also as a positive capacity. The willingness to rely on and receive support from others is a basic human propensity that is fostered when autonomy is supported (Ryan et al., 2005). Future research can thus build on this distinction, examining more clearly the pros and cons of dependencies in different developmental epochs and interpersonal contexts. It can also inform

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the growing literatures on psychopathology as it relates to gender and culture, where issues of autonomy and independence have too often been melded and confused (Chirkov, Ryan, & Sheldon, 2011).

More generally, we have pointed to the connections between the development and integration of personality and the phenomenological experience of autonomy in the regulation of behavior. In our view, the issue of autonomy is a critical one for organizational perspectives on developmental psychopathology. The experience of autonomy is a defining feature of organization, whereas disturbances of autonomy that correspond to fragmentation and disorganization in psychological development are also manifest as experiences of control and amotivation. We have further pointed to environmental conditions that either thwart or nurture needs for autonomy, competence, and relatedness as influential factors in development either away from or towards greater organization and integrity, respectively. The differentiated study of how these psychological needs, in interaction with the biological and social conditions of development, result in relative integration and healthy self-regulation supplies a broad and important agenda for future clinical research, and for the development of a knowledge base applicable in clinical interventions.

Because of their fundamental importance in psychological development and their pervasive expression in human behaviors, there is clearly more to know about the nature of basic psychological needs, their evolution, and their mechanistic underpinnings. Moreover, research is only nascent regarding their dynamic interaction with physiological or physical needs (Chen, Van Assche, Vansteenkiste, Beyers, & Soenens, in press). Finally, there is much more research needed about micro- and macrosocial contextual factors impacting their satisfaction or frustration. Progress is rapidly being made on the neuropsychological underpinnings of autonomous and controlled forms of motivation, as we have reviewed. However, much of this knowledge is still at the descriptive level and has yet to be coordinated with genetic studies, and the differential expression of human capacities for growth and defense over development. For example, we know that need thwarting impacts more than immediate experience and behavior and can have cascading effects in multiple areas, from social adjustment to executive functioning (e.g., Bernier, Carlson, & Whipple, 2010; Vansteenkiste & Ryan, 2013). Understanding how need frustrations have these arrayed effects is a matter that will require both more refined empirical and theoretical efforts at every level of analysis.

Developmental psychology, in fact, offers windows into our evolved tendencies and their selective advantages

(Ryan & Hawley, in press; Tomasello, 2008). The fact that basic psychological needs universally play a role in healthy psychological development and wellness suggests that further studies, both genetic and comparative, will add to our understanding of their role in adaptation and maladaptation. More generally, SDT has grown very rapidly in recent years, and its body of evidence contains studies of persons in every part of the life span. Yet there needs to be much deeper understanding of both how need satisfactions change over time in character and focus and how they support developmental progressions in multiple developmental lines.

As a universalistic, organismic perspective on development and personality functioning SDT is also inherently a cross-cultural psychology. Cultures, by their behavioral norms, environmental affordances, and familial practices differentially impact need satisfactions and frustrations. Although the cross-cultural research in SDT has largely focused to date on showing commonalities in effects of satisfaction and frustration of basic needs across groups, domains and cultures, as a maturing scientific perspective it is also time for SDT to take closer interest in the differences these contexts set in motion. For instance, there may exist some cross-cultural variability in the way the psychological needs get nurtured and satisfied (Soenens, Vansteenkiste, & Van Petegem, in press). Along with this, greater attention is needed on cultural differences that enhance or undermine the adopted and internalization of need supportive tertiary and preventive interventions.

Beyond culture we also need more empirical research on how conditions of impoverishment and oppression at cultural levels impact developmental outcomes as mediated by need supports and thwarts. Both proximal and global conditions affect human psychological need satisfactions, so just as we need to coordinate the study of psychological needs with their mechanistic underpinnings, understanding the more global social conditions that affect human wellness is critical to research that can inform policies on child welfare, education, and the necessary social supports to facilitate optimal development for children of all social backgrounds. Illustratively, two recent studies demonstrate how differences in socioeconomic status and the presence of income inequalities negatively affect people's physical and mental health (Di Domenico & Fournier, 2014; Gonzales, Swanson, Lynch, & Williams, 2014). Insofar as conditions of poverty and deprivation conduce to psychopathology through the frustration of basic needs, global efforts to address such conditions and to establish greater social justice deserve our attention both as clinical scientists and as world citizens.

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Queries in Chapter 9

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"One Day I Will Make a Good Parent": On The Relationship Between Overparenting and Young Adults' Early Parenting Representations

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Abstract Early parenting representations are likely to affect future parenting, and it is therefore important to investigate their predictors. In this study, we focused on one dimension of early parenting representations, i.e., perceived ability to relate well to children (PARC) in young adults who are not yet parents, and examined whether this was associated with their own parents' overparenting. In addition, we investigated whether this association was mediated by young adults' attachment styles and perceived general interpersonal problems. Questionnaires were collected from 96 triads (mothers, fathers, young adults; 50% male) comprising intact families. Overparenting dimensions were not consistently associated with PARC. First, significant associations with PARC were observed only for maternal overparenting. Second, higher levels of maternal anticipatory problem solving were significantly associated with lower levels of PARC, whereas higher levels of maternal advice/affect management were significantly associated with higher levels of PARC. These associations were significantly mediated (partially) by levels of secure attachment style and (completely) by levels of dismissive attachment style. Dimensions of maternal overparenting and their interplay with young adult offspring's attachment might have a part in the formation of young adults' early parenting representations. Prevention initiatives could be set up to

inform young adults' parents about the drawbacks of overparenting, and young adults themselves about possible coping mechanisms.

Keywords Overparenting · Early parenting representations · Young adulthood · Mothers and fathers · Attachment · Interpersonal problems

Introduction

People start preparing for parenthood long before becoming parents, or even getting pregnant. Young adulthood is a developmental period in which finding a romantic partner and establishing a family are crucial developmental tasks. During this period, the formation of parenthood expectations can therefore be assumed to play a key role (Arnett 2010). Early expectations about parenthood have been found to relate to future parenting, including the transition to parenthood, parenting behaviors, and parental and child adaptation (Jones and Prinz 2005; Kunseler et al. 2014; Verhage et al. 2013). To advance our understanding of these early buds of future parenting, and our ability to address them in prevention initiatives, it is important to examine their predictors. Although young adults' parenthood expectations are likely to be influenced by their experience of their own parents (George et al. 2008; Mikulincer and Shaver 2007), few studies have examined this topic (Scharf and Mayseless 2011). The present study investigates the association between early parenthood expectations in young adults who are not yet parents and their parents' overparenting. In addition, it examines whether this association is mediated by young adults' attachment styles and interpersonal problems.

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Parenthood Expectations: Perceived Ability to Relate to Children (PARC)

Expectations about parenthood have been studied under various terminologies, such as parental orientation, models of parenthood, buds of parenting, and parenting representations (Rholes et al. 1997; Scharf and Mayseless 2011). The concept traditionally relates to expectations about the self as a parent, about the future child, and about the parent–child relationship (Mayseless 2006). In this paper, we focus on expectations about the self as a parent (Rholes et al. 1997). PARC can be defined as individuals' perceived capacity to become emotionally attached to children, feel comfortable with children, and be a good parent (Rholes et al. 1997).

PARC is likely to develop based on one's actual experiences of being cared for (George et al. 2008; Mikulincer and Shaver 2007; Scharf and Mayseless 2011). Experiencing sensitive and autonomy-granting care lays the groundwork for individuals' willingness and capability for providing such care for their future children, while experiencing inadequate parenting practices might reduce individuals' confidence in their capability to provide adequate care to their future children (Rholes et al. 1997; Scharf and Mayseless 2011). Thus, young adults who experience problematic parenting practices might feel less competent when thinking about their own future parenting.

Overparenting and its Association with PARC in Young Adults

Overparenting (and related concepts such as intensive parenting and helicopter parenting) was first used in popular culture to describe parents who have difficulties separating from their young adult children (Gabriel 2010; Marano 2010). It described parents who, for example, call their young adults' professors to discuss lower than expected grades, try to settle their young adults' disputes with roommates, or write their young adults' college applications (Gabriel 2010; Marano 2010). Guided by these observations, and based on more professional and clinical literature on the phenomenon (Munich and Munich 2009; Taylor 2006), overparenting has been described as a pattern of parenting behavior that is used by parents of young adults, and combines low levels of autonomy granting with unsuitable involvement or intrusive parenting behavior (LeMoyne and Buchanan 2011; Padilla-Walker and Nelson 2012; Segrin et al. 2012). Overparenting relates to abundant, unnecessary, and developmentally inappropriate levels of advice, problem solving, risk protection, monitoring, attention, and management of young adult offspring's mood and emotions (Segrin et al. 2012, 2015). At times, this parental behavior is perceived to be driven by 'parental good intentions' (i.e.,

risk aversion, anxiety, preoccupation with the child's happiness; Segrin et al. 2012, 2015).

According to the self-determination theory, offspring who do not take the initiative in solving their own problems tend to have lower levels of personal confidence and self-efficacy (Deci and Ryan 1995), which might also be reflected in their perception of competence in future developmental tasks such as couple relationships and parenting. Willoughby, Hersh, Padilla-Walker, and Nelson (2013) reported that higher levels of helicopter parenting were significantly associated with young adults' belief that being single is preferable to being married, and with young adults' expected delay in marrying. As overparenting violates the autonomy–connectedness balance in parent–child relationships, this study hypothesizes a significant association with young adults' doubts regarding their future parenting competence (i.e., lower levels of PARC).

Attachment Style and General Interpersonal Problems as Mediators of the Relationship between Overparenting and PARC

Attachment style and problems in interpersonal relationships might explain the link between overparenting and PARC. Attachment theory describes how persons develop general mental representations (general internal working models) of the self, the world, and relationships, based on their experience of primary caregivers (Bowlby 1969). In adulthood, a typology of four attachment styles has been suggested, based on two dimensions: representations of others (the degree to which others are expected to be responsive, supportive, and emotionally available) and representations of oneself (the degree to which a person has internalized the worthiness of the self to be loved and supported; Bartholomew and Horowitz 1991; Griffin and Bartholomew 1994). Individuals rank themselves in terms of four attachment styles: secure (positive other/positive self), dismissive (positive self/negative other), fearful (negative self/negative other), and preoccupied (negative self/positive other).

As overparenting is high in levels of intrusiveness and autonomy suppression (LeMoyne and Buchanan 2011; Padilla-Walker and Nelson 2012; Segrin et al. 2015), it might contribute to negative representations of the self (as incompetent) and of the other as being unresponsive to one's needs. Higher levels of overparenting might therefore be associated with lower levels of secure attachment style. Previous studies have suggested significant connections between higher levels of overparenting and higher levels of attachment insecurity in young adults (Munich and Munich 2009; Rousseau and Scharf 2015). Young adults' attachment style might relate to their PARC. Young adults with secure attachment styles, i.e., young adults who have

positive perceptions about both themselves (e.g., I can solve problems; I have enough patience) and their future child (e.g., my future child will not be too demanding), are likely to perceive themselves as capable of relating well to children. Alternatively, young adults who perceive themselves negatively (i.e., young adults with preoccupied or fearful attachment styles) and/or perceive others negatively (i.e., young adults with preoccupied or dismissive attachment styles) might be more likely to report low levels of PARC. Thus, young adults' attachment styles might mediate the association between overparenting and young adults' perception of future parenting.

While attachment relates to the emotional domain of interpersonal relationships, considering beliefs about being loved and being worthy, interpersonal problems define inept behavioral skills, i.e., individuals' struggle to interact effectively with others (Bochner and Kelly 1974). Problems in interpersonal relationships can be organized on a two-dimensional behavior circumplex based on the major interpersonal dimensions of personality (Horowitz et al. 1997; Pincus and Gurtman 2006). The first dimension is affiliation (interpersonal behavior that ranges from friendly and warm to hostile and cold), and the second dimension is dominance (interpersonal behavior that ranges from dominating or controlling to yielding or relinquishing control; Horowitz et al. 1997; Kiesler 1996; Wiggins 1982). Based on these dimensions, eight aspects of interpersonal problems can be assessed, which also relate to a common latent factor, namely general interpersonal problems (Horowitz et al. 2000).

Overparenting might be associated with young adults' interpersonal problems. First, young adults with overparenting parents might fear being treated similarly in other interpersonal relationships and, therefore, be more likely to act coldly. Second, through modeling processes, young adults might project maladaptive characteristics of the parent-child relationship (e.g., controlling behaviors) onto other interpersonal contexts (Bandura and McClelland 1977; Ladd and Pettit 2002). Only a few studies have examined the association between overparenting and young adults' interpersonal behavior. Odenweller, Booth-Butterfield, and Weber (2014) showed significant associations between higher levels of helicopter parenting and more conformity orientation and dependency on others in young adults. Because of this association between overparenting and general interpersonal problems, young adults with overparenting parents might be less likely to experience compensating positive, sensitive, and autonomy-granting care in interpersonal events outside the parent-child relationship, which might put them at an even higher risk for developing lower levels of PARC. Hence, the relation between overparenting and PARC might be mediated by young adults' interpersonal problems.

Mothers, Fathers, and Control Variables

Mothers and fathers have been observed to play somewhat different roles in the family, in that mothers are generally more involved than fathers in their children's day-to-day activities (Nelson 2010; Patock-Peckham and Morgan-Lopez 2009). Because of their greater involvement, mothers might adopt higher levels of overparenting than fathers, and maternal overparenting might have a stronger impact on offspring's adjustment than paternal overparenting. Young adult gender, age, and romantic relationship status, as well as the cultural context, might relate to the study's variables, and therefore we control them in the analyses. For example, succeeding in forming and maintaining committed romantic relationships might bolster young adults' confidence in their ability to form other close relationships, including with their own children (Scharf and Mayseless 2011). Related to this, PARC might increase with age, as older young adults might feel more mature and have more experiences with infants (e.g., when their friends become parents; Bandura and McClelland 1977; Conrad et al. 1992). Collectivistic culture entails higher levels of intergenerational interdependence compared to individualistic culture, which might positively relate to overparenting (Scharf et al. 2015). Also, females are generally encouraged to be more oriented towards interpersonal relationships than males (Benson et al. 2006; Rose and Rudolph 2006; Shulman and Scharf 2000), and young adult females might therefore exhibit higher levels of PARC than young adult males.

This Study

In sum, this study investigates the association between overparenting (both maternal and paternal) and young adults' PARC. Based on the above considerations, we hypothesize that:

1. Higher levels of overparenting are associated with lower levels of PARC; and
2. The association between overparenting and PARC is (partially) mediated by higher levels of young adults' insecure attachment style and general interpersonal problems.

Method

Participants and Procedure

Mothers, fathers, and young adults (50% male) from 96 intact families participated in the study. All families were

from a middle-class socioeconomic background; 34 families were Arab (35.4%); 62 families were Jewish (64.6%); 95.8% of the young adults were born in Israel; and 29.2% of the mothers and 36.8% of the fathers had a high school education, and the rest had a higher education. Graduate students invited young adults between 20 and 30 years old who were not parents themselves, and their married parents, to participate in a study that examined parent–child relationships in young adulthood. Additional families with the same characteristics were invited using the snowball sampling technique. The young adults were between 20 and 30 years old ($M=25.27$; $SD=3.33$). Participants completed informed consent forms and hard copy questionnaires (paper questionnaires that they received and sent back by mail) or electronic questionnaires (Word documents that they received and sent back by email), according to their preferences. Participants were asked to complete and return the questionnaires individually.

Measures

Measure Completed by the Parents

Overparenting was assessed in terms of three subscales from a measure created by Segrin et al. (2012), filled out separately by fathers and mothers: anticipatory problem solving (12 items; e.g., I tell my child how to plan certain activities); advice/affect management (8 items; e.g., I say or do things to cheer my child up); and child self-direction (12 items; e.g., I let my child solve most problems on his/her own [reverse scored]). A fourth subscale, tangible assistance, was excluded because of low Cronbach's Alphas in both this and previous studies (Rousseau and Scharf 2015; Scharf et al. 2015; Segrin et al. 2012). Parents answered the items on a five-point Likert scale ranging from 1—strongly disagree, to 5—strongly agree. In this study, Cronbach's Alphas were 0.85 and 0.87 for maternal and paternal anticipatory problem solving, respectively; 0.85 and 0.82 for maternal and paternal advice/affect management, respectively; and 0.85 and 0.78 for maternal and paternal child self-direction, respectively. The original development study indicated good internal consistency reliability for the three subscales: $\alpha=0.79$ for child self-direction; $\alpha=0.81$ for advice and affect management; and $\alpha=0.88$ for anticipatory problem solving (Segrin et al. 2012). Past studies by Segrin et al. (2012), Segrin et al. (2015), and Rousseau and Scharf (2015) have supported the concurrent validity of the overparenting subscales.

Measures Completed by the Young Adults

Attachment Style was measured by the Relationship Questionnaire (RQ; Bartholomew and Horowitz 1991; Griffin

and Bartholomew 1994). The RQ consists of four paragraphs, each describing a separate attachment style (secure, dismissive, preoccupied, and fearful). For example, the paragraph describing secure attachment reads as follows: “It is relatively easy for me to become emotionally close to others. I am comfortable depending on others and having others depend on me. I don't worry about being alone or having others not accept me” (for an overview of all four paragraphs, see Bartholomew and Horowitz 1991). Respondents rated the extent to which each paragraph characterized them, ranging from 1—does not describe me at all, to 7—describes me exactly. The relationship questionnaire is constructed to be a brief and easy to administer self-report attachment measure, though with a sound theoretical background. Its stability and validity are not as well studied as other self-report or interview attachment measures; however, the studies that have been performed show acceptable psychometric properties (Brennan et al. 1998; Scharfe and Bartholomew 1994). Insecure attachment style scores measured by the RQ correlated significantly with insecure attachment style scores measured by the Experiences in Close Relationships questionnaire (ECR; Brennan et al. 1998). An 8-month stability of RQ-assessed attachment styles of 63% for women and 56% for men was found (Scharfe and Bartholomew 1994).

Interpersonal problems were assessed by means of the Inventory of Interpersonal Problems Circumplex (IIP-C; Alden et al. 1990). The questionnaire consists of 64 items that assess interpersonal behavior that is “difficult for you” (e.g., It is difficult for me to be self-confident when I am with other people), and interpersonal behavior in which “you do too much” (e.g., I open up to people too much). The items were answered on a 5-point Likert scale ranging from 0—not at all, to 4—extremely. A total interpersonal problems score was calculated by averaging all item scores. Previous studies have shown a strong resemblance between the IIP-C total score and self, therapist, and peer ratings of interpersonal behavior, as well as high test–retest reliability ($r=.98$) and good Cronbach's Alphas (0.72–0.85; Horowitz et al. 2000; Monsen et al. 2006; Vittengl et al. 2003; Woodward et al. 2005). In the current study, Cronbach's Alpha was 0.93.

Perceived ability to relate well to children (PARC) was measured by the ‘ability to relate to children’ questionnaire (Rholes et al. 1997). The scale included 11 items (e.g., I worry that I could not become emotionally attached to children; I feel uncomfortable with children), which were reverse scored to reflect perceived competence. A total PARC score was calculated by averaging all item scores. Both in the original development study and in the current study, Cronbach's Alphas were high (0.88 and 0.83, respectively). The original development study supported the convergent validity of the scale by showing that higher levels

of PARC significantly related to lower levels of attachment avoidance and ambivalence, and to higher levels of desire to have children (Rholes et al. 1997). In addition, the scale was significantly associated with other aspects of early expectations and motivations concerning future parenthood, such as the desire to have children, expected satisfaction from parenting, and positive future child representations (Rholes et al. 1997; Scharf and Mayseless 2011).

Data Analysis

All analyses were performed using PASW statistics 22. Direct associations between overparenting and young adults' PARC, indirect associations through attachment style and general interpersonal problems, and total associations (i.e., the sum of all possible direct and indirect associations between overparenting and young adults' PARC) were assessed by means of mediation analysis, following the guidelines of Preacher and Hayes (2004, 2008). An indirect association (i.e., mediation) is significant when the confidence interval does not contain zero (Fritz and Mackinnon 2007; Hayes 2009). To avoid problems of multicollinearity, analyses were performed separately for each mediator. As suggested by Hayes (2009), analyses were executed using bias-corrected bootstrap sampling over 5000 iterations.

Results

The proportion of missing data was low and varied over the items from 0.00 to 3.23%. For overparenting and interpersonal problems, missing values were handled when creating scale scores (i.e., total scores were calculated by averaging all non-missing item scores). For the other variables, missing values were handled in the statistical analyses, through listwise deletion. Table 1 presents descriptive statistics and correlations between the study variables. All variables presented sufficient variability to allow robust testing of hypotheses. Bivariate Pearson r correlations (two-tailed) showed that for the study variables of interest, higher levels of maternal anticipatory problem solving were significantly associated with lower levels of young adults' PARC, and higher levels of young adults' dismissive attachment. Higher levels of maternal advice/affect management were significantly associated with higher levels of young adults' secure attachment, whereas higher levels of paternal child self-direction (reverse scored) were significantly associated with higher levels of young adults' interpersonal problems. Higher levels of secure attachment were significantly associated with higher levels of PARC. Higher levels of dismissive attachment, fearful attachment, and interpersonal

problems were significantly associated with lower levels of PARC.

Concerning the control variables, participants from Arab family backgrounds reported significantly higher levels of maternal anticipatory problem solving, paternal advice/affect management, and interpersonal problems than participants from Jewish family backgrounds. Maternal anticipatory problem solving was significantly lower for young adults in committed romantic relationships than for young adults without committed romantic relationships, and PARC was significantly higher for females than for males. Family origin (Arab or Jewish), relationship status of the young adult (in or not in a committed romantic relationship), and gender of the young adult were controlled for in all analyses. The age of the young adult was significantly associated with the mediator 'secure attachment style,' and, therefore, age was controlled for in the analysis, including 'secure attachment style' as a mediator.

Total, Direct, and Indirect Associations

Tables 2 and 3 and Fig. 1 present the results of the mediation analyses. Tables 2 and 3 show that there was a significant total association (i.e., the sum of all possible direct and indirect associations) between higher levels of maternal anticipatory problem solving and lower levels of PARC in young adults. The same tables and Fig. 1 indicate that this association was partially explained by young adults' lower levels of secure attachment (i.e., after controlling for this indirect effect, a significant direct effect remains) and fully explained by young adults' higher levels of dismissive attachment (i.e., after controlling for this indirect effect, no significant direct effect remains). In addition, Tables 2 and 3 show a significant total association between higher levels of maternal advice/affect management and higher levels of PARC. The same tables and Fig. 1 indicate that this association was partially explained by young adults' higher levels of secure attachment, and fully explained by young adults' lower levels of dismissive attachment. For maternal child self-direction, or the dimensions of paternal overparenting, no significant associations were seen with PARC. In addition, general interpersonal problems did not significantly mediate the relation between overparenting and PARC.

Discussion

Early expectations about parenthood have been found to affect future parenting, including transition into parenthood, parenting behavior, and parental and child adaptation (Jones and Prinz 2005; Kunseler et al. 2014; Verhage et al. 2013). To advance our understanding of these early buds of parenting, it is important to examine their

Table 1 Descriptive statistics and correlations between the study variables

	<i>M</i>	<i>SD</i>	Correlations																
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Maternal overparenting																			
1	Anticipatory problem solving	2.99	0.69	1	0.43***	0.44***	0.53***	0.16	0.24*	-0.27**	-0.08	0.14	0.23*	0.15	0.06	0.25*	-0.10	-0.22*	-0.08
2	Advice/affect management	3.95	0.55	1	0.00	0.06	-0.04	-0.06	0.10	0.21*	0.03	-0.15	0.09	-0.14	0.14	0.14	0.07	0.04	0.13
3	Child self-direction (reverse scored)	2.41	0.61	1	0.30**	0.17	0.41***	-0.13	-0.05	0.12	0.13	0.00	0.12	0.10	0.12	0.10	0.08	-0.12	-0.02
Paternal overparenting																			
4	Anticipatory problem solving	3.12	0.74	1	0.46***	0.40***	-0.16	-0.01	0.06	0.05	0.15	0.03	0.17	-0.01	-0.17	-0.18	-0.18	-0.18	-0.18
5	Advice/affect management	3.85	0.67	1	0.04	0.03	0.06	-0.02	-0.11	0.21*	0.12	-0.11	0.21*	0.16	-0.05	-0.18	-0.11	-0.11	-0.11
6	Child self-direction (reverse scored)	2.32	0.53	1	0.36***	-0.20	-0.33**	-0.39***	-0.34**	-0.16	0.32**	0.03	0.08	0.11	0.21*	0.16	-0.05	-0.18	-0.11
7	Perceived ability to relate well to children (PARC)	5.67	1.04	1	0.36***	-0.20	-0.33**	-0.39***	-0.34**	-0.16	0.32**	0.03	0.08	0.11	0.21*	0.16	-0.05	-0.18	-0.11
Attachment style																			
8	Secure	4.48	1.41	1	-0.27**	-0.36***	-0.26*	-0.23*	-0.02	0.09	0.05	0.24*	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
9	Preoccupied	2.82	1.60	1	0.34**	0.10	0.35***	0.12	-0.01	-0.15	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
10	Dismissive	2.40	1.53	1	0.03	0.34**	-0.06	-0.06	-0.06	-0.06	-0.03	-0.14	-0.03	-0.03	-0.03	-0.03	-0.03	-0.03	-0.03
11	Fearful	3.40	1.77	1	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
12	Interpersonal problems	2.19	0.45	1	0.22*	-0.15	-0.12	-0.07	-0.07	-0.12	-0.12	-0.07	-0.07	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12
13	Origin	0.35	0.48	1	0.01	-0.02	0.11	0.11	0.01	-0.02	0.11	0.11	0.01	-0.02	0.11	0.11	0.01	-0.02	0.11
14	Gender	0.51	0.50	1	0.10	-0.08	0.38***	0.10	0.10	-0.08	0.38***	0.10	0.10	-0.08	0.38***	0.10	0.10	-0.08	0.38***
15	Committed romantic relationship	0.69	0.47	1	0.38***	0.10	0.38***	0.10	0.38***	0.10	0.38***	0.10	0.38***	0.10	0.38***	0.10	0.38***	0.10	0.38***
16	Age	25.27	3.33	1	0.38***	0.10	0.38***	0.10	0.38***	0.10	0.38***	0.10	0.38***	0.10	0.38***	0.10	0.38***	0.10	0.38***

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; gender: male = 0, female = 1; Origin: Jewish = 0, Arab = 1; committed romantic relationship: no = 0, yes = 1

Table 2 Indirect association between overparenting and young adults' perceived future parenting competence, through attachment style

Independent variable	Mediator = secure attachment style				Mediator = preoccupied attachment style				Mediator = dismissive attachment style				Mediator = fearful attachment style			
	Total		Indirect 95% CI		Total		Indirect 95% CI		Total		Indirect 95% CI		Total		Indirect 95% CI	
	B	(SE)	Low	Up	B	(SE)	Low	Up	B	(SE)	Low	Up	B	(SE)	Low	Up
Anticipatory problem solving mother	-0.58*	0.23	-0.47*	0.23	-0.54*	0.23	-0.53*	0.23	-0.54*	0.23	-0.46	-0.05	-0.54*	0.23	-0.49*	0.22
Advice/affect mother	0.61**	0.22	0.46*	0.23	0.53*	0.22	0.52*	0.22	0.53*	0.22	0.35	0.23	0.45	0.53*	0.22	0.55**
Child direct mother	0.06	0.20	0.04	0.20	-0.01	0.21	0.04	0.21	-0.01	0.21	-0.04	0.20	0.18	-0.01	0.21	-0.08
Anticipatory problem-solving father	0.01	0.19	-0.04	0.19	-0.04	0.20	-0.01	0.20	-0.04	0.20	-0.10	0.19	0.24	-0.04	0.20	-0.03
Advice/affect father	0.11	0.18	0.08	0.17	0.17	0.18	0.13	0.18	0.17	0.18	0.14	0.17	0.13	0.17	0.18	0.22
Child direct father	0.02	0.23	0.03	0.22	0.05	0.23	-0.04	0.24	0.00	0.32	0.05	0.23	0.06	0.05	0.23	0.14
Gender	0.58**	0.21	0.55**	0.20	0.54*	0.21	0.54**	0.21	0.54*	0.21	0.56**	0.20	0.54*	0.21	0.45*	0.20
Origin	-0.24	0.23	-0.22	0.22	-0.32	0.22	-0.27	0.22	-0.32	0.22	-0.37	0.22	-0.32	0.22	-0.21	0.21
Committed romantic relationship	-0.32	0.24	-0.26	0.23	-0.18	0.23	-0.23	0.23	-0.18	0.23	-0.13	0.22	-0.18	0.23	-0.14	0.21
Age	0.03	0.03	0.01	0.03												

B bootstrapped unstandardized beta coefficient, SE bootstrapped standard error

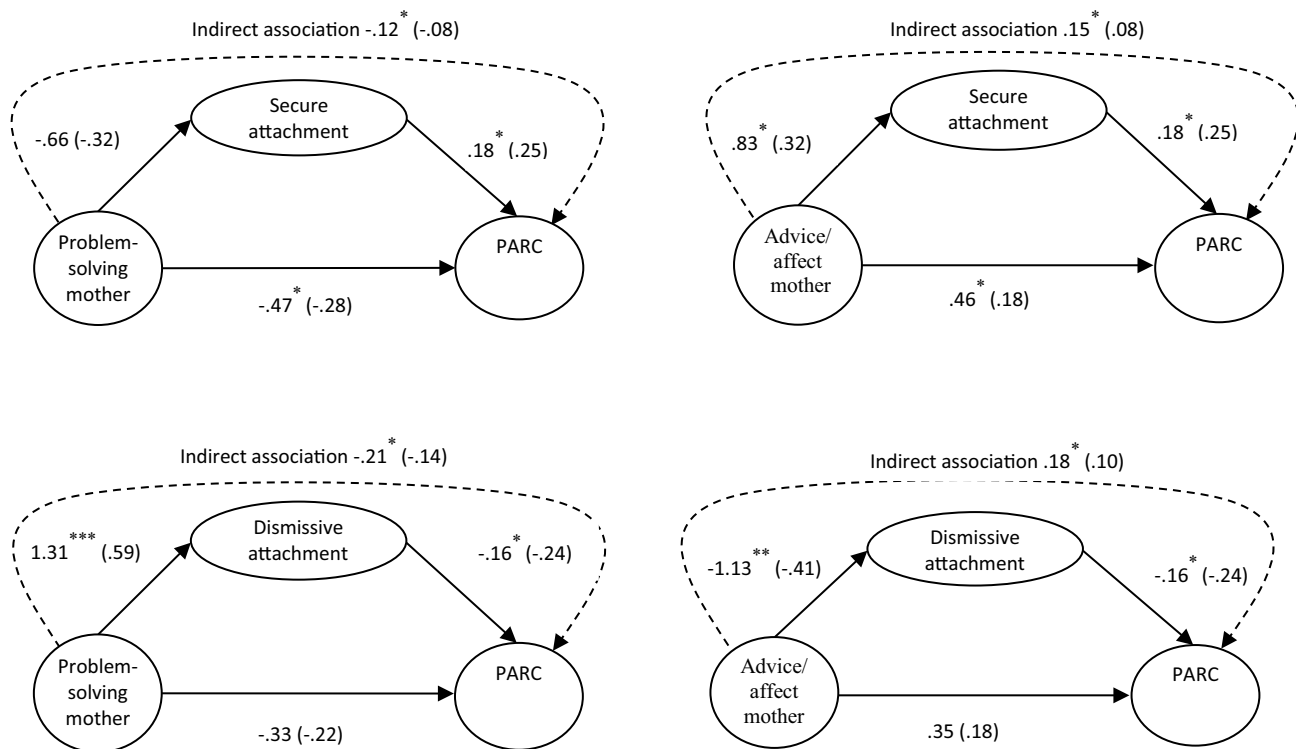
*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; gender: male = 0, female = 1; Origin: Jewish = 0, Arab = 1; committed romantic relationship: no = 0, yes = 1

Table 3 Indirect association between overparenting and young adults' perceived ability to relate well to children, through general interpersonal problems

Independent variable	Mediator = general interpersonal problems					
	Total		Direct		Indirect 95% CI	
	B	(SE)	B	(SE)	Low	Up
Anticipatory problem solving mother	−0.54*	0.23	−0.53*	0.23	−0.14	0.09
Advice/affect mother	0.53*	0.22	0.45*	0.22	−0.02	0.31
Child direct mother	−0.01	0.21	0.02	0.20	−0.27	0.09
Anticipatory problem-solving father	−0.04	0.20	−0.04	0.19	−0.10	0.10
Advice/affect father	0.17	0.18	0.09	0.17	−0.01	0.24
Child direct father	0.05	0.23	0.11	0.23	−0.23	0.04
Gender	0.54*	0.21	0.49*	0.20		
Origin	−0.32	0.22	−0.18	0.22		
Committed romantic relationship	−0.18	0.23	−0.22	0.22		

B bootstrapped unstandardized beta coefficient, SE bootstrapped standard error

* $p < 0.05$; gender: male = 0, female = 1; Origin: Jewish = 0, Arab = 1; committed romantic relationship: no = 0, yes = 1

**Fig. 1** Significant indirect associations between overparenting and young adults' perceived ability to relate well to children (PARC). *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; PARC perceived ability to relate

well to children; all depicted indirect associations were significant as calculated by means of 95% bias-corrected bootstrapped confidence intervals. Standardized coefficients are presented between brackets

predictors. This study investigated whether overparenting by young adults' parents was associated with young adults' PARC, and whether this association was mediated by young adults' attachment styles and their interpersonal problems.

Parental Gender and the Specific Overparenting Subscale

This study indicated that overparenting dimensions were not consistently associated with PARC. First, significant associations were seen only for maternal overparenting. Second, for maternal overparenting, the direction of the

significant associations with PARC depended on the specific overparenting dimension. As expected, higher levels of maternal anticipatory problem solving were significantly associated with lower levels of PARC. However, contrary to our expectations, higher levels of maternal advice/affect management were significantly associated with higher levels of PARC.

The unexpected positive result for maternal advice/affect management might be explained by that fact that, as past studies have shown, mothers are generally very concerned with interpersonal relations and caring, and are highly involved in the lives of their children (Coyl-Shepherd and Newland 2013; Eggebeen 1992; Phares et al. 2009; Rossi and Rossi 1990). Maternal advice/affect management might therefore be relatively common and acceptable, and interpreted by the young adults as caring rather than intrusive. Nonetheless, as expected, this study revealed that the overparenting subscale 'maternal anticipatory problem solving' was significantly associated with lower levels of PARC. Anticipatory problem solving might be more unequivocally intrusive, as it entails mothers providing help before there is any sign of the need. This study found no significant results for paternal overparenting, which might reflect mothers' parenting playing a greater role when imagining future parenting, possibly due to their higher involvement in parenting tasks (Nelson 2010; Patock-Peckham and Morgan-Lopez 2009).

Attachment and Interpersonal Problems as Mediators of the Association between Overparenting and PARC

As expected, the significant association between higher levels of maternal anticipatory problem solving and lower levels of PARC was significantly mediated by lower levels of secure attachment and higher levels of dismissive attachment. As elaborated in the introduction, securely attached persons have positive perceptions of both themselves and others, whereas dismissively attached persons have positive perceptions of the self combined with negative perceptions of others (Bartholomew and Horowitz 1991; Griffin and Bartholomew 1994). The fact that young adults perceive overparenting as originating in good intentions increases the chance of them retaining positive self-perceptions (Padilla-Walker and Nelson 2012). However, the fact that overparenting parents do not fulfill young adults' need for autonomy is likely to relate to young adults' negative perceptions of the parent, which might generalize to negative perceptions of others (LeMoyne and Buchanan 2011; Padilla-Walker and Nelson 2012; Segrin et al. 2012). The significant association between higher levels of maternal advice/affect management and higher levels of PARC was significantly mediated by higher levels of secure attachment and lower levels of dismissive attachment. As mentioned

above, maternal advice/affect management might be experienced by young adults as caring rather than intrusive into, or unsupportive of, their autonomy. It might therefore relate to positive perceptions not only of the self, but also of the other.

In addition, the significant mediations through dismissive attachment were complete, indicating that no direct association exists between maternal overparenting and PARC. Moreover, this study showed that perception of interpersonal problems was not a significant mediator. In other words, it is especially the young adults' attachment style, i.e., levels of trust in oneself and the other, rather than their perceived current interpersonal problems which is important for their PARC. Attachment styles might be more strongly determined by relationships with the primary caregivers (i.e., overparenting), and therefore more closely related to their PARC, whereas interpersonal problems are more likely to be influenced by interpersonal experiences with a broader variety of individuals.

Strengths, Limitations, Further Research, and Implications

The study included perspectives of mothers, fathers, and their young adult children. Our knowledge of fathers of young adults is scarce, and our study enabled the examination of both parents. We included families from a middle-class socioeconomic background because overparenting is especially prominent among these families in order to ensure their offspring's success (Bernstein and Triger 2010; Gibbs 2009; Locke et al. 2012). However, investigating overparenting in families from other backgrounds might be interesting and yield different results. For example, research has suggested that what might be perceived as intrusive and maladaptive parenting behavior in families with a middle-class socioeconomic status could be protective in families from a lower socioeconomic background (Flouri and Buchanan 2004). In addition, we included only intact families, so that characteristics related to divorce or single parenthood would not bias the results. Divorced or single parents might have additional motives to protect their children, which might be associated with intensive parenting. Further, children from such families might be more likely to have different family experiences, which could relate to their attachment security and to their perceived ability to relate well to children. Future studies should explore the hypotheses among heterogeneous and larger samples.

Our study included only cross-sectional data and, as a result, conclusions about causality and the direction of associations are precluded. In addition to overparenting influencing young adults' characteristics, those characteristics might also stimulate parents' overparenting (Pettit and Arsiwalla 2008). Future research should include

longitudinal data in order to investigate directionality. Another limitation relates to the overparenting questionnaire, in that more information is needed on its convergent and discriminant validity.

Future studies might further investigate the roles of gender, age, family origin, and romantic relationship status. In addition, other variables, such as ‘experience with children,’ might be important, for example, as a possible moderator of the association between overparenting and PARC. Future studies might also investigate how maternal overparenting and paternal overparenting interact with each other to predict young adults’ adjustment. Maladaptive parenting behavior might have stronger negative effects when it is used by both mothers and fathers (Forehand and Nousiainen 1993; Jones et al. 2000). Prevention initiatives might use this study’s results to inform parents that, despite their good intentions, overparenting harms rather than benefits young adults’ adjustment. Further, helping young adults to cope with parents’ overinvolvement might help both partners.

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Overparenting and Young Adults' Interpersonal Sensitivity: Cultural and Parental Gender-Related Diversity

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Abstract The first goal of this study was to investigate whether levels of overparenting behavior (anticipatory problem-solving, advice/affect management, tangible assistance, and low levels of child self-direction) differ depending on the context (Arab-Israeli vs. Jewish-Israeli; mothers vs. fathers). Second, we considered whether the association between overparenting and young adults' interpersonal sensitivity depends on those contexts. Questionnaires were collected from 165 triads (mothers, fathers, and young adults), of which 89 were Jewish-Israeli and 76 Arab-Israeli. Parents reported on their overparenting behaviors and young adults reported on their interpersonal sensitivity. Results indicated that all four dimensions of overparenting behaviors were more prominent in Arab-Israeli culture than in Jewish-Israeli culture, while advice/affect management was lower for mothers than for fathers and fathers provided more child self-direction than mothers. In addition, higher levels of anticipatory problem-solving were significantly associated with higher levels of young adult interpersonal sensitivity, independent of parental gender or cultural background, supporting the general negative association between anticipatory problem-solving and interpersonal sensitivity.

Keywords Overparenting · Interpersonal sensitivity · Culture · Gender · Young adult

Introduction

During the last decade a growing number of popular media and scientific studies have discussed the phenomenon of overparenting (also referred to as helicopter parenting, intensive parenting, or parenting out of control) and its adverse implications for young adults (LeMoyne and Buchanan 2011; Nelson 2010; Schiffrin et al. 2014; Segrin et al. 2012). Overparenting is a parenting style that is observed in young adulthood and describes parents who use high levels of developmentally inappropriate involvement, indicating problems in family differentiation (LeMoyne and Buchanan 2011; Segrin et al. 2012). Overparenting parents have been characterized as intrusive and thereby interfering with children's need for autonomy (Schiffrin et al. 2014; Segrin et al. 2012). In particular, four dimensions of parenting behavior have been described as characterizing overparenting parents (Segrin et al. 2012): high levels of anticipatory problem-solving (i.e., being highly attentive to potential risk and future problems affecting the child, and a tendency to intervene before problems arise or have been perceived as such by the offspring); high levels of advice/affect management (offering high levels of advice to the child and intensively managing the child's emotions and moods); high levels of tangible assistance (i.e., helping out with the practical issues of paying bills and providing transport, and doing day-to-day chores such as cooking and laundry); and low levels of child self-direction (i.e., not allowing their children the freedom to encounter problems and do things on their own). These parenting behaviors are thought to arise from parents' negative past experiences and their tendency to be critical and to try to prevent negative outcomes, rather than responding adequately to their children's needs (Segrin et al. 2015).

In line with the self-determination theory (Deci & Ryan, 2000), overparenting can be expected to violate three basic

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human needs which are necessary for healthy functioning: competence (secure and confident in their own ability), autonomy (capable of making personal choices), and relatedness (involved in a genuine and caring relationship). Overparenting's intrusiveness undermines young adults' need for autonomy and competence, because it restricts them from doing things independently and thereby communicates that they are incompetent, while at the same time interfering with their acquisition of skills necessary to feel competent (Segrin et al. 2012). Hence, insensitive and intrusive parenting behaviors also violate young adults' need for involvement in genuine and caring relationships (Schiffrin et al. 2014). Overparenting might be expressed differently in environments that stress varying levels of autonomy. Collectivistic cultures have traditionally been described in terms of intergenerational interdependence, guidance, and advice, while individualistic cultures generally place higher value on children's independence and privacy (Coll and Pachter 2002; Rudy and Grusec 2001; Triandis 2004). According to the person-environment fit theory, congruence between personal and environmental characteristics promotes well-being while a misfit between persons and their environment may cause stress and negative psychological outcomes (Edwards et al. 1998; Gilbreath et al. 2011). Thus, in environments that value interdependence, overparenting is likely to be more common and normative and may therefore have less harmful effects than in contexts that value independence. However, most studies have not differentiated between environmental contexts.

According to social role theory, societal expectations and preferred characteristics are attributed to each gender (Eagly and Wood 1999). Mothers are described as being more oriented towards interdependence in the relationship with their children than fathers (Bretherton 2010; Craig 2006; Larson and Richards 1994). Few empirical studies have reported that mothers show higher levels of overparenting than fathers (Fingerman et al. 2012; Rousseau and Scharf 2015). However, these studies did not take into account the interdependence of mothers and fathers within the same family (Kenny 2011). For other types of intrusive parental control, results are mixed. In a review, Barber and Harmon (2002) concluded that mothers tend to use higher levels of psychological control, i.e., parenting behavior that is conditionally approving, autonomy-reducing and intrusive towards children's emotions and cognitions, than fathers towards children and adolescents. Yet, other studies have found that mothers and fathers do not significantly differ in their use of psychological control of emerging adults (Nelson et al. 2011) and of various other types of control of younger children (Collins et al. 2005; Steinberg and Silk 2002). Regarding culture, results have been more straightforward, as most studies have confirmed that intrusive and controlling parenting behavior is higher in collectivistic than individualistic cultures. Researchers have reported that

compared to parents from an individualistic/majority background, parents from a collectivistic/minority background provide higher levels of overparenting (Bradley-Geist and Olson-Buchanan 2014), tiger parenting, i.e., overinvolved parenting behavior that is autonomy-reducing and intrusive as regards children's academic performance (Kim 2013), and psychological control (Chao and Aque 2009). However, most of the studies have been conducted with adolescent and young children and in North America and China, and additional research is needed to shed further light on the generalizability of such findings.

Whereas scholars have argued that the three basic psychological needs are universal and must be satisfied in all contexts for optimal adjustment (Deci and Ryan 2000, p. 246), according to the person-environment fit perspective, intrusive parenting behavior might be less negative and even positive in contexts where high levels of involvement and interdependence are more common and socially approved (Rothbaum and Trommsdorff 2007). In interdependence-oriented contexts, offspring are more likely to perceive overparenting as normative than as criticism or an indication of their divergence, and as such it is less likely to make people expectant of critique and rejection by others, and dependent on others' feedback and acceptance to guide their behavior (Wright et al. 2009). However, experiencing such criticism and divergence is likely to lead to inferiority, rejection, and the development of cognitive schemas of "interpersonal sensitivity" (Otani et al. 2009). Interpersonal sensitivity is an excessive awareness of and sensitivity to the behavior and feelings of others. Individuals with high levels of interpersonal sensitivity are concerned with their interpersonal relationships, overly attentive to the behavior and feelings of others, and inclined to adapt their behavior according to other's expectations so as to minimize criticism or rejection (Boyce and Parker 1989; Otani et al. 2009). In this regard, two dimensions of interpersonal sensitivity may be relevant. The first concerns young adults' worry about interpersonal issues, the importance of others' opinions and feedback, and fear of others' responses, while the second dimension relates to young adults' lack of assertive expression of opinions and feelings and their worry about pleasing others. An affirmative response might be viewed as negative in individualistic cultures (i.e., not being assertive enough) but positive in collectivistic cultures (i.e., being willing to forego one's own interests for the benefit of the group). Nevertheless, interpersonal sensitivity has been shown to be maladaptive and was associated with depression, both in Caucasian (Boyce and Parker 1989; Wilkowski et al. 2009) and non-Caucasian samples (Sakado et al. 1999; Vidyandhi and Sudhir 2009).

Past empirical research has yielded mixed results on how implications of intrusive parenting behavior are generalized across contexts. Several studies have found that culture does not moderate associations between parental psychological

control and the psychosocial development of offspring (Barber et al. 2005; Pomerantz and Wang 2009; Rudy et al. 2008; Wang et al. 2007). Similarly, studies have indicated comparable results for maternal and paternal psychological control (Aunola et al. 2013; Barber et al. 2005) and for maternal and paternal overprotection (Vera et al. 2012). However, other studies have supported the person-environment fit theory, indicating that psychological control is associated with psychosocial risk in offspring in individualistic cultures but not in collectivistic cultures (Olsen et al. 2002), in collectivistic/minority cultures but not in individualistic/majority cultures (Rudy and Halgunseth 2005), and when used by the father but not when used by the mother (Aunola and Nurmi 2005). A recent study has addressed the specific aspects of overparenting and found it to be associated with outcomes for offspring only when used by fathers and not when used by mothers (Rousseau and Scharf 2015). However, cultural differences were not examined and interdependence between maternal and paternal parenting behavior within the same family was not controlled for.

The current study adds to our knowledge of overparenting by investigating whether it is expressed differently within the more individualistic contexts of Jewish-Israeli families and paternal parenting than in the more collectivistic context of Arab-Israeli families and maternal parenting. The study contributes to our understanding of the person-environment fit by examining the generalizability of the occurrence and consequences of overparenting. More specifically, the first aim of the current study is to assess differences in overparenting between mothers and fathers and between Arab-Israeli and Jewish-Israeli families. The second aim is to investigate whether the association between overparenting and interpersonal sensitivity depends on the gender of the parent or the cultural background of the family. Based on the arguments presented in the introduction, overparenting is hypothesized to be more prominent in Arab-Israeli than in Jewish-Israeli families; however, for differences between mothers and fathers, the picture is less straightforward. In addition, following the self-determination theory, overparenting can be expected to be related to higher levels of interpersonal sensitivity, independently of the family culture or parental gender, while according to the environment-fit theory, such associations can be expected for those contexts where overparenting is less common.

Method

Participants

The sample consisted of 165 young adults, 80 males (48.5 %) and 85 females, and their mothers and fathers. All participants resided in the northern area of Israel. A total of

76 young adults were Arab (46.1%; all Muslim), and 89 (53.9%) were Jewish. The young adults ranged in age from 20 to 30 years ($M = 24.55$; $SD = 2.97$), and most (87.3%) were students or had academic education. A total of 64.5% of the mothers and 73.7% of the fathers had a higher education degree. Most of the participating families lived in neighborhoods with a middle class socioeconomic index, as identified by the Israel Central Bureau of Statistics (2013). Dar and Resh (1991) showed that for Israel, residential neighborhood provides a good indication of socioeconomic status. Of the participating young adults, the main occupation of 76.4% was studying, while that of 23.6% was paid employment; 53.3% were living with their parents, and 50.9% were in a committed romantic relationship.

Procedure

Families were invited by graduate students to participate in a study examining parent-child relationships in emerging adulthood. Additional families were recruited via the snowball sampling technique and social network sites. The precondition for participation was that mother and father were living together, and that all three family members were willing to participate. Interested families received information about the study, informed consent forms, and questionnaires. Participants were asked to complete and return the questionnaires separately. Only those families that submitted all three questionnaires were included in subsequent analysis.

Measures

Overparenting was measured by a questionnaire created by Segrin et al. (2012), which was completed by mothers and fathers. The questionnaire included 39 items, which were answered on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The items loaded on four scales, namely anticipatory problem-solving (e.g., I tell my child how to plan out certain activities; Cronbach Alpha .91 for Arab mothers, .92 for Arab fathers, .88 for Jewish mothers, and .86 for Jewish fathers), advice/affect management (e.g., I say or do things to cheer up my child; .87 for Arab mothers, .91 for Arab fathers, .84 for Jewish mothers, and .82 for Jewish fathers), tangible assistance (e.g., I see to it that my child's financial needs are taken care of; .81 for Arab mothers, .79 for Arab fathers, .69 for Jewish mothers, and .64 for Jewish fathers), and child self-direction (e.g., I let my child solve most problems on his/her own [reverse-scored]; .85 for Arab mothers, .88 for Arab fathers, .84 for Jewish mothers, and .71 for Jewish fathers). Construct validity of the questionnaire was demonstrated by Segrin et al. (2012). The original development study (Segrin et al. 2012) showed good construct validity for the overparenting scale, as its subscales correlated in expected

directions with subscales of the parental authority questionnaire (Buri 1991) and the family adaptability and cohesion evaluation scales, version IV (Olson 2008). In addition, the original development study showed good internal consistency reliability: $\alpha = .88$ for anticipatory problem-solving; $\alpha = .81$ for advice and affect management; $\alpha = .74$ for tangible assistance; and $\alpha = .79$ for child self-direction (Segrin et al. 2012).

Two subscales of *The Interpersonal Sensitivity Measure* (Boyce and Parker 1989), in its revised version (Harb et al. 2002) were filled out by the young adults: Interpersonal Worry and Dependency (11 items, e.g., My value as a person depends enormously on what others think of me; Cronbach's Alpha .81 for Arab young adults, and .86 for Jewish young adults), and unassertive interpersonal behavior (8 items, e.g., I will do something I do not want to do rather than offend or upset someone; .69 for Arab young adults, and .73 for Jewish young adults). The subscales assess excessive sensitivity to the interpersonal behavior of others, to social feedback, and to (perceived or actual) negative evaluation by others. Items were measured on a four-point Likert scale ranging from 1 (very unlike me) to 4 (very like me). Boyce and Parker (1989) and Harb et al. (2002) reported good psychometric performance of the questionnaire, with a Cronbach's Alpha of .88 for interpersonal worry and dependency, and .79 for unassertive interpersonal behavior.

Data Analyses

Cultural and parental-gender differences in levels of overparenting practice were explored by multivariate analysis of variance (MANOVA) with repeated measure, using PASWstatistics23 (SPSS Inc., Chicago, IL, USA). Parental gender was treated as a within subject variance component and culture as a between subject variance component. All analyses in the current study were controlled for young adults' gender (male or female; Bretherton 2010) and living situation (with the parent or independent; Bradley-Geist and Olson-Buchanan 2014). To investigate whether the association between overparenting and young adults' interpersonal sensitivity was moderated by parental gender and/or cultural background, we used multi-group structural equation modelling in MPLUS software version 7 (Muthén and Muthén 1998–2012). Latent variables included overparenting (indicated by the subscales anticipatory problem-solving, advice/affect management, tangible assistance, and child self-direction) and interpersonal sensitivity (indicated by interpersonal worry and dependency, and unassertive interpersonal behavior). For latent variables to be considered appropriate, the correlation between indicators cannot be excessively high, the model should have a good fit, and indicators must have relatively high standardized loadings

(>.30) and load only on one factor (Kline 2005). When performing multi-group structural equation modelling, the latent variables have to be comparable across groups, indicated by metric invariance (a model in which both the factor structure and factor loadings are constrained to be the same across groups has a good fit; Milfont and Fischer 2010).

Subsequently, all structural paths were added and moderation was tested by multi-group analyses, as outlined by Bowen and Guo (Bowen and Guo 2011). The fit of a basic model (associations between overparenting and young adults' interpersonal sensitivity were constrained to be equal across parental gender and cultural background) was compared with that of a parental-gender moderation model (associations between overparenting and young adults' interpersonal sensitivity were freed to differ for parental gender but constrained to be equal for cultural background) and a cultural moderation model (associations between overparenting and young adults' interpersonal sensitivity were freed to differ for cultural background but constrained to be equal for parental gender). Model fit was assessed by means of the likelihood-ratio test (X^2), Root Mean Square Estimation of Association (RMSEA), and the Bentler comparative fit index (CFI; Barrett 2007; Cheung and Rensvold 2002). Good model fit was indicated by a non-significant X^2 , an RMSEA lower than .06 (>.1 suggests poor fit), or a CFI larger than .95. Significance of model fit improvement was indicated by a significant X^2 difference and a CFI difference higher than .01 (Barrett 2007). There were no missing data.

Results

The MANOVA repeated measure for the four dimensions of overparenting behavior indicated a main effect of parental gender $F(4, 159) = 3.22, p < .05, \mu^2 = .08$, and cultural context $F(4, 159) = 13.57, p < .001, \mu^2 = .25$. The interaction between parental gender and cultural context was not significant. These results were controlled for young adults' living situation. We also investigated the role of young adults' gender but as the results were not significant, it is not included in the final analyses. Table 1 presents the univariate tests and descriptives. Mothers reported higher levels of advice/affect management and lower levels of child self-direction than fathers. Parents with an Arab-Israeli background reported higher levels of anticipatory problem-solving, advice/affect management, and tangible assistance, and lower levels of child self-direction than parents with a Jewish-Israeli background.

Correlations between study variables are presented in Table 2 (for Arab families) and Table 3 (for Jewish families). For Arab families, higher levels of paternal problem-solving and lower levels of paternal child self-direction

Table 1 Multivariate analysis of variance with repeated measures (within factor parental gender; between factor cultural background; controlling for shared residence)

	Mothers (<i>n</i> = 76)		Fathers (<i>n</i> = 89)		Jewish (<i>n</i> = 165)		Arab (<i>n</i> = 165)		<i>F</i> parental gender (η^2)	<i>F</i> culture (η^2)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Anticipatory problem-solving	3.38	.36	3.31	.82	3.01	.61	3.74	.70	.25 (.00)	46.39** (.22)
Advice/affect management	4.12	.64	3.84	.73	3.82	.51	4.17	.61	6.93** (.04)	15.81*** (.09)
Tangible assistance	3.75	.79	3.82	1.09	3.60	.61	4.00	.97	.12 (.00)	5.78* (.03)
Child self-direction	3.65	.64	3.76	.60	3.87	.40	3.52	.58	5.23* (.03)	14.79*** (.08)

Parental gender was dummy coded as 0 = male and 1 = female; culture was dummy coded as 0 is Israeli-Jewish and 1 is Israeli-Arab

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 2 Correlations between the study variables—Arab families (*n* = 76)

	1	2	3	4	5	6	7	8	9	10
<i>Maternal overparenting</i>										
1 Anticipatory problem-solving		.86***	.66***	-.26*	.56***	.42***	.36***	.02	.13	.18
2 Advice/affect management		1	.64***	-.18	.54***	.52***	.41***	-.02	.04	.10
3 Tangible assistance			1	-.27*	.38**	.40***	.50***	-.07	.14	.05
4 Child self-direction				1	.04	.16	-.11	.42***	.06	-.14
<i>Paternal overparenting</i>										
5 Anticipatory problem-solving					1	.85***	.49***	-.28*	.21	.26*
6 Advice/affect management						1	.46***	-.15	.18	.12
7 Tangible assistance							1	-.26*	.02	.08
8 Child self-direction								1	.02	-.32**
<i>Interpersonal sensitivity young adult</i>										
9 Interpersonal worry and dependency									1	.68***
10 Unassertive interpersonal Behavior										1
Mean	3.81	4.31	3.98	3.43	3.67	4.04	4.02	3.61	2.50	2.55
SD	.77	.59	.82	.65	.82	.80	1.39	.72	.56	.51

*** $p < .001$; ** $p < .01$; * $p < .05$

were significantly related to higher levels of offspring's unassertive interpersonal behavior.

For the latent variable overparenting, several alternative measurement models were explored, none of which, however, met the criteria of invariance across groups. Therefore, the different subscales of overparenting were included as observed variables and addressed in separate analyses to avoid problems of multicollinearity. For the latent variable interpersonal sensitivity, the metric invariance model (both factor structure and factor loadings are constrained to be the same across cultures), assuming that "interpersonal worry and dependency" and "unassertive interpersonal behavior" are adequate indicators of the latent variable "interpersonal sensitivity" for both Arab and Jewish young adults, had a good fit ($X^2(1) = .611$, $p = .43$; CFI = .00; RMSEA = 1.00) and the other assumptions for adequacy of measurement model were also met. Note that the residual variance of worry/dependency was fixed to zero because it was low and non-significant.

Table 4 shows the fit indices for the alternative structural models testing moderation of parental gender and culture. For the models that included the overparenting subscale of child self-direction, the variance between paternal child self-direction and young adults' unassertiveness and between maternal child self-direction and young adults' assertiveness was freed for Arab families in order to achieve a proper model fit, as was indicated by Mplus modification indices. For all aspects of overparenting, the basic model (the association between overparenting and young adults' outcome is not moderated for parental gender or culture) had a good fit and the moderation models did not have a significantly better fit. Significant associations were seen for the overparenting subscale of problem-solving, and this model is depicted in Fig. 1. The results indicated that higher levels of parental problem-solving were significantly associated with higher levels of interpersonal sensitivity among young adults, regardless of parental gender and parental culture. We also

Table 3 Correlations between the study variables—Jewish families ($n = 76$)

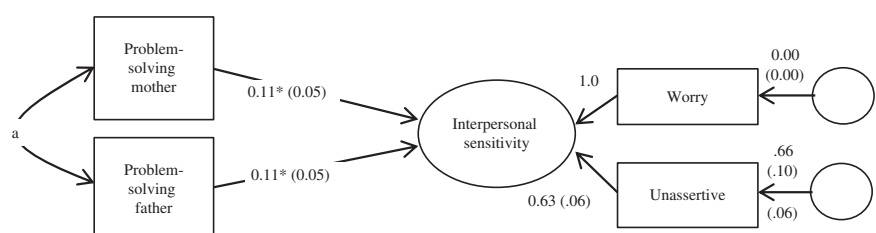
	1	2	3	4	5	6	7	8	9	10
<i>Maternal overparenting</i>										
1 Anticipatory problem-solving		.56***	.53***	−.36***	.41***	.06	.13	−.30**	.03	−.09
2 Advice/affect management		1	.31**	−.25*	.38***	.31**	.10	−.13	.07	.12
3 Tangible assistance			1	−.12	.24*	.16	.48***	−.25*	.15	.00
4 Child self-direction				1	−.04	.08	.02	.27**	−.02	.19
<i>Paternal overparenting</i>										
5 Anticipatory problem-solving					1	.60***	.37***	−.28**	.21	.04
6 Advice/affect management						1	.17	−.27*	.18	.18
7 Tangible assistance							1	−.22*	.13	−.05
8 Child self-direction								1	−.13	−.02
<i>Interpersonal sensitivity young adult</i>										
9 Interpersonal worry and dependency									1	.59***
10 Unassertive interpersonal Behavior										1
Mean	3.01	3.95	3.56	3.85	3.00	3.67	3.65	3.89	2.52	2.47
SD	.76	.63	.73	.56	.68	.63	.70	.44	.56	.51

*** $p < .001$; ** $p < .01$; * $p < .05$ **Table 4** Multi-group structural equation modelling: fit indices of alternative models

	Base model (no moderation)				Moderation model: parental gender				Moderation model: culture			
	X^2	df	CFI	RMSEA	X^2	df	CFI	RMSEA	X^2	df	CFI	RMSEA
Anticipatory problem-solving	10.37	9	.98	.04	7.74	8	1.00	.00	10.34	8	.97	.06
Advice/affect management	8.21	9	1.00	.00	5.98	8	1.00	.00	8.16	8	1.00	.02
Tangible assistance	9.84	9	.99	.03	8.48	8	.99	.03	9.17	8	.99	.04
Child self-direction	11.00	7	.92	.08	10.47	6	.96	.09	10.28	6	.96	.09

Note. All X^2 were non-significant. None of the X^2 differences between the base model and the moderation models were significant

Fig. 1 The association between parental problem-solving and young adults' interpersonal sensitivity; no moderation by parental gender and culture. Note. Standard estimates are reported. ^a This path was freed to vary between Arab-Israeli and Jewish-Israeli families; the path coefficients (and standard errors) were .50 (.12) for Arab-Israeli families and .30 (.08) for Jewish-Israeli families. * $p < .05$



investigated interactions between parental gender and culture, but they were not significant. In addition, running the analyses while controlling for child gender and independent living did not alter the significance of the results.

Discussion

The current study investigated four dimensions of overparenting behavior (anticipatory problem-solving; advice/affect management; tangible assistance; and less child-self

direction) and indicated that they were more prominent in Arab-Israeli families than in Jewish-Israeli families. In addition, advice/affect management and less child-self direction were more prominent amongst mothers than fathers. Higher levels of anticipatory problem-solving were significantly associated with higher levels of offspring's interpersonal sensitivity, regardless of cultural background or parental gender.

These results confirm our hypothesis that overparenting is higher in Arab-Israeli than Jewish-Israeli culture. Arab-Israeli culture has been described as a collectivistic/minority culture, typified by a general tendency for interdependence and intergenerational guidance and advice. Offspring are therefore likely to rely on their parents and parents are likely to intervene in their children's lives. In contrast, in cultures that are more focused on independence and privacy, parents are more likely to give their children freedom to make their own choices and to be their own persons, regardless of the fact that parents might have different preferences or anticipate certain risks. In addition, even when parents from individualistic cultures feel the need to intervene in their children's lives, they are less likely to use relational mechanisms, such as guidance and advice, that are typical of overparenting behavior. Indeed, previous research has suggested that although parents with a collectivistic background use higher levels of all aspects of control than parents with an individualistic background, they are significantly more likely to employ the social relationship with their children as a control mechanism, for example by using relational induction (indicating how the child's behavior affects others, for example by means of guilt induction and love withdrawal) than hostile psychological control (Fung and Lau 2012).

In line with our hypothesis, we saw that mothers reported higher levels of advice/affect management and lower levels of child-self-direction than fathers; however, contrary to our hypothesis, this study indicated that fathers and mothers reported the same levels of anticipatory problem-solving and tangible assistance. These results are comparable with research on gender differences in coping mechanisms, suggesting that males are more likely to confront problems directly than to exhibit more emotional responses, such as discussing the problems with friends and family (Tamres et al. 2002).

In addition, the results indicated that young adults' interpersonal sensitivity was associated with only one type of overparenting behavior, anticipatory problem-solving. Anticipatory problem-solving implies highly insensitive and intrusive parental behavior, resulting mainly from parental needs rather than their offspring's needs and wishes. It is likely that young adults' interpretations of parents' behaviors are the key aspect in understanding the implications for their socio-emotional functioning. Parental anticipatory problem-solving conveys to children that they are incapable of coping independently. Further, the excessive management

of issues related to offspring's personal domain is experienced as disrespect of their privacy and individuality (Barber et al. 2012), which are crucial for the healthy development of offspring, especially in this developmental period (Nelson et al. 2011). Other studies have also found that only anticipatory problem-solving predicted offspring psychosocial development, and scholars have suggested that it might be the preferable subscale for measuring overparenting in young adulthood (Scharf and Rousseau *in press*; Schiffrin et al. 2014). The association between anticipatory problem-solving and interpersonal sensitivity was not moderated by parental gender or cultural background, which supports a context-universal perspective on the effect of this dimension of overparenting.

Strengths, Limitations, and Future Directions

The study included triads (mother, father, young adult) from two different cultural backgrounds, enabling us to better understand the role of parental gender and culture in levels of overparenting and its association with young adults' adverse outcomes. The fact that the study comprised multiple informants (parents reported on overparenting and young adults reported on interpersonal sensitivity) reduced shared-method variance bias. However, we did not include young adults' reports on their parents' overparenting, and doing so might have yielded different results. Young adults' subjective perception of relationships might be a better predictor of outcomes than more objective measures (e.g., Thomas et al. 1997). Segrin et al. (2015) indicated that young adults' perception of overparenting, but not parents' reports, predicted their self-reported adjustment. Padilla-Walker and Nelson (2012) showed that child reporting on paternal helicopter parenting (rather than the father self-reporting) was associated with children's reports of their positive emotions toward their father (Padilla-Walker and Nelson 2012). Including both offspring's and parents' reports might deepen our understanding of overparenting and its implications. Another limitation of the study is that no longitudinal data were gathered. Future studies should include additional data points in order to gain more insight into the directions of significant relationships, e.g., whether overparenting predicts variation in young adults' interpersonal sensitivity, and/or vice versa. In addition, we did not include a representative sample of Arab and Jewish families in Israel, as, because of the sampling procedure, study participants comprised mainly higher education students and their parents. Further, the sample size is not large. Future studies should attempt to include larger samples with other and more diverse backgrounds to assess whether the results can be generalized or only apply for those families with middle-high socioeconomic status. Moreover, because of the sampling technique, the assumption of independent

observations is potentially violated, thereby possibly reducing error variance and the likelihood of significant intergroup differences. Also, some variables in the theoretical framework of this study were not directly assessed but rather inferred, such as collectivism and individualism, and might be assessed directly in future studies. Other group characteristics, such as religion or race, might have contributed to the results, which should therefore be generalized with caution. In addition, it is possible that a general family overparenting climate is more likely to occur in Arab families because of the tendency towards greater similarity and interdependence in collectivistic cultures. Future studies might investigate interactions between maternal and paternal dimensions of overparenting behavior and how they operate in different contexts.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no competing interests.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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Parent-Teacher Collaboration: Teacher Perceptions of What is Needed to Support Students with ASD in the Inclusive Classroom

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Abstract: Positive parent-professional collaboration is critical for the educational success of students with autism spectrum disorder (ASD). However, little is known about teacher perceptions of parent-professional collaboration. Thirty-four teachers participated in a qualitative study to gain a better understanding of teachers' perceptions of helpful parental involvement and advocacy strategies to ensure the success of students with ASD educated in inclusive settings. Through focus groups and interviews, teachers reported perceptions of parents ranging from too much involvement to not enough involvement, the importance of parental and student advocacy, and shared examples of positive parental advocacy. Implications for practice and directions for future research are discussed.

As children and youth with autism spectrum disorder (ASD) are increasingly participating in inclusive education settings, the need for parent and professional collaboration is essential for students' success. The foundation of support for students is ongoing communication and collaboration between parents and teachers. Positive parent-teacher collaboration benefits the family, educators, and students with disabilities (Bezdak, Summers, & Turnbull, 2010; Turnbull, Zuna, Turnbull, Poston, & Summers, 2007). In fact, research indicates parental involvement in schools is strongly linked to better student outcomes related to academics and involvement in organized groups and friendships (Newman, 2004). Moreover, federal mandates support parent involvement in developing, reviewing, and revising the child's individualized education program (IEP; Turnbull et al., 2007) and value parents as equal partners and informed

decision makers in their child's education (e.g., the Individuals with Disabilities Education Improvement Act, 2004, and the No Child Left Behind Act, 2002). Research suggests that in the case of social skills of students with ASD, certain skills may be context-specific making it necessary for parents and professionals to be involved in order to fully understand the student's abilities (Murray, Ruble, Willis, & Molloy, 2009). Even though such partnerships are widely valued, establishing positive parent-teacher partnerships can be difficult (Epstein, 2005).

Research has found conflicting results in regards to parents' perceptions of parent-teacher partnerships. For example, in a survey of parents of children with ASD, parents reported they felt resentment from school personnel and other parents (Starr & Foy, 2010). Parents felt this resentment was often the result of the time and resources their child required from teachers. Further, many parents reported lack of communication and collaboration as a significant problem. On the other hand, strong communication and collaboration were reported by some parents as primary reasons for their satisfaction with their child's educational experience (Rodriguez et al., 2014).

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Parents who were most satisfied with their child's educational services had children in younger grades (kindergarten to third grade), possibly indicating greater collaboration in early elementary school years compared to secondary school years. Similarly, parents of children with ASD in a study conducted by Stoner et al. (2005) echoed the need for frequent and open communication among teachers and parents. These parents further noted that negative communication and collaboration experiences resulted in a lack of trust of the educational professionals, which was difficult to regain. Parents reported feeling supported when they believed educators were knowledgeable about ASD, able to manage behaviors, and engaged in quality collaboration and communication with them (Starr & Foy, 2012).

The diagnostic process is a crucial time for potential collaboration. Unfortunately, parents have reported frustration due to their concerns not being heard, and needing to "fight" to be heard in order to begin the diagnostic process (Braiden, Bothwell, & Duffy, 2010). Once the process begins some parents report feeling confused about the roles of the team members and what evaluations are done (Braiden et al., 2010). When a diagnosis is received, some parents report they were not given the information they needed about understanding ASD or the available services for their child (Osborne & Reed, 2008). Parents often feel they have to search for information instead of having it provided by the professionals working with their child (Brown, Ouellette-Kuntz, Hunter, Kelley, & Cobigo, 2012; Glazard & Overall, 2012).

Another important time for collaboration is during the IEP process. While IEP meetings provide an opportunity for parents and educators to collaborate, research suggests families who participate in traditional IEP meetings have expressed their primary roles included listening and answering questions (Childre & Chambers, 2005). When Childre and Chambers (2005) interviewed families about their experiences with traditional IEP meetings, families reported minimal collaboration with the school staff and feeling pressured to agree with preset agendas including student goals and educational placements (Childre & Chambers, 2005). Further, in a

study of parent perceptions of IEP meetings, parents reported inconsistency between their views and teachers' views regarding what practices should be implemented for their children and what services should be provided (Fish, 2006). Parents additionally reported they felt blamed for their child's academic and behavioral difficulties and expressed concern that teachers were unaware of the student's services and accommodations listed in the IEP. Parents voiced a desire for the IEP meeting to be more collaborative in nature so they could be equal contributors (Fish, 2006).

Unfortunately, research indicates education professionals often do not view parents as equal partners. For example, Bezdek and colleagues (2010) interviewed educational professionals regarding their perceptions of partnerships with parents of children with disabilities and results indicated they wanted parents to be involved but only to a limited extent. In other words, education professionals desired families who supported their guidance about how to work with the child with disabilities, but did not value families who provided too much input on the supports they felt their child needed. While some of the professionals placed blame on families who did not follow through with suggested supports at home, others recognized that not all parents have the necessary time, knowledge, or skills to facilitate supports at home (Bezdek et al., 2010). Parents have noted strong parental involvement often depends on individual teachers, not the school system as a whole (Barclift, 2010), highlighting the importance of individual teachers in starting and sustaining collaboration with parents. Parent-teacher collaboration can often be hindered by unfamiliar language during the IEP process, as many educators use educational jargon parents are unfamiliar with (Barclift, 2010), and language and cultural differences between the family and school personnel (Lo, 2009).

Parent-teacher collaboration and parental advocacy are integral to one another. Parents who have children with ASD have been noted in the literature as being strong advocates for their children. For example, Barclift (2010) interviewed 15 parents of children with ASD and provided examples of successful parental advocacy, including one participant who requested monthly meetings with the IEP team

because she felt the yearly IEP meeting did not provide sufficient information to keep her fully informed. Another parent noted “she felt she was the only voice her child had” (Barclift, 2010, p. 66). Parents need educators who are not only knowledgeable about their child’s disability and evidence based interventions, but who will collaborate and advocate with them in order to best support their child.

Planned parent-professional partnerships within the school setting are necessary for increased parental involvement and advocacy (Epstein & Jansorn, 2004). School personnel need to encourage and guide parents on how to become involved in their child’s education (Epstein & Jansorn, 2004). In fact, research has demonstrated that parent involvement is strongly correlated with teacher invitations (Anderson & Minke, 2007). Moreover, communication between home and school predicted positive parent-teacher relationships (Minke, Sheridan, Kim, Ryoo, & Koziol, 2014). However, limited information is available regarding teachers’ perceptions of parents of children with ASD and their views on parent-teacher collaboration.

More information is needed about teachers’ perceptions of parents and how their beliefs impact parent-teacher partnerships. Research supports the notion that collaborative parent-teacher relationships can enhance the positive social and academic outcomes for children and youth with ASD (Turnbull et al., 2007). However, more information is needed to help understand and confront the barriers of parent-professional collaboration to promote positive outcomes for children and youth with ASD in our schools. Thus, the focus of this study was to gain an understanding of teachers’ perceptions of helpful parental involvement and advocacy strategies for ensuring students’ with ASD success in inclusive school settings.

Method

The purpose of this study was to explore teachers’ perceptions of parents of children and youth with ASD educated in inclusive K-12 classrooms. Of particular interest was understanding how parents support children and youth with ASD within the school setting through advocacy and other collaborative ac-

tivities with the school team. This investigation was a component of a larger study focused on understanding teachers’ perceptions of the social support needs of students with ASD, teacher preparation practices, and current strategies most helpful for the inclusion of students with ASD (Able, Sreckovic, Schultz, Garwood, & Sherman, 2015). Parent advocacy and collaboration activities became a clear factor influencing children and youth’s social and academic success within the school setting. Thus, our primary research questions for this study were: 1) What are teachers’ views of parents in facilitating their child’s school success? 2) What parent advocacy and collaboration strategies do teachers find most helpful in achieving school success for students with ASD?

Participants and Procedure

The research was conducted in a southeastern rural school district with approximately 7,500 students. The research team partnered with the district’s Exceptional Children’s Coordinator (ECC) in order to identify schools with students who had ASD. Both general and special education teachers at the identified schools were invited to participate in focus groups. Thirty-four teachers who were general, special, and related arts educators from two elementary, two middle, and two high schools participated in the focus groups. Participants across the school levels included: 10 elementary teachers in which one was an Academically Gifted Specialist; 12 at the middle school level with two who were special education teachers; and 12 at the high school level with four who were special education teachers and one was a student teacher. See Table 1 for additional participant demographic information.

Over the course of 1 year, two focus groups were conducted at the elementary level, two at the middle school level, two at the high school level, and one interview was held for a teacher at the secondary level unable to attend the focus groups. The focus groups and interview were held at the schools at the end of the school day. There were four to eight participants in each focus group, which lasted approximately one hour each. Two members of the research team attended each focus group.

TABLE 1
Participant Demographics

<i>Sex</i>	<i>Age</i>	<i>Ethnicity</i>	<i>Experience</i>	<i>Highest Degree</i>
Female: 31	< 30 years: 9	European American: 30	1 year: 1	Bachelor's: 17
Male: 3	31–49 years: 16	African American: 3	5–10 years: 15	Master's: 16
	> 50 years: 8	DND: 1	> 10 years: 18	DND: 1
	DND: 1			

DND = Did not disclose.

One member was the facilitator, and was a university faculty or graduate assistant trained to facilitate focus groups. The facilitators used a script to keep facilitation across groups consistent. The second member of the research team took notes and coordinated paperwork for the participants. Before beginning the focus groups, participants signed consent forms and completed a demographic form. Each participant received a \$25 gift card to compensate them for their time.

Once paperwork was completed, participants were given a case study with a list of questions to read before the focus group discussion began. The case study described a fictional student named *Luke* who was described as often playing and working alone, being a strict rule follower, and typically experiencing isolation or bullying by his peers. The case study was similar across school levels, but varied slightly to best reflect a student at that school level. For example in the elementary version of the case study, Luke was depicted as playing by himself during recess, while in the middle and high school versions, he was depicted as spending the time before morning bell in the library alone instead of in the halls like the other students. The specific focus group questions related to parent advocacy and collaboration were as follows: (a) How is Luke similar to or different from the students you work with? (b) What are your biggest concerns related to students such as Luke? (c) What would be most helpful to you in helping students like Luke? Issues regarding parent involvement and advocacy were the major foci of teachers' responses to questions b and c.

The focus groups and interview were audio taped and later transcribed verbatim. One member of the research team transcribed the

tapes and then a different member reviewed all of the tapes and transcripts to ensure accuracy. Next, transcripts and summaries of the focus groups were emailed to the participants to serve as a member check procedure (Brantlinger, Jimenez, Klinger, Pugach, & Richardson, 2005; Creswell, 2008). The participants who responded did not note any inaccuracies with the transcripts and had no concerns to share.

Data analysis. The focus group data were coded using a constant comparative method in which themes and subcategories were constantly revised and recoded as new themes and categories emerged from the interviews (Strauss & Corbin, 1998). A constant process of organizing and reviewing the data was used to cluster the data into discrete categories or domains. This process allowed the team to analyze data while the focus groups were being conducted. Memo writing (Charmaz, 2000) was used to organize the data and identify thematic relationships from the focus group transcripts helping us to understand the participants' perceptions of parent involvement and advocacy. Codes were continually refined to ensure that the interpretations were thorough and consistent across the focus groups.

All data were coded by two researchers and inter-rater reliability coding was conducted (House, House, & Campbell, 1981). This process ensured that the specific delineation of the categories was consistent and congruent. The reliability procedure served as an inter-rater agreement index in which the data coders sought to reach agreement on thematic categories and the inclusion of specific data into those categories. The goal for agreement was on the description or categorization of the

data rather than the frequency of the data, which is typical in experimental studies. The number of agreements and disagreements were calculated per page and totaled for each focus group interview. The average inter-rater reliability was 87%. For those data in which agreement was not initially obtained, peer debriefing and discussion was used to determine agreement of the inclusion of the data into categories.

Results

Several issues emerged related to teachers' perceptions of parents and parents' collaboration and advocacy activities focused on children's school success. Teachers' perceptions of parents focused on collaborating with "under" or "over" involved parents as well as with parents who were having difficulty accepting and navigating the diagnosis of their child's ASD. Teachers stressed the need for parental collaboration with the school team and parental advocacy as well as provided examples of effective advocacy strategies. Of particular concern, was the need for parents to teach their children to be self-advocates and the crucial role parents can play in supporting their child's or adolescent's social development. The information below highlights the teachers' perceptions.

Teachers' Perceptions of Parents' Involvement

Teachers' perceptions of parents ranged from their having to deal with parents who are "over involved" or "under involved" with their children's schooling. Teachers also were concerned about parents who were perceived to be unrealistic and guilty about their children's ASD diagnosis. Teachers' perceptions of parents were important indicators of collaboration between the home and school.

The issue of too much parent involvement or advocacy was a concern for teachers. Teachers indicated, "We see a little bit too much involvement from parents. They ask for resources and supports that our schools cannot provide." A specific example provided included: "We don't have a sensory room where these students can go to chill and sit in a chair to swing or bounce if they need to. We just don't have any of that." Teachers felt that in certain

circumstances parents were unrealistic about the supports and services schools can provide. Conversely, teachers discussed the issue of parents who were not involved with their children's schooling. Teachers described these "under involved" parents as: "A lot of parents are not going to come in and talk to me about their child – they either do not know how to or some parents had difficulty in schools themselves from being in special education classes." Thus, these teachers recognized that many parents do not have the skills to be advocates for their children. On the other hand, teachers felt some parents were not "ready" to be advocates for their children.

Teachers felt parental lack of advocacy and involvement often was because some parents were struggling with the acceptance of their child's disability. At the elementary level, teachers reported parents appeared to be trying to understand what it means to have an ASD diagnosis and how that impacts their child's school success. For instance, a teacher shared that parents may not know much about child development and are "just really lost" with their child who has ASD. They referred to parents expecting their child to be perfect. "There is not a lot of acceptance when their children are ages 5 or 6." Teachers explained that often parents of younger children have not had much experience with other children – so they do not understand what is typical development. Elementary teachers' perceptions were that parents were searching for information and resources while trying to accept and understand ASD and its implications for their children.

However, teachers of middle school aged youth described parents who still struggled with guilt and their child's diagnosis of ASD. One teacher explained: "We had an eighth grader who had ASD and was a paper eater." Finally, his mother said to us – "OK – I have to deal with the elephant in the room – my son is not like other eighth graders." Thus, teachers recognized the difficult adjustment process in accepting a child's ASD diagnosis.

Based on these perceptions of parents, teachers discussed having "careful conversations" with parents about their child's development and performance in the general education classroom. Teachers explained that parents were often uncomfortable with their

child being the focus of concern for the school or teachers – so they recognized that expressing concern about a student has to be done in a very sensitive manner. Teachers explained this further by stating, “I use parent conferences as a teaching tool to talk to parents about what is working at school for their child while trying to educate parents about autism.” Thus, teachers felt they needed to educate and empower parents toward becoming informed advocates for their children and youth with ASD. They emphasized that parents need to understand ASD, and also the vast array of services and supports available in the school and community.

Need for Collaboration and Advocacy

The discussion of having “careful conversations” with parents led teachers to elaborate further on the need for collaboration and advocacy with/from parents to ensure the success of students with ASD. Teachers stressed the critical importance of parental advocacy. As one elementary teacher emphasized, “The more aware, educated, and involved the parent is with their child’s autism characteristics – the more successful the child is going to be.” Many teachers at the high school level discussed how students are on their own in high school because parents do not typically come in and advocate for their adolescent’s needs. As one teacher emphasized, “when these kids with ASD get to high school, they are on their own unless the parents advocate for them which is not very common.” All teachers recognized how helpful it would be to obtain information from parents about “helpful hints, behaviors, clues, or whatever about the student with ASD rather than waiting three to four weeks going through a steep learning curve trying to figure out what works and doesn’t work for students with ASD.” A teacher emphasized this important parental advocacy role by stating: “Parents understand what makes their kid tick or NOT – they know their kid more than anybody else.” Thus, the critical importance of parental collaboration and advocacy was highlighted by teachers.

Middle and high school teachers also emphasized the importance of adolescents’ self-advocacy skills. Teachers perceived parents to be struggling with explaining the ASD diagno-

sis with their child. One teacher noted, “Parents are really struggling with how do we tell them they have autism?” Though teachers sympathized with parents’ dilemmas, there was a perception that delaying diagnosis-related discussions was problematic. One teacher stated, “There are times when parents try to hide stuff (about their child’s ASD diagnosis) from their children. Thus, they are not making it easy for their son or daughter.” Further, teachers at the high school level discussed how difficult it was for students with ASD to make adjustments to changing class schedules with different teachers and students every period. A high school teacher emphasized, “these students need to know how to say ‘these are my strengths and this is what I need help with’.” High school teachers recognized that if the adolescent with ASD or his or her parents did not have advocacy skills, it often takes a long time for the teacher to learn how to accommodate for the student with ASD within an inclusive education setting. They felt it was important for the adolescent to advocate about the accommodations he or she might need to be successful in school.

Another important area of concern related to parent involvement and advocacy related to the promotion of the child’s or adolescent’s social skills. Teachers discussed how their curricula are so academically focused causing them to have little time or resources to facilitate the child’s or adolescent’s social skills. As teachers, “we need for parents to teach social skills”. However, teachers recognized the importance of their roles in connecting students with ASD with accepting and supportive peers. Teachers discussed grouping students who are socially awkward with more socially competent peers for class work and lunch groups but were concerned about their own abilities and resources to promote appropriate social behaviors.

Teachers at the middle and high school levels stressed the importance of appropriate interpersonal interactions for adolescents. As one teacher stated, “It doesn’t really matter about the academics but it is the interpersonal interactions that are more important for college, for working at Burger King or IBM. These adolescents need appropriate behaviors for the work place.” Thus, teachers were quite concerned about the social skills of their stu-

dents with ASD, but felt they needed strong collaboration and advocacy from the parent to promote students' social competence.

Positive Examples of Collaboration and Advocacy

Teachers also provided many examples of parental advocacy promoting the child's and adolescent's school success. Such examples included information sharing, Circle of Friends (Taylor, 1997) networks, and IEP information sheets or booklets to assist the teachers in understanding their children and youth with ASD. More information regarding these strategies is provided below.

Helpful parent implemented strategies for facilitating the child's or adolescent's social skills included working with the sibling of the student with ASD to promote the youth's social skills and a Circle of Friends model (Taylor, 1997). One particular example shared was when parents supported their child's social skills by encouraging the sibling who is typically developing to mentor their sibling with ASD in needed social skills. As one teacher stated, "In the past, we have had older siblings help their sibling with autism be more social by introducing him to their friends and by being the sibling's social coach." Alternatively a Circle of Friends approach (Taylor, 1997) was noted in which parents facilitated a group of friends and peers for their adolescent with autism to accompany that adolescent to certain social outings but also for social interactions at school such as lunch groups, club meetings, and school sponsored sporting events. Other examples of parents providing supports regarding their child's or adolescent's social skills included parents who created a social group for students with ASD where they could "hang out" together. Teachers felt this approach helped students with ASD find a social group and feel a sense of belonging in the high school setting.

Examples of positive parent-professional information exchange included teachers and parents sharing "goal sheets" from students' IEPs. Teachers also shared how helpful parents have been who have shared booklets or information sheets about their child or adolescent with ASD at the beginning of the school year or semester. This information included the child's characteristics, particular

interests, IEP goals and objectives, and classroom accommodations. As one teacher explained, "If parents can help me understand their child better – it helps me support them in an inclusive classroom so much better." Teachers stressed that the information parents can and are willing to share about their child or adolescent is so much more helpful than what they can decipher from an IEP or educational team meeting.

Clearly, teachers' perceptions of parents influenced their descriptions of parent-professional collaboration and parental advocacy. Perceptions of parents ranged from being over involved and unrealistic about the supports that their children might need in school to being under involved because of their lack of advocacy skills or their struggle with the acceptance of their child's autism diagnosis. Regardless of these different perceptions of parents, all teachers recognized how critical home-school collaboration is to ensure students' with ASD success.

Also, parent information and advocacy was viewed as essential for teachers and peers to understand and accept students with ASD. Positive examples included parents sharing information about their child with the class, parents promoting their child or youth's social skills, and parents sharing specific information about the child's or adolescent's learning strengths and needs with teachers. Thus, the teachers recognized that students with ASD as well as teachers themselves need information and support from parents.

Discussion

Results from this study provide insight into teachers' perceptions regarding partnering with parents. Teachers shared information in several areas such as the need for parental advocacy and information sharing to their struggles with collaborating with "over involved parents" adding to our understanding of partnerships and collaboration between parents and professionals. This information can inform both practice and research. Following is a discussion of specific implications for practice, limitations, and future directions for research.

Implications for Practice

This study highlights several areas for professionals to consider when working with parents. There is a strong need for increased teacher awareness and understanding of parent experiences and needs. Based on what teachers in this study shared and other research exploring parent experiences, several implications for practice emerge. Below are suggested strategies for teachers when working with parents.

Recognize a continuum of parent involvement. In this study, many teachers had the perception that parents are “over involved” or “under involved” in their child/adolescent’s schooling. This is consistent with other research that found educational professionals wanted parents to be involved, but did not value parents who gave too much input (Bezdek et al., 2010). Though teachers would like parents to be involved, there are particular ways in which they would like parents to do so. Unfortunately, it is not entirely clear what this balance would look like, making it difficult for parents to know what level or type of involvement they should have related to their child/adolescent’s schooling. In addition, not all parents have skills or resources that promote partnering with schools. In this study, teachers reported understanding that not all parents knew how to help support teachers, which is consistent with other research indicating that many professionals realize parents may not have the time, resources, or skills to carry out supports at home (Bezdek et al., 2010). Providing a variety of ways in which parents can be involved may help parents find ways to be involved that work for them (Rodriguez et al., 2014). Professionals need to recognize that there is a continuum of parent involvement and meet parents where they are. Parents will be involved at differing levels of intensity based on their individual skills and resources. Evidence based person centered planning tools like Making Action Plans (MAPS; Vandercook, York, & Forest, 1989) can assist parents in providing input for goal development in IEP meetings (Wells & Sheehy, 2012).

Provide extra support during diagnostic process. The disconnection between parents and teachers may begin during the diagnostic process. In this study teachers reported percep-

tions of parents struggling with their child’s diagnosis of ASD, noting parents seemed to have feelings of guilt or unrealistic expectations of what professionals could provide. However, other research has highlighted that many parents report feelings of frustration and a need to “fight” for their children during the diagnostic process (Braiden et al., 2010). Parents also have reported feelings of confusion during the process (Braiden et al., 2010) and lack of information from professionals once a diagnosis is made (Osborne & Reed, 2008). Parents have reported feeling like they are on their own to locate information (Glazard & Overall, 2012). Teachers may be underestimating the amount of support or unaware of the type of support parents need during the diagnostic process and immediately following diagnosis. This period of time is likely to set the foundation for future partnership and collaboration. If parents are feeling unsupported and teachers are feeling like parents are steeped in guilt or harboring feelings of anger, there is little room for productive collaboration. Professionals might consider targeting this time period as one for providing extra support and focusing on the parent-professional relationship. Recognizing that parents are dealing with a lot of stress, frustration, and other emotions during this time period could help professionals understand parents’ perspectives. In addition, providing information about the process, roles of professionals on the team, interpretation of diagnostic results, and information on resources is a key need of parents.

Support for parents in their advocacy roles. Despite this potential disconnection, some teachers in this study reported having “careful conversations” with parents in order to foster collaboration. Teachers emphasized the need for parents to advocate for their children. Other research has found that parents are most likely to be involved when teachers invite them (Anderson & Minke, 2007) and parents need guidance on how to be involved in their child/adolescent’s education (Epstein & Jansorn, 2004). It may be necessary for teachers to provide coaching on how to effectively advocate during these “careful conversations.” Parents may need guidance on how to advocate and are already looking to teachers for support and information. Teachers in this

study also indicated that middle and high school students should be learning how to self-advocate. Self-advocacy is an essential skill to help students prepare for maximum independence in adulthood. Professionals may need to facilitate the process for helping parents and youth advocate. Parents may need support in working with their children to learn to self-advocate, as well.

Target key areas for ongoing collaboration. A particular area that teachers in this study noted needing support from parents is in the area of social skill development. Teachers noted that academic curricula are heavily focused on academics, not leaving much time for targeting social skill development. Teachers shared that parents often had helpful strategies related to fostering social skill development such as working with a sibling or using a Circle of Friends Model (Taylor, 1997). Teachers appreciated ideas from parents and help in implementing social skills related strategies. Research has found that partnerships between parents and teachers are critical when it comes to social skill development (Murray et al., 2009). It may be helpful for teachers to explicitly tell parents how helpful their input is in this area. Parents may not realize their help is desired and needed.

Teachers in this study also shared other strategies that helped support a positive parent-teacher relationship. One included the exchange of goal sheets from students' IEPs. Another was parent-created information booklets given to teachers to help get to know students. These strategies could be used at any time throughout the school year, but key times that may be overlooked are during the annual IEP meeting and at the beginning of the school year. Parents have reported a desire for IEP meetings to be more collaborative than they typically are (Fish, 2006). School professionals may create unintentional barriers to collaboration during IEP meetings by using jargon (Barclift, 2010) and putting parents in a position to listen or answer questions (Childre & Chambers, 2005) instead of working together to develop the IEP. Changing the way IEP meetings are carried out may be a pivotal area for building collaborative relationships with parents. Specifically, eliminating jargon, making space for parents to share, and integrating parents' ideas could have a

noticeable positive impact on the parent-professional relationship.

Limitations

The results of this study need to be considered in light of its limitations. Although this study targeted educators across grade levels from multiple schools, all participants were from one school district. In addition, the participants in this study were volunteers. It is possible that those who volunteered had particularly positive or particularly challenging experiences related to inclusion or working with students who have ASD. This sample may not be representative of all school professionals. Further, a systematic investigation of parent perceptions of partnerships would enhance the study's results by obtaining viewpoints from multiple stakeholders in the partnership process. Finally, because this investigation was a component of a larger study aimed at understanding teachers' perceptions of the social support needs of students with ASD, teacher preparation practices, and current strategies most helpful for the inclusion of students with ASD, the emphasis of the focus group questions was not entirely on parent-professional collaboration. Therefore, participating teachers may not have had the opportunity to fully elaborate on their perspectives of parent-professional collaboration.

Future Research Directions

Future research should continue to identify variables associated with successful collaboration and strong parent-teacher partnerships. Though some variables have been identified by parents, less is known about what teachers view as helpful collaboration strategies. Further, even the variables that have been identified are broadly defined (such as open communication) and would benefit from specific, concrete strategy identification. For example, in this study, teachers reported wanting parents to advocate for their children, but noted concerns with parents being too involved or not involved enough. Identifying what that specifically entails would be helpful to both parents and teachers. Relatedly, research is needed on evaluating the effectiveness of collaboration techniques. In addition to needing

research identifying specific techniques that might be effective, research is needed to evaluate what works in different situations for different individuals.

Moreover, further research is needed on professional preparation in collaboration. Future research should work toward identifying what is needed to prepare school staff with collaboration skills, as well as identifying the best timing of providing education. Providing this education in pre-professional programs will likely look different than providing it in professional development to practicing teachers. Also, general education teachers and special education teachers are prepared differently than each other, as they are prepared for different roles. However, as more schools move toward inclusive models, there is more overlap in their jobs than there has been historically, highlighting the need for all educators to be skilled in promoting and sustaining positive collaboration with parents. Further, parents may benefit from participation in trainings related to collaboration with school staff. It is important to develop and evaluate appropriate and effective learning opportunities for parents.

Finally, future research should strive for diverse samples. Including participants from many different schools, across different regions of the country is important. Also, including participants across racial and ethnic groups is essential.

Conclusion

This study adds to the research body on parent-professional collaboration. Specifically, it helps fill a gap in our understanding of teacher perceptions of parents, which is an area with very little research. Understanding how both parents and teachers perceive their partnership (or lack thereof) provides valuable information for potential changes to practice and new directions for future research. In addition, a greater understanding and appreciation of parent-professional partnerships will yield better outcomes for children and youth with ASD and other disabilities in schools.

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Overparenting is Associated with Child Problems and a Critical Family Environment

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Abstract Overparenting involves the application of developmentally inappropriate parenting tactics that far exceed the actual needs of adolescents and emerging adults. Past research as well as elements of self-determination theory suggest that this type of parenting should be associated with greater child problems in relation to other people and a more critical family environment. These hypotheses were tested on 477 emerging adult child-parent dyads from 30 of the 50 United States who both completed self-report measures of overparenting and elements of a critical family environment. In addition, emerging adults completed self-reports of problems, primarily in relation to other people, and how they cope with them. Results of a structural equation model indicated that the child, but not parent, overparenting latent variable was strongly associated with reports of more child problems. Both the emerging adult child and parent overparenting latent variables were positively and significantly associated with the critical family environment latent variable. These results can be usefully explained by several postulates of self-determination theory and add to a growing literature pointing to the ill effects of overparenting when applied to emerging adults.

Keywords Overparenting · Helicopter parenting · Anxious parenting · Expressed emotion · Coping

Introduction

Over the past decade the presentation and ill effects of overzealous parenting, particularly of adolescents and young adults, has received considerable attention in both popular media and social scientific outlets. This phenomenon is often referred to as helicopter parenting or overparenting (e.g., Cline and Fay 1990; Munich and Munich 2009). Overparenting involves the application of developmentally inappropriate parenting through the use of excessive advice, problem solving, and provision of abundant and unnecessary tangible assistance, combined with risk aversion, anxiety, and parental involvement in the child's emotional well-being to the point of enmeshment (Segrin et al. 2012). These parenting practices reduce demands on children to undertake behaviors that would effect change in their own lives (Locke et al. 2012).

Even though decades of research support the beneficial effects of parental involvement on child well-being (e.g., Gronlick and Ryan 1989), the *over* part of overparenting is a reference to excessive levels of involvement, control, and problem solving dispatched seemingly in the service of the child's well-being. At younger ages, many of these same parenting behaviors may be beneficial to the child. However, evidence is rapidly accumulating to indicate that the opposite is the case when applied to emerging adult children. The primary aims of this investigation are to examine associations between overparenting of emerging adults and (1) a theoretically specified domain of child problems that has received little research attention thus far, and (2) a counterintuitive demeanor of the family environment in which overparenting is enacted.

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One of the paradoxes of overparenting is that it is presumably enacted with the intention of ensuring positive child outcomes. Nevertheless, scientific research consistently reveals negative effects of overparenting on child well-being. This research has specifically highlighted two such effects. First, overparenting has been linked with psychological distress in emerging adults such as increased depression, anxiety, and perceived stress, as well as lower life satisfaction and self-acceptance (LeMoyne and Buchanan 2011; Schiffrin et al. 2012; Segrin et al. 2013). Second, overparenting is positively associated with various maladaptive personality traits such as entitlement and narcissism (Locke et al. 2012; Segrin et al. 2012) and negatively associated with adaptive traits such as self-efficacy (Givertz and Segrin 2012).

Schiffrin et al. (2012) provided a compelling account of the deleterious effects of overparenting on child well-being based on self-determination theory (Deci and Ryan 2012; Ryan and Deci 2000). According to self-determination theory, there are three universal psychological needs: competence, autonomy, and relatedness. Competence is a feeling of security and confidence in one's own ability, autonomy reflects the need to make one's own choices, and relatedness is the need for involvement in genuine and caring relationships. The pursuit and satisfaction of these needs are postulated to be essential for growth and well-being. Overparenting poses a substantial threat to all three of these needs. For example, excessive problem solving on the child's behalf could easily diminish the child's perceived sense of competence and perhaps the child's actual competence due to poorly developed coping skills (Segrin et al. 2013) and low self-efficacy (Givertz and Segrin 2012). Some of the more intrusive and controlling qualities of overparenting could damage parent–child relationships, thus compromising the child's relatedness. Indeed, prior research has shown that overparenting has an indirect effect on young adults' diminished family satisfaction through more problematic parent–child communication (Segrin et al. 2012). However, Schiffrin et al. (2012) argue that it is the need for autonomy that is most threatened by overparenting. The intensive guidance, lack of child self-direction, and intrusive involvement that are components of overparenting clearly present major threats to an adolescent or emerging adult child's desire for autonomy.

Overparenting has previously been shown to be associated with psychological distress and maladaptive personality traits in emerging adults (e.g., Schiffrin et al. 2012; Locke et al. 2012). However, in an effort to further explore the extent to which overparenting has implications relevant to emerging adult children's relatedness needs, we sought to assess problems that involve the self in relation to others. Thus far, this has rarely been studied in the domain of overparenting, but prior research findings suggest that it is

a likely correlate of overparenting. LeMoyne and Buchanan (2011) found that helicopter parenting was a negative and significant predictor of emerging adult well-being, operationalized as a composite of autonomy, positive relations with others, environmental mastery, purpose in life, personal growth, and self-acceptance. Some of these phenomena, especially positive relations with others, clearly indicate success in meeting relatedness needs. Even more recently and to the point, Schiffrin et al. (2012) found that helicopter parenting behaviors were negatively associated with university students' reports of how well their relatedness needs were being met (e.g., "People in my life care about me"). In the present study we specifically assess emerging adult children's problems with their parents, self in relation to others, and coping with problems in the domain of parents, school, and self.

Thus far, it has been a widely held assumption that helicopter parenting, or overparenting, is enacted with good intentions and positive regard for the child and his or her well-being. This position was eloquently summarized by Locke et al. (2012) who observed that "This overly effortful parenting approach has been generally hypothesized as being deliberately chosen by these parents in a loving but misguided attempt to improve their child's current and future personal and academic success" (p. 250). It is sensible to believe that helicopter parents want nothing but the best for their child and that they hold the child in high regard, with the desire, if not expectation, for fantastic success in the child's future. In this investigation we seek to explore an alternative to this commonly held assumption. Research on family expressed emotion and self-determination theory converge on a counterintuitive prediction that overparenting may occur in family environments that are marked by criticism and negative attitudes toward each other.

Expressed emotion is a pathogenic family interaction pattern marked by criticism, overinvolvement, excessive attention, and emotional reactivity, usually communicated by parents toward their children (Vaughn and Leff 1976). Parents who exhibit high levels of expressed emotion often utter intrusive and invasive statements to their grown children during family interactions (Miklowitz et al. 1984). In fact, emotional overinvolvement and critical attitudes toward the child have been identified as the two key elements of family expressed emotion (Vaughn and Leff 1976). In other words, emotional overinvolvement and criticism often go hand in hand in family relationships. The overinvolvement identified in research on family expressed emotion bears a striking resemblance to elements within many conceptualizations of helicopter parenting or overparenting. Accordingly, it is plausible that overparenting might also occur in a family environment marked by critical, not favorable, attitudes toward other family members.

Deci and Ryan (2012) explain from the vantage point of self-determination theory how attempts to control child outcomes that are evident in overparenting can be maladaptive for the child. A parenting behavior known as autonomy support involves encouragement of initiation, exploration, and responsible choice. This practice is associated with positive child outcomes, particularly the internalization of positive values. In contrast, parental conditional regard involves provision of attention and affection when the child does or becomes what the parent wants. Deci and Ryan (2012) observe that such parenting practices foster shame and guilt in children when they fail and resentment toward the parent. Parental conditional regard is a heavy-handed control tactic that could be evident in helicopter parents who are overly focused on the success of their children.

Research on expressed emotion and parental conditional regard collectively raise questions about the good intentions and favorable attitudes between parent and child that are often thought to define the backdrop of overparenting. Overly involved and intrusive parents are often critical of their children and the parental conditional regard that poses threats to children's autonomy has a corrosive effect on attitudes toward parents. In an effort to examine whether overparenting might emerge from more critical, not supportive, family environments, we assessed the criticism component of expressed emotion, attitudes toward parent and child, and conditional parental regard in this investigation.

Based on the aforementioned research and theory, the present investigation was designed to test two hypotheses. First, it is predicted that overparenting will be associated with greater problems experienced by the child in relation to others. If confirmed, this would reflect the failure to meet relatedness needs postulated by self-determination theory. Second, it is predicted that overparenting will be associated with a more critical, not accommodating, family environment. If confirmed, this too could reflect a failure to meet relatedness needs, particularly in the family context.

Because of the inherent complexity of the constructs under investigation, we sought to operationalize them with multiple indicators and analyze them as latent variables. Analyses of latent variables also have a variety of statistical advantages, especially in terms of compensating for the negative effects of measurement error. Also, we feel that overparenting is an inherently dyadic phenomenon. That is, by definition it involves at least one parent and his or her child. Consequently, we collected data from parent–child dyads in this study. Finally, because of potential regional variations in parenting practices, we secured parent–child dyads from a variety of locations throughout the United States in the service of testing the study's hypotheses on a geographically diverse sample.

Method

Participants

Participants in this investigation were 477 parent-emerging adult child dyads. The parents had a mean age of 51.89 years ($SD = 6.10$); 78 % were female and 22 % male. Ninety-six percent were the biological parent of the emerging adult child who participated with them in the study, with the remaining 4 % split between stepparents, adoptive parents, and others who had legal guardianship when the child was a minor. The parent sample was 0.2 % American Indian/Alaskan Native, 3.6 % Asian/Pacific Islander, 2.1 % Black/African American, 10.1 % Hispanic/Latino, 82.1 % White, and 1.9 % Other/Unknown. As far as highest level of education completed, 10.3 % reported high school or less, 36.5 % had some college or a two-year college degree, 37.5 % had a four-year college degree, and 15.5 % had completed a graduate or professional degree. In response to the question, “For the majority of the time that your child resided with you, did you own or rent the dwelling that you lived in?”, 90 % indicated ownership. The marital status of parents was 1 % single, 80 % married, 3 % separated, 14 % divorced, and 2 % widowed. These parents resided in 30 of the 50 United States, and just over 1 % of parents resided in other countries.

The 477 emerging adult children who participated in this investigation were 345 females (72.5 %) and 132 males (27.5 %). Due to a computer error, age data for emerging adult participants is not available. Previous data drawn from the same population (e.g., Segrin et al. 2012) suggests that the young adults in this study were on average 20 years old, and the fact that 95 % of their parents reported their age as 35–60 also indicates that the vast majority of young adult participants are in the 18–25 age range. The race/ethnicity of the emerging adult child sample was 0.2 % American Indian/Alaskan Native, 3.5 % Asian/Pacific Islander, 2.5 % Black/African American, 10.3 % Hispanic/Latino, 80.5 % White, and 2.9 % other/unknown. Thirty percent of emerging adults reported living at home with the parent who was participating in the study with them. In terms of family size, 10.5 % reported being an only child, 45 % had one sibling, 29 % had two siblings, 10.5 % had three siblings, and 5 % had four or more siblings. To assess current levels of contact with their parents, emerging adult children were asked “On average, how frequently do you communicate with the parent who is participating with you in this study (via phone, text messaging, face-to-face, and so on)?” Responses were several times a day (30 %), approximately once a day (21 %), several times a week (35 %), approximately once a week (10 %), several times a month (3 %), with the remaining 1 % indicating once a month or less.

Procedure

Parent–child dyads were recruited through students enrolled in undergraduate courses at one of three universities located in the West, Southwest, and North Eastern United States. Students were offered extra credit toward their course grade in exchange for completing an on-line survey and for referring a parent to do the same. Interested students were given a link to a secure website where they could complete the survey. At the end of the survey, they were asked for the name and email address of a parent who would be willing to complete the survey. Measures for both student and parent surveys are described in the next section. The parent referred by the student was then sent a link to a different survey. The parent–child dyads were linked with a code number so that no names were required as part of their survey response. The parental response rate was 86 %, based on those students who provided a working email address for their parent. The software used to collect student and parent survey responses recorded the start and finish time of the survey responses. Four dyads were dropped because at least one member completed the survey in less than 10 min. After this deletion, there were 477 parent–child dyads retained for analysis.

Measures

Parents completed the following measure.

Overparenting

The Overparenting Scale (Segrin et al. 2012), assesses such parenting behaviors as offering advice, problem solving for the child, providing tangible assistance, protection from risk, monitoring and attention, removal of obstacles, and management of the child's emotions/moods. This multidimensional 39-item measure asks parents to rate their agreement with items such as “I make suggestions to my child to help him/her get things accomplished,” and “I do what I can to keep my child out of difficult situations.” Items were measured on a 5-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*). Higher scores are reflective of engaging in more overparenting behaviors. In the original investigation, reliabilities for the various subscales were $\alpha = .74$ for tangible assistance, $\alpha = .79$ for child self-direction (not included in the present study), $\alpha = .81$ for advice and affect management, and $\alpha = .88$ for anticipatory problem solving (Segrin et al. 2012). Internal reliabilities for the subscales used in the present investigation were as follows, anticipatory problem solving $\alpha = .88$, advice and affect management $\alpha = .82$, tangible assistance $\alpha = .76$, and risk aversion $\alpha = .75$.

The following measures were completed by both parents and their emerging adult children.

Critical Family Environment

Parent–child expressed emotion was assessed using the Perceived Criticism subscale of the Family Emotional Involvement and Criticism Scale (FEICS; Shields et al. 1992). The subscale is comprised of seven items that assess perceived criticism from family members from the recipient's perspective. Sample items include, “My family is always trying to get me to change,” and “I have to be careful what I do or my family will put me down.” Items were measured using a 5-point Likert-type scale (1 = *almost never*, 5 = *almost always*). In the original research the perceived criticism scale had an internal consistency reliability of $\alpha = .84$ (Shields et al. 1992). In the present study, internal reliabilities were $\alpha = .78$ for young adult children and $\alpha = .74$ for parents.

Attitude Toward Parent/Child

Parent and child attitudes toward one another were assessed using items from the Child's Attitude Toward Mother/Father scales (CAM/CAF; Hudson 1992). The CAM/CAF assesses the severity of parent–child relationship problems. For the purpose of this study, a version of the scale that could be administered to parents was created. Additionally, items were reworded in the child version to include *parent*, instead of specifying mother or father. The parent and child versions of the measure were identical, except for the inclusion of the word *parent* or *child* on the appropriate scale. Fifteen items were used to measure parent/child attitudes toward one another. Sample items include, “My parent's/child's behavior embarrasses me,” and “My parent/child puts too many limits on me.” Items were measured on a 5-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*). Higher scores are reflective of more severe parent–child relationship problems. Originally the CAM and CAF scales were reported to have internal consistency reliabilities of .94 and .95, respectively (Giuli and Hudson 1977). In the present study, internal reliabilities were $\alpha = .91$ for young adult children and $\alpha = .89$ for parents.

In addition to the two measures previously mentioned, emerging adult children also completed the following measures.

Parental Conditional Regard

Perceived parental conditional regard was assessed using the Perceptions of Parental Conditional Regard Scale-Academics (PCRS-A; Roth et al. 2009). The PCRS-A is a

10-item scale that assesses the child's perception that positive and negative parental regard is conditional upon academic performance. Five items assess parental positive regard, and the other five assess parental negative regard. Sample items include, "When I succeed at school, my parent gives me the feeling I'm worth more," and "When I get a poor grade at school, my parent stops giving me attention for a while." Items were measured on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Originally, this scale was reported to have internal reliability of .84–.92 (Roth et al. 2009). In the present investigation internal reliability was $\alpha = .86$.

Problems with Parents and Self

Problems with parents and self was assessed using the Problem Questionnaire (PQ; Seiffge-Krenke 1995). The PQ identifies common difficulties and worries for young adults, and assesses the extent to which they are experienced as stressors. The PQ assesses problems across a variety of domains, including school, future, parents, relationships, leisure, romantic involvement, and self, with each domain representing a distinct subscale. The domains of parents (9 items) and self (12 items) were examined in this study. Sample items from the parent subscale include, "I wish I wasn't so dependent on my parents," and "It's difficult for me to pursue my own interests because I don't want to disappoint my parents." Sample items from the self subscale include, "I find it difficult to talk about my feelings with others," and "I am different from my friends." Items were measured on a 5-point Likert-type scale (1 = *not stressful at all*, 5 = *highly stressful*). Higher scores are reflective of higher stress associated with problems with parents and self. The original seven factors of the Problem Questionnaire were tested in four different countries with reliabilities ranging from $\alpha = .72$ –.78 (Seiffge-Krenke et al. 2010). In the present study, internal reliabilities were $\alpha = .84$ for the parent subscale and $\alpha = .91$ for the self subscale.

Anxious Parenting

Anxious parenting was assessed using Rapee's (2009) Anxious Parenting scale. The scale assesses the child's perception of the degree to which the parent provides an anxious and overprotective influence. Items reflect overt parental behaviors that attempt to protect the child from harm, and express the parent's own anxieties. Fifteen of the 23 scale items were used in this study, and sample items include, "shelters me from life's difficulties," and "has a say in who I go out with." Items were measured on a 5-point Likert-type scale (1 = *not at all*, 5 = *all the time*). Higher scores are reflective of higher anxious parenting

behavior. In the original investigation the author reported reliabilities of $\alpha = .53$ and .62 for the full version of the scale at baseline assessment and 12 months (Rapee 2009). In the present investigation, the 15-item version of the scale that was used had an internal consistency reliability of $\alpha = .71$.

Helicopter Parenting

To assess overparenting from the child's perspective, emerging adult children completed Montgomery's (2010) helicopter parenting scale that assesses children's perceptions of parental overinvolvement. Based on results of a measurement model presented in the Results, only the hovering and control subscales were included in subsequent analyses. The subscales are comprised of 15 and 14 items, respectively. Sample items from the hovering subscale include, "My parents have come to my school or work to make sure I was there," "My parents make most of my decisions for me," and "If 2 days go by without contact my parents would contact me." Sample items from the control subscale include, "My parents are always trying to control me," "My parents monitor what I spend my money on," and "My parents go through my things at home." Items were scored on a 5-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*) with higher scores reflecting perceptions of greater parental involvement. In the original investigation, Montgomery (2010) reported a reliability of $\alpha = .71$ for the overall scale. In the present investigation, internal reliabilities were $\alpha = .75$ for the hovering subscale and $\alpha = .76$ for the enmeshed subscale.

Results

Table 1 contains correlations, means, standard deviations, and potential scale ranges for all variables included in the subsequent analyses. Prior to testing the study's hypotheses, a measurement analysis was conducted to determine the loadings of the observed variables onto the latent variables of interest. Our initial attempt to fit this measurement model indicated that the overparenting scale-child self-direction subscale did not load adequately on the overparenting-parent report latent variable, and that the helicopter parenting scale-enmeshment subscale did not load adequately on the overparenting-child report latent variable, creating an overall poor model fit, $\chi^2 = 768.87$, $p < .001$, $df = 113$, χ^2/df ratio = 6.80, CFI = .76, RMSEA = .11 (95 % CI = .10–.12). Consequently, these two observed variables were dropped and the measurement model was reanalyzed. Modification indices revealed that the overall model fit could be improved substantially by

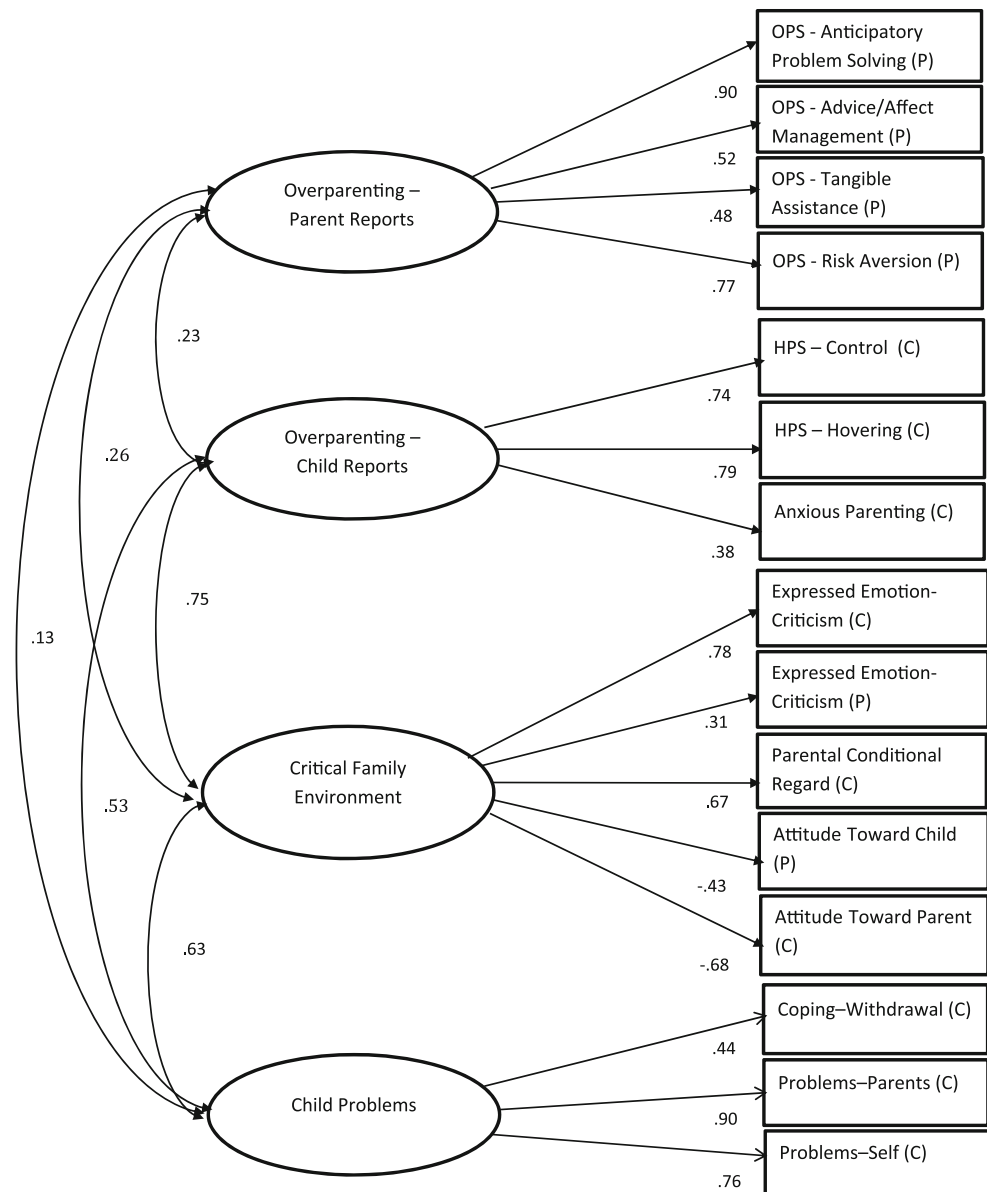
Table 1 Correlations, means, and standard deviations for all study variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Anticipatory problem solving (P)	–														
2. Advice/affect management (P)	.49***	–													
3. Tangible assistance (P)	.41***	.34***	–												
4. Risk Aversion (P)	.70***	.36***	.41***	–											
5. Exp emotion criticism (P)	.22***	–.02	.06	.22***	–										
6. Att. toward child (P)	–.17***	.11*	.07	–.12**	–.43***	–									
7. Helicopter parenting-control (C)	.14**	.04	.05	.12**	.09	–.20***	–								
8. Helicopter parenting-hover (C)	–.15**	.08	.20***	.20***	.09*	–.15**	.59***	–							
9. Anxious parenting (C)	–.16***	.19***	.17***	–.16***	–.02	.07	.22***	.37***	–						
10. Exp emotion criticism (C)	.19***	.03	.00	.14**	.25***	–.35***	.52***	.42***	.06	–					
11. Parent cond. regard (C)	–.18***	–.05	–.05	.19***	.18***	–.29***	.41***	.43***	.01	.51***	–				
12. Att. toward parent (C)	–.10*	.11*	.08	–.07	–.25***	.38***	–.40***	–.18***	.24***	–.54***	–.44***	–			
13. Withdrawal (C)	.08	.03	.02	.04	.15**	–.18***	.26***	.27***	.04	.30***	.24***	–.23***	–		
14. Problems-parents (C)	.12**	.02	.02	.10*	.24***	–.21***	.35***	.41***	.12*	.47***	.38***	–.43***	.35***	–	
15. Problems-self (C)	.08	.02	.03	.03	.17**	–.14**	.27***	.25***	.07	.37***	.27***	–.31***	.41***	–.67***	–
<i>M</i>	3.17	4.06	3.50	3.02	1.68	4.60	2.45	3.02	3.17	1.78	2.58	4.22	0.93	3.76	3.66
<i>SD</i>	0.65	0.44	0.60	0.51	0.53	0.42	0.67	0.51	0.41	0.63	0.58	0.52	0.55	0.78	0.83
Potential range	1–5	1–5	1–5	1–5	1–5	1–5	1–5	1–5	1–5	1–5	1–5	1–5	0–3	1–5	1–5

C indicates measure completed by child; P indicates measure completed by Parent

* $p < .05$; ** $p < .01$; *** $p < .001$

Fig. 1 Overparenting, family environment, and child problems measurement model. Figure values between latent and observed variables are standardized factor loadings. Figure values between latent variables are correlations. *OPS* overparenting scale, *HPS* helicopter parenting scale, *P* parent report, *C* child report. For ease of presentation, error terms are not depicted



specifying three correlations between pairs of error terms. Specifically, these were parent criticism-parent attitude toward child, child reports of hovering-child attitude toward parent, and child reports of anxious parenting-child attitude toward parent. In all cases, these pairs of error terms reflected similar constructs measured from the same person in the dyad, suggesting some justification for these specifications. Correlations were specified between each of the four latent constructs in the measurement model as depicted in Fig. 1. The fit of this measurement model was tested in AMOS 18 with maximum likelihood estimation. Results of this analysis indicated that the model provided a good fit to the sample data, $\chi^2 = 253.49$, $p < .001$, $df = 80$, χ^2/df ratio = 3.17, CFI = .93, RMSEA = .067 (95 % CI = .058–.077).

Before examining the results of the structural model, it is worth noting that our initial attempts to fit the measurement model started with specification of a single latent overparenting variable. However, it was clear from the results that parent and child reports of overparenting did not share a sufficient amount of variance to load on a single latent variable. Although this measurement issue is not one of the study's central hypotheses, the issue has some practical and theoretical significance. The modest correlation between parent and child reports of overparenting indicates that at least some of the phenomena that parents report on (e.g., "If I can see that my child is about to have some difficulty, I will intervene to take care of the situation before things get difficult for him/her") do not always generate a related perception in the child (e.g., "My parents are heavily invested in my success").

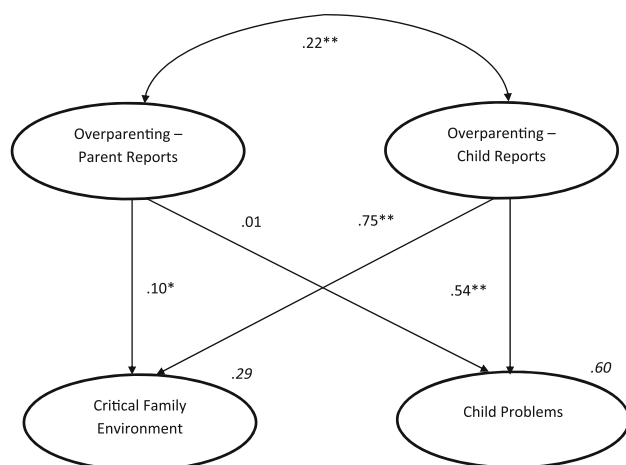


Fig. 2 Overparenting, family environment, and child problems structural model. Coefficients in *regular font* are standardized regression coefficients. Coefficients in *italics* are squared multiple correlations. For ease of presentation, observed variables and error terms are not depicted. * $p < .05$; ** $p < .001$

The study's hypotheses were tested with structural equation modeling in AMOS 18 using maximum likelihood estimation. In this structural model a path was specified from each of the overparenting latent variables to the critical family environment latent variable (H1) and from each of the overparenting latent variables to the child problems latent variable (H2). Results from the initial analysis indicated a marginal model fit, $\chi^2 = 304.65$, $p < .001$, $df = 81$, χ^2/df ratio = 3.76, CFI = .91, RMSEA = .076 (95 % CI = .067–.085), that could be improved by specifying correlations between the critical family environment and child problems error terms and between the anxious parenting and critical family environment error terms. With these specifications in place, the resultant model that is depicted in Fig. 2 provided a good fit to the sample data, $\chi^2 = 230.72$, $p < .001$, $df = 79$, χ^2/df ratio = 2.92, CFI = .94, RMSEA = .064 (95 % CI = .054–.073).

The results in Fig. 2 provide mixed support for hypothesis 1. As predicted, child reports of overparenting were significantly associated with the child problems latent variable ($\beta = .54$, $p < .001$). However, parental reports of overparenting were not associated with the child problems latent variable ($\beta = .01$, *ns*). In this structural model, overparenting had a powerful association with child problems ($R^2 = .60$), but it is clear from the individual paths that virtually all of that variance is explainable by child, not parent, reports of overparenting.

The results that are depicted in Fig. 2 provide support for the hypothesis that overparenting is associated with a critical family environment (H2). Both the parent ($\beta = .10$, $p < .05$) and child ($\beta = .75$, $p < .001$) reports of overparenting were significantly associated with the critical family environment latent variable. The sign of these

associations indicates that higher levels of overparenting are associated with reports of a more critical family environment where both parents and their young adult children hold less positive attitudes toward each other.

Discussion

The primary aim of this investigation was to test two hypotheses concerning the association between overparenting and child problems as well as a critical family environment. Overparenting and critical family environment were operationalized with reports from both parents and their young adult children. Child problems were assessed exclusively through child reports. The results provided mixed support for the hypothesized association between overparenting and child problems. Young adult child reports of overparenting were strongly associated with their reports of their own problems. However, parental reports of overparenting were not associated with child problems. Results from this study supported the hypothesis that overparenting is associated with a critical family environment, operationalized through both parent and child reports of criticism and attitudes toward each other, as well as child reports of parental conditional regard.

According to self-determination theory, the need for genuine and caring relationships is universal (Deci and Ryan 2012). The fulfillment of that need is assumed to be essential to human growth and well-being. The results of this investigation suggest that overparenting is associated with personal problems in relation to other people, with one important caveat. This effect appeared when overparenting was measured by emerging adults' reports, not when measured through the reports of their parents. In other words, to the extent that emerging adults perceived their parents engaging in high levels of hovering, control, and anxious parenting, these emerging adults reported more problems connecting with their parents (e.g., "I can't talk with my parents"), with other people (e.g., "I am different than my friends"), and they respond to problems with school, parents, and self through withdrawal (e.g., "I withdraw because I cannot change things anyway"). The correlations in Table 1 reveal that these associations are particularly substantial with respect to helicopter parenting and problems with parents, but the overall pattern of findings suggests that overparenting may contribute to a social psychological template in which relations with other people, not just the parents, become more difficult. If an emerging adult child views the controlling attempts of the parent as motivated by something other than good will, it is plausible that over the years, such perceptions could generalize to other people and situations. This pattern is consistent with findings from Schiffrin et al. (2012) who found

helicopter parenting behaviors, as reported by emerging adults, to be negatively associated with satisfaction of their relatedness needs (e.g., “I get along with people I come into contact with”).

The findings on overparenting and child problems highlight an issue that is evident in the measurement model in Fig. 1. Although parent and child reports of overparenting were modestly correlated ($r = .23$), they did not load on a common factor. In other words, 95 % of the variance in these constructs was unique. Although the parent and emerging adult child measures were different, it is clear that parents and their children have fairly unique perceptions of this phenomenon. Many of the indicators of overparenting assessed from parents’ point of view (e.g., risk aversion, anticipatory problem solving) are matters that their adult children may not be aware of because they represent private cognitions or actions that happen outside of the child’s presence. This highlights an important methodological and conceptual issue for future studies of overparenting, and should be a reminder that like beauty, sometimes overparenting might be in the eye of the beholder. Some of the objective behaviors enacted by helicopter parents might never enter the awareness of their children.

The finding that child, but not parent, reports of overparenting predicted child problems is consistent with a more general effect in the literature that puts priority on people’s perceptions of what are sometimes thought of as objective phenomena. For example, perceived social support often proves more consequential to mental health than actual received or available social support (McDowell and Serovich 2007). Similarly, perceived stress, not actual stress (as measured by the objective experience of negative life events), is associated with human immune system fitness (Burns et al. 2002). Consistent with these related findings, the results of this study show that emerging adults’ perceptions of their parents’ overparenting predicted emerging adults’ problems considerably more so than their parents’ reports of overparenting.

The results of this study raise questions about whether it is safe to assume that overparenting is enacted out of benevolence and good will. The results reveal quite clearly that overparenting tends to occur in critical family environments, which is somewhat counterintuitive given what is known about parental involvement more generally. What is particularly noteworthy about this finding is that both parent and child reports of overparenting were predictive of the critical family environment latent variable, although the association was much stronger in the case of child reports of overparenting. Related research on anxious parenting, clearly a component of overparenting, has shown that it is negatively associated with parental warmth (Drake and Ginsburg 2011). Consequently, it may be more accurate to

view overparenting as a parenting practice that occurs in a critical family environment and where parents and their children do not necessarily hold each other in high regard.

The cross-sectional nature of this investigation makes the determination of causal ordering impossible, but two possibilities are worthy of future investigation. It is possible that overparenting eventually generates a critical family environment. As Deci and Ryan (2012) argued from the perspective of self-determination theory, parental conditional regard (which was correlated with 5 of the 7 indicators of overparenting in this study) creates a conflict for the child, guilt and shame when the child fails, and ultimately leads to resentment and anger toward the parent. That, coupled with intrusive and perhaps unwanted control attempts, could easily generate friction between parent and child. Simply put, emerging adults may resent helicopter parenting and the parents who enact it. This resentment and anger between the parent and emerging adult child could fuel a critical family environment. A related possibility is that critical family environments motivate overparenting. A parent who is critical of his or her child, feeling that the child is not capable of making good decisions on his or her own, who lacks effective problem solving skills, and who is likely to fall victim to life’s circumstances and challenges might be motivated to engage in overparenting. In contrast, parents who see their emerging adult children as competent and capable of effective decision making and problem solving may not feel the need to engage in overparenting. In such a process, a critical family environment might be expected to predate overparenting. Of course, it is entirely possible that overparenting and the critical family environment function as a vicious cycle where each phenomenon continuously promotes the other. In any event, results of the current investigation suggest that it may not be entirely accurate to conceptualize overparenting as a family process enacted in a context of purely positive regard.

There are several limitations of this study that restrict the conclusions that can be drawn from these findings. First, as previously noted, the cross-sectional design of this study precludes any causal ordering of the variables. Second, the sample was largely white, middle- to-upper class parents and their emerging adult children. On one hand, this is the exact population in which overparenting appears to be most prevalent (Nelson 2010). On the other hand, those features of this sample make it unclear if the results could be generalized to other demographic groups such as Asian heritage families or low SES families. Finally, emerging adults and their parents completed entirely different measures of overparenting. This renders comparison of paths from parents versus emerging adults tenuous because variance in perspective (i.e., parent, emerging adult) is confounded with variance in measurement (e.g., overparenting scale, helicopter parenting scale).

In conclusion, this study shows that overparenting, as perceived by emerging adults, is significantly associated with relationship problems reported by young adults. These problems include their parents, naturally, but extend to other interpersonal contexts, and include withdrawal as a means of “addressing” such problems. In this regard it appears that helicopter parenting paradoxically does not promote positive interpersonal relationships and social problem solving in emerging adults. Second, overparenting occurs in a family content marked by criticism, less positive attitudes between parent and child, and conditional parental regard. The latter finding questions whether it is prudent to assume that overparenting is enacted with entirely benevolent parental intentions.

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Understanding when parental aspirations negatively affect student outcomes: The case of aspiration-expectation inconsistency

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ABSTRACT

Psychological and sociological studies have often shown how parental aspirations positively influence children's academic outcomes. However, less is known about how outcomes are affected when parents have aspirations that are higher than the child's expectations for himself or herself. In this study, aspiration refers to the level of schooling parents ambition for their child while expectation refers to the level the child believes he or she will attain. Using US longitudinal data from a sample of tenth grade students ($n = 7,635$), I show two circumstances when parental aspirations negatively affect academic outcomes. Confirming previous research on status attainment and blocked opportunities, parents and children who expect less than college have, on average, worse academic outcomes. However, challenging the expectancy-value theory, students whose parents have inconsistently higher aspirations for them also experience worse outcomes. The findings suggest that unnecessarily high and unrealistic parental aspirations can disadvantage students' performance.

1. Introduction

Whether conscious of it or not, parents usually have aspirations for their children—particularly, how far in school they ambition for the child. There are parents who desire for their children to go as far as a professional or medical school, while there are parents who desire less than high school for their children because of particular circumstances. The common understanding, however, is that parental aspirations have positive effects on children's academic outcomes (Eccles & Wigfield, 2002; Sommerfeld, 2016). Using psychology's expectancy-value theory, higher parental aspiration is usually associated with stronger parental involvement and support, which helps students accomplish more in school (Jung & Zhang, 2016; Porumbu & Necşoi, 2013). Using sociology's status attainment and blocked opportunities theory, parents who have higher aspirations financially invest and support their children's education (Hao & Yeung, 2015), and alternatively, the family's socioeconomic status can itself block life opportunities and outcomes (Berzin, 2010; Vowell & May, 2000). Given theories and empirical evidence supporting the positive link between parental aspirations and children's academic outcomes, a practical implication is for parents to aspire higher for their children.

High parental aspirations does influence children's motivation to achieve higher outcomes, but these aspirations can also translate to unnecessary pressure and stress for children who recognize they are

unable to reach their parents' aspirations for them (Randall, Bohnert, & Travers, 2015; Ritchwood, Carthron, & Decoster, 2015). Nascent research on this possibility of parental aspirations' negative effects has suggested that parental overaspiration—defined as parents' aspiration exceeding their expectation—can have detrimental effects on academic outcomes (Murayama, Pekrun, Suzuki, Marsh, & Lichtenfeld, 2016). The distinction between aspiration and expectation comes with the former being about ambition while the latter being about a realistic assessment. Since the study has only compared parents' aspirations and expectations, there is still a gap in the literature of the effect if parents' aspirations are higher than the students' expectations of themselves. Understanding this interaction, however, is important in nuancing the significance of parental aspirations.

In this study, I argue that although high parental aspirations are important for students' academic success, two circumstances can negatively affect these outcomes: (i) if both parent and child expect for less than college, and (ii) if parental aspirations are inconsistently higher than the student's expectations. Using longitudinal data from a sample of tenth grade students from the United States, I perform hierarchical linear regressions on parental aspirations predicting short-, medium- and long-term outcomes. I investigate how consistency or inconsistency between the parent's aspirations and the child's expectations could affect three academic outcomes: taking a standardized test for college, attending college, and graduating from college. In the

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discussion, I show how psychological and sociological factors—like high expectations, perceptions of blocked opportunities, and inconsistency or strain—can influence these outcomes.

2. Literature review

2.1. Expectancy-value theory

Developed by Eccles, Wigfield and colleagues, the expectancy-value theory posits that the person's expectancies for success and the value given towards success are important predictors for the achievement of a task (Eccles & Wigfield, 2002; Wigfield, Tonks, & Klauda, 2009). Applied to educational literature, students are more likely to achieve academic outcomes if they believe they are capable of succeeding, and if they personally value the task at hand (Martin & Dowson, 2009).

Achievement orientation helps students in pursuing higher academic outcomes (Nasser & McInerney, 2016), and this orientation is often codified in how far in school a student expects to achieve. Some students do not expect to finish college, while others expect to pursue masters, professional or doctoral degrees. Since motivation codified in educational expectations influence eventual academic outcomes (Ariani, 2016; Liu, Cheng, Chen, & Wu, 2009), researchers study what factors contribute to higher expectancies and to better motivation among students. One set of factors that can affect the formation of the student's expectancies and values is the child's social circles (King & Ganotice, 2014; Wigfield & Tonks, 2002).

Primary among the child's social circles is the family, specifically the parents. Expectancy-value theory holds that influence happens through the beliefs of important socializers (e.g. parents) influencing the child's expectancy for oneself (Eccles & Wigfield, 2002; Wood, Kaplan, & McLoyd, 2007). More than the indirect effect of parents' expectations through the child's expectancies, Froiland and Davison (2016) argue that parent expectation actually predicts students' intrinsic motivation, which in turn predicts math achievement. This is supported by research that parents who directly communicate their academic expectations with their children help mediate the effects of IQ score on school achievement (Phillipson & Phillipson, 2012). Relatedly, parent expectations of post-secondary achievement as early as kindergarten can strongly affect subsequent achievement in later grades (Froiland, Peterson, & Davison, 2013).

Aside from parents' influence on motivation, parents also influence the child's academic outcomes through their behavior and involvement. Davis-Kean (2005) suggest that although material poverty affects the child's development, parents' provision for "an emotionally stable and stimulating environment" minimizes poverty's negative effects. Other behaviors associated with positive outcomes for students are parents helping in terms of literacy, trusting the work done by students, and giving time to hear what children do in school (Hayes, Blake, Darensbourg, & Castillo, 2015; He, Gou, & Chang, 2015; Levpušček & Zupančič, 2009). Given the belief that good education is a ticket out of poverty, parents often transfer their aspiration to their children but structural conditions may make these aspirations harder to attain (Behnke, Piercy, & Diversi, 2004). Thus, even as parents influence their child's motivation, behavior and achievement, other social factors play a role in these student outcomes, either facilitating or preventing student achievement.

2.2. Status attainment and blocked opportunities

Inasmuch as psychological research into students and parents' expectancies help us understand cognitive processes at work, sociological theories also provide explanations to people's achievement of life and academic outcomes. This line of research can be traced as far back as Blau and Duncan (1967), where they theorized that status is attained by both achieved and ascribed factors, such as educational attainment and family socioeconomic status respectively. As this model is limited to

social structural variables, a more sophisticated model, the Wisconsin model, added social psychological factors in the child's educational and occupational attainment (Sewell & Shah, 1968; Sewell, Haller, & Portes, 1969). In this model, children's abilities, levels of aspirations, and influence of significant others all play important roles in the student's eventual status and educational attainment (Sewell, Haller, & Ohlendorf, 1970). This model, however, has been criticized for flaws on "measurement, conceptualization, interpretation, and evaluation" (Campbell, 1983, p. 48). Nonetheless, the general concept of social structural and psychological factors affecting eventual outcomes is widely accepted, particularly with how youth aspirations play a role in their achievement (Buchmann & Hannum, 2001).

Parents often influence their children through different channels: increased financial spending, developmental opportunities, moral encouragement or social capital. Although there are differences in child spending according to socioeconomic status (SES) and ethnicity, parental aspirations still affect whether parents will be spending more for their children, particularly for college (Hao & Yeung, 2015; Napolitano, Pacholok, & Furstenberg, 2014). More than financial support, parents who have high aspirations for their children also involve themselves in the students' education, and this positively affects their achievement (Jeynes, 2012; Jung & Zhang, 2016). Usually parents show involvement by attending parent-teachers conferences (Gu & Yawkey, 2010; Jekonia & Möwes, 2014), helping children with homework (Kim & Fong, 2013), providing opportunities for out-of-school learning (Ono & Sanders, 2010), and sharing their educational aspirations for their children (Espino, 2016). Hill and Wang (2015) argue that parental involvement and support indirectly influence long-term academic outcomes through their effects on the child's aspirations. Alternatively, narratives of parents' aspirations for their children help these children form similar aspirations (Stockfelt, 2015).

Although aspirations—both the child's and parents'—play important roles in eventual achievement, structural and personal realities may block the influence of these aspirations. Social structural systems may prevent a substantial number of driven and talented youth from achieving simply because of their socioeconomic placement (Hanson, 1994). The usual explanation is that the constant experience and reminder of poverty increases the person's perception of blocked opportunities, that is, one's "limited access to educational and occupational opportunities" (Vowell & May, 2000, p. 44). Because of this perception of blocked opportunities, disadvantaged students may either overcompensate this deficiency by overachieving (Sue & Okazaki, 2009) or underperform because of the perceived lack of upward mobility (Fordham & Ogbu, 1986). Kao and Tienda (1998) found that socioeconomic position influences not only aspirations but the stability of aspirations and that long-term stability helps predict likelihood of going to college.

Since social structural forces affect the aspirations of parents and children, it is possible that having low aspirations is a result of the family's socioeconomic status. It is interesting, however, that some students experience having parents with high aspirations but who themselves have low expectations. Such situations are not often studied either in expectancy-value theory or in status attainment literature.

2.3. Aspiration-expectation inconsistency

Although previous literature highlights the important role of high aspirations for parents and children, high ambitions do not always lead to higher educational achievement. Schneider, Kim, and Klager (2017) argue that most adolescents have high educational aspirations but these aspirations are usually not aligned with their occupational expectations. Murayama et al. (2016) also suggest that the misalignment between parent aspirations and parent expectations (what they call *parental overaspiration*) have negative effects on the child's mathematics performance. These fairly new insights on the negative effects of high aspirations on school achievement highlight the danger of mindlessly

raising the child or parents' aspirations.

Rather than think of it as high aspiration's negative effects on achievement, research has pointed to the negative effect of having an inconsistency between one's aspirations and expectations (Agnew, 2012; Merton, 1938; Zhang, Wieczorek, Conwell, & Tu, 2011). According to the general strain theory, strain arises when high levels of aspirations is accompanied by low levels of expectations or perceived outcomes (Knight, Ellis, Roark, Henry, & Huizinga, 2016). As aspirations surpass the individual's expectations, a "negative affective state" surfaces, and this leads to increased likelihood of delinquency (Lee & Cohen, 2008). Although this theory is usually applied to criminological research, it can also explain how aspiration-expectation inconsistency leads to "deviant" academic behavior like using cheat notes, copying from classmates, coming late to class, or skipping a class altogether (Tedor, Sharp, & Kobayashi, 2015). Most examples in the strain theory applied to education involve the individual's experience of high educational aspirations and low perceived future outcomes.

Different from the previous theories that limit the inconsistency within the same person (i.e. strain as an individual experience), I apply the strain theory to parents having high aspirations *and* their child having low expectations. Could it be possible for strain to be about the inconsistency between two people's aspired and expected outcomes? The hypothesis is that higher parental aspirations disconnected from the child's personal expectations can lead to similar strains for the student, and thus, affect academic outcomes.

3. Data and methods

Data for this study came from the Education Longitudinal Study of 2002 (ELS:2002) of the National Center for Education Statistics (NCES). The dataset is a nationally representative sample of United States high school students who were in tenth grade during the year 2002. The 2002 sample was balanced across sex, and participants were then around 16 years old. Recruitment happened by contacting the Chief State School Officers of each state, officers of school districts or dioceses, and then, school officials. Parents provided informed consent on behalf of the respondents.

3.1. Sample

The data used for this research combine variables from the first to fourth waves of the program (2002, 2004, 2006, and 2012), and was acquired as one dataset from the publicly available file from the NCES. Although this was conducted in 2002, this dataset provides a rich source that shows where students have been ten years after the first survey. In this way, the dataset is able to provide the longer-term effects of the aspiration-expectation inconsistency.

As with most longitudinal studies, the dataset experienced sample attrition from the first wave to the subsequent ones. The present research dataset is limited to those that have answered the 2002, 2004, 2006 and 2012 surveys. Thus, although the initial number of students in 2002 is 13,794, the study sample is limited to 7,635. One limitation of the present study is that those who have data from all four waves were likely to have slightly higher aspirations and outcomes. Nonetheless, a considerable number of people still did not have high aspirations or outcomes. Thus, the data—though not completely representative of the US population—still have statistical power in answering the research question about how parental aspirations and aspiration-expectation inconsistency influence outcomes.

For the 2002 sample, I limited this to students who have answered the student expectation variable. The parent aspirations variable had no missing data. The present research sample is limited to individuals who have valid data on the subsequent waves, that is, those with complete data on their PSAT, college enrollment/non-enrollment, and highest education degree in 2012. Table 1 presents descriptive statistics for the 2002 and the research sample while Appendix Table A1 shows data for

Table 1

Descriptive statistics for Education Longitudinal Study.

Source: Education Longitudinal Study of 2002.

	2002 Sample	Research Sample*
<i>Dependent variables:</i>		
% took/ planned to take PSAT		68.27
% enrolled in college in 2006		61.31
% attained bachelors by 2012		48.34
<i>Individual-level variables:</i>		
<i>Parental aspirations (percent)</i>		
Not graduate four-year college	11.27	7.88
Graduate four-year college	43.72	43.33
Pursue graduate studies	45.01	48.79
<i>Aspirations consistency (percent)</i>		
Parental aspirations higher than child's expectations	27.06	22.92
Parental aspirations lower than child's expectations	19.73	20.89
Parents and child aspire/expect less than four-year college	6.86	4.30
Parents and child aspire/expect four-year college	20.78	21.02
Parents and child aspire/expect graduate studies	25.58	30.87
10th grade math test score	51.09 (9.91)	53.51 (9.38)
<i>Demographic background</i>		
SES (mean)	0.07 (0.74)	0.19 (0.73)
% Male	49.27	43.60
% White	57.40	63.67
% Black	13.38	10.20
% Hispanic	14.01	11.33
% Asian	9.49	9.72
% Others	5.73	5.08
<i>School-level variables:</i>		
% Public school students	77.83	73.25
% Catholic school students	13.03	16.96
% Private school students	9.14	9.78
% Urban school students	33.38	32.56
% Suburban school students	48.17	49.38
% Rural school students	18.46	18.06
Students (n)	13,794	7,635
Schools (n)	751	751

Note: The measures represent mean values with standard deviations in parentheses, or the percentage of the sample falling under the category.

each wave.

For the research sample, there were 68.27% who took or planned to take the PSAT, 61.31% who were enrolled in a four-year college in 2006, and 48.34% who were able to obtain their bachelor's degree in 2012. In terms of parental aspirations, 7.88% had parents whose aspirations for their children were less than a four-year college, 43.33% whose aspirations were a four-year degree, and another 48.79% whose aspirations were for graduate degrees. For the consistency in parental aspirations and child expectations, 22.92% had parents with higher aspirations than the student and 20.89% with parents having lower aspirations. The difference between this research sample from the 2002 sample is less than three percentage points, which suggests that the composition of the two samples are close to each other.

The average 10th grade math test score was at 53.51 points, and socioeconomic status had a mean of 0.19. The sample is also 64% White, 10% Black, 11% Hispanic, 10% Asian, and less than 6% others. This racial composition is markedly different for Whites that had only 57% in 2002 sample, and Blacks that had 13% in the original sample. This suggests that there were less Blacks who had data for all four waves. Additionally, there were also less males who had data for all four waves. If in 2002, the percentage of males was at 49%, this was reduced to 44% in the research sample. The percentage who were studying in public, Catholic and private schools were consistent, similar with the percentage studying in urban, suburban, and rural schools.

3.2. Dependent variables

To understand the effect of parental aspirations on student outcomes, I examine three dependent variables that show short-, medium- and long-term outcomes for students. Short-term academic outcome recorded in 2004 is given by whether a student has taken or plans to take the Preliminary Scholastic Aptitude Test (PSAT). The medium-term outcome recorded in 2006 is whether a student is enrolled in a four-year college or university. The long-term academic outcome assessed in 2012 is indexed by whether the student had earned a bachelor's degree or higher. All variables are dichotomous variables coded 1 if the student fell under the category, and 0 otherwise.

3.3. Independent variables

There are two sets for independent variables. The first is the individual parents' educational aspiration for their children, while the second is the consistency between the parents' aspirations and student's expectations.

For educational aspirations, I recode the parents' answer to how far in school they want their children to go. In the original first-wave ELS:2002 dataset, this was a categorical variable with seven categories. Because some categories had very few observations and having seven categories could affect statistical parsimony, the variable was recoded to three categories: (i) less than a four-year college degree, (ii) a four-year college degree, or (iii) a graduate degree, inclusive of Master's, PhD and MD.

Since some students answered that they do not know how far they expect to go in school, these students have been marked missing and were not included in the sample. When a distribution test was conducted to look at the distribution of math test scores of students who marked themselves "Don't know," this specific sample showed a similar distribution as the whole sample. However, there is still a risk of sampling bias because these students were less likely to have information in the subsequent waves of the ELS, and thus, their subpopulation's distribution for the other dependent variables was slightly lower than the research sample's. Despite this limitation, this exclusion is preferred over the imputation of the primary explanatory variable.

The other independent variable is the consistency between parents' aspirations and student's expectations. There were five categorical variables: (i) parental aspirations are higher than student expectations, (ii) parental aspirations are lower, (iii) both parent and student aspire/expect less than a four-year college, (iv) both aspire/expect a four-year college, and (v) both aspire/expect a graduate degree. For example, if parents desired for graduate school when the student only expects to go to college or less than college (or college when the student expects less than college), then this is coded as 1 for the category *Parental aspiration higher*. The same recoding happened for the other independent variables. Both variables were asked during the base-year survey, and were only obtained from the time when the students were in tenth grade.

3.4. Control variables

The primary control variable is the student's standardized math test scores during tenth grade, which measures mathematical and logical abilities. Students from the 2002 base-year had their test scores in the spring term, and the scores have been standardized with a mean of 50, and minimum and maximum values of 10 and 90, respectively (Ingels et al., 2007). This control variable aims to hold constant the students' prior scholastic achievement, in order to see the strength of relationship between independent and dependent variables. The individual's sex (male or female) was also used as a control variable since there were marked differences in the distribution per sex.

Other individual-level control variables used are the family's socioeconomic status during the base year, with values ranging from −2.11 to 1.82. This variable is a composite variable that includes the

mother and father's highest level of education, mother and father's occupation, and the combined family income during the base year. This variable was not changed or recoded from the original dataset because of missing variables (such as parents' education), which were then imputed by the NCES to create the composite variable. This can be read as an index showing where in a continuum a certain family is, based on the factors of parents' education, occupation, and income.

Since high aspirations could translate to parents being more involved in their child's academics, I also controlled for parental involvement in academics. There were three variables used: (1) parents helping with homework, (2) discussing course content with child, and (3) discussing college plans. In the regressions, parents who do not or rarely help/discuss formed the reference group, and the coefficients were estimated for those who helped/discussed *sometimes* and *often*. The student's ethnic identification was also used as a control variable. In this study, I limited the groups to five categories: White, Black, Hispanic, Asian, and others.

School-level control variables are the school's classification and urbanicity. I control for whether a school is a public school, a Catholic school, or a non-Catholic private school, and whether a school is located in an urban, suburban or rural district.

3.5. Analytic strategy

Hierarchical linear models (HLM) were estimated to answer how *parental aspirations* and the *consistency* between these aspirations and child expectations influence student outcomes. First, student outcomes are regressed on parental aspirations, controlling for prior math test score, sex, socioeconomic status (SES), parental involvement, ethnicity, school classification and urbanicity. Second, these same student outcomes are regressed on the categories for aspiration-expectation consistency, inclusive of the same control variables as the previous regression.

Model 1 had the odds of taking the PSAT as the dependent variable, and this variable was regressed on parents' aspirations, with student- and school-level controls. Model 2 used the odds of a student entering a four-year college as dependent variable, while Model 3 used the odds of a student receiving at least a bachelor's degree by 2012. For the second HLM, the parental aspiration variables were replaced by categories for the consistency in parent's aspiration and student's expectation.

All the models added 10th grade mathematics test score so as not to overestimate the effect of the independent variables. Additionally, socioeconomic status and ethnicity were also used since studies have shown that economically disadvantaged groups and minorities have more limited opportunities and educational resources (Darby & Saatcioglu, 2015; Horan, Brown, Jones, & Aber, 2016; Kim, Chang, Singh, & Allen, 2015). Sex and parental involvement were also used as controls because of higher achievement for females and those with more involved parents (Hayes et al., 2015). Lastly, controls were used for school type since prior research has suggested higher student outcomes for Catholic schools and urban schools (Morgan & Todd, 2009; Strayhorn, 2009).

All statistical analyses were performed in STATA/MP 14, where the *melogit* function was used. Two-level HLM helped account for the nesting of students within schools, and it also avoids the dangers of aggregation bias, or the bias that comes if individual-level conclusions are made from group-level analyses (Fantuzzo, LeBoeuf, & Rouse, 2014; Raudenbush & Bryk, 2002).

4. Results

4.1. Demographic data per consistency group

Table 2 shows the demographic data of each of the five groups in terms of consistency: (1) those with parents having higher aspirations than the child's expectations, (2) those with parents having lower

Table 2

Demographic Data per Consistency Group.

Source: Education Longitudinal Study (ELS) – 2002.

	Parental aspirations higher than child's expectations	Parental aspirations lower than child's expectations	Parents and child aspire/expect less than college	Parents and child aspire/expect college	Parents and child aspire/expect graduate studies
Percentage Male	54.95	44.35	64.27	50.08	41.72
Mean SES	−0.07	0.07	−0.43	0.04	0.36
Percentage White	48.10	63.58	65.01	63.20	55.73
Percentage Black	18.41	10.11	10.10	10.60	13.69
Percentage Hispanic	18.52	12.31	13.85	12.28	11.99
Percentage Asian	9.35	7.50	4.02	8.79	13.21
Percentage Others	5.63	6.50	6.98	5.13	5.39
Number of Students	3,732	2,721	946	2,867	3,528

Notes: The table shows the percentage of students who fall under a particular sex or ethnicity (or the mean socioeconomic status) in the different groups that were used as explanatory variables.

aspirations than the child's expectations, and those with similar aspirations for (3) less than college, (4) college, or (5) graduate studies. In this table, there are markedly more males in the group expecting less than college (64.27%) and markedly less males in the group expecting to do graduate studies (41.72%). This is one reason why sex is added as a covariate for the HLMs.

In terms of socioeconomic status, those who are in the third group (both expect less than college) actually had a negative score at −0.43 while those in the fifth group (both expect graduate studies) had a higher than average positive score at 0.36. Additionally, for the group where parents aspire higher for their children, there was actually quite a large percentage of Blacks and Hispanics compared to the other groups. For this group, Blacks comprised 18.41% while Hispanics comprised 18.52%. For the group on parent and child both aspiring for college, this was reduced to just 10.60% and 12.28%, respectively.

Table 2 highlights differences in the composition per aspiration-expectation consistency group, which is why these demographic data are added in the research as control variables. In addition, these details provide information that can supplement sociological hypotheses about how aspiration-expectation inconsistency negatively affects later life outcomes.

4.2. Parental aspirations

One concern of this present research is how parental aspirations are predictive of student outcomes. From Table 3, the reference group were students whose parents aspire college for them. The first column shows the effect of parental aspirations on the odds of taking the PSAT: a parent who does not aspire a four-year college for the child reduced the odds of the child taking the PSAT (OR 0.45, $p < 0.001$). Additionally, a parent who aspires for graduate studies for the child increased the odds of taking the PSAT (OR 1.16, $p < 0.01$). These results control for prior achievement, socioeconomic status, sex, parental involvement, ethnicity, and school-level covariates.

For the medium-term outcomes, the second column of Table 3 shows the effect of parental aspirations on the odds of students entering a four-year college. The table shows how those whose parents aspire for less than college for the student had lower odds of entering a four-year college (OR 0.39, $p < 0.001$). On the other hand, students whose parents aspire for them to pursue graduate studies were 37% more likely to enter a four-year college when compared to the reference group ($p < 0.001$).

More importantly, the present research finds that these effects were still present for longer-term outcomes such as the likelihood of graduating with a bachelor's degree. Those whose parents did not aspire for their child to enter college had reduced odds of graduating from college (OR 0.32, $p < 0.001$) while those whose parents aspired for graduate studies were 27% more likely to graduate from college ($p < 0.001$), controlling for all other variables.

For those interested to see how student expectations (as opposed to parental aspiration) predict these three dependent variables, they may refer to Appendix Table A2. This table shows the same pattern of reduced odds for students who do not expect to graduate a four-year degree and increased odds for those who expect to pursue graduate studies, even after controlling for individual- and school-level variables.

4.3. Inconsistency of parental aspirations and student expectations

The other question this present research asks is how the consistency or inconsistency of aspirations and expectations affect academic outcomes. Table 4 presents the effect of such consistency or inconsistency. For this table's independent variable, the reference group comprised students who expect and parents who aspire for a four-year college. For the odds of taking the PSAT, students with parents who aspire higher had reduced odds of taking the PSAT (OR 0.82, $p < 0.05$) similar to how students and parents aspiring for less than college reduced the odds of taking the PSAT (OR 0.33, $p < 0.001$). It must be noted, however, that when both parent and child aspire for graduate studies, the likelihood of the child taking the PSAT are increased by 59% ($p < 0.001$). These significant results take into consideration the control of various covariates mentioned in the previous section.

The second column of Table 4 shows that even after controlling for individual- and school-level variables, having parents with higher aspirations was still associated with a lower likelihood of enrollment in a four-year college (OR 0.77, $p < 0.01$). Likewise, when both student and parents aspire/expect for less than college, there was also a lower likelihood of entrance to college (OR 0.26, $p < 0.001$). A factor that increased the likelihood of entering a four-year college is when parents and student have similar aspirations to pursue graduate studies (OR 1.71, $p < 0.001$).

The last column of Table 4 shows that the inconsistency between parents and students had slightly reduced effects for the long-term outcome of likelihood of college graduation. If parents' aspirations are higher than the child's expectations, the odds of their graduation from college were reduced, although the statistical significance is not as high as before (OR 0.87, $p < 0.10$). However, if both parent and child aspire for less than college, the odds of graduating from college were still statistically significantly reduced (OR 0.25, $p < 0.001$). Conversely, both aspiring for graduate studies increased the odds of graduating from college by 51% ($p < 0.001$). All these results add in controls for previous achievement, sex, socioeconomic status, parental involvement, ethnicity, and school placement.

5. Discussion

Psychological and sociological research has often emphasized the importance of aspirations in the attainment of academic and life outcomes. From psychology's expectancy-value theory, aspirations

Table 3

Hierarchical Linear Regression of Dependent Variables on Parental Aspirations.

Source: Education Longitudinal Study (ELS) - 2002, 2004, 2006, and 2012 Waves.

	Odds Ratio of Taking PSAT	Odds Ratio of Entering College	Odds Ratio of Graduating College
<i>Student-level variables</i>			
Parent aspirations (Reference group: Parents aspire for four-year college)			
Parents do not aspire for four-year college for the child	0.45*** (0.05)	0.39*** (0.04)	0.32*** (0.05)
Parents aspire for graduate studies for the child	1.16** (0.07)	1.37*** (0.09)	1.27*** (0.07)
10th grade math test score	1.07*** (0.00)	1.11*** (0.00)	1.08*** (0.00)
Male	0.74*** (0.04)	0.70*** (0.04)	0.70*** (0.04)
Socioeconomic status	1.55*** (0.07)	2.00*** (0.10)	1.89*** (0.08)
Parental Involvement: (reference group: parents are not or rarely involved)			
helped with homework sometimes	0.85* (0.06)	0.89 (0.06)	1.05 (0.06)
helped with homework often	0.86 (0.09)	0.61*** (0.06)	0.77* (0.07)
discussed course content sometimes	1.29** (0.13)	1.16 (0.11)	1.24** (0.11)
discussed course content often	1.42** (0.17)	1.51*** (0.17)	1.53*** (0.16)
discussed college plans sometimes	1.33* (0.16)	1.49** (0.19)	1.38** (0.16)
discussed college plans often	1.81*** (0.24)	2.29*** (0.30)	1.67*** (0.21)
Ethnicity (Reference group: White)			
Black	1.50** (0.19)	1.31*** (0.15)	0.88 (0.09)
Hispanic	1.11 (0.13)	0.69*** (0.07)	0.78** (0.08)
Asian	1.96*** (0.26)	1.33* (0.16)	1.48*** (0.15)
Other Race	1.15 (0.17)	0.93 (0.12)	0.78** (0.10)
<i>School-level variables</i>			
School type (reference: Public School)			
Catholic School	6.14*** (1.18)	2.36*** (0.29)	1.64*** (0.14)
Other Private School	3.07*** (0.64)	1.68** (0.24)	1.48** (0.16)
School urbanicity (reference: Urban School)			
Suburban	0.76* (0.10)	0.68*** (0.06)	0.86* (0.06)
Rural	0.66* (0.11)	0.64*** (0.08)	0.78* (0.07)
Number of Students	7,635	7,635	7,635
Number of Schools	751	751	751

Notes: The table presents regression coefficients from multilevel models regressing the different outcome variables on student and school-level variables of parental aspirations and other controls. Standard errors are written in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

approximate motivation and value students give to their education, and social circles like the family affect these aspirations (Hill & Wang, 2015; King & Ganotice, 2014). From sociology's status attainment model, aspirations help mediate the effects of socioeconomic status and personal ability on eventual life outcomes (Hauser, Tsai, & Sewell, 1983; Sewell et al., 1970). Often, the conclusion is the positive influence of having high aspirations. In a study about parents with higher aspirations than expectations, Murayama et al. (2016) find that this over-aspiration could actually have some detrimental effects on student achievement.

This present study, however, does not look at the difference between the parents' aspirations and their expectations, but the difference between the parents' aspirations and their child's expectations for how far to go in school. In this way, the inconsistency in aspirations happens between two people, and I find three important insights: (i) Controlling for individual- and school-level variables, parental aspirations still positively affect short and long-term academic outcomes. (ii) When both parents and children aspire/expect for less than college, students are also less likely to have higher test scores, and less likely to enter into and graduate from college. (iii) However, when parents have higher aspirations than their child's expectations, the negative effect is felt in short and medium-term outcomes but not as much in the long-term outcome of obtaining at least a bachelor's degree.

First, the study finds important effects of parents' aspirations on children's short-term outcomes. For example, having parents who do not aspire for a four-year college for their children is significantly associated with reduced odds of taking the PSAT, even after controlling for socioeconomic status and ethnicity. These results confirm findings of previous literature that parental aspirations are important predictors of student academic outcomes (Yamamoto & Holloway, 2010). The same is true for the medium-term outcome of entering a four-year college since those whose parents aspire graduate studies for their child

are actually more likely to enter college than those whose parents only aspired for college for their children. Most importantly, these effects are still felt even after a number of years because individuals who had parents with high aspirations are more likely to graduate from college. These results follow a similar logic from sociological and psychological research that higher aspirations approximate parental support, socialization, and investment (Jeynes, 2012).

Second, the study seeks to analyze how the consistency or inconsistency of parents' aspirations and students' expectations can have important effects for academic attainment. In terms of consistency, students who expect to go to graduate school and have parents who aspire for them to go to graduate school have far better short-, medium-, and long-term outcomes than the reference group (parents and students who aspire/expect to go to college). This highlights the importance placed on creating a culture of high expectations within the family and letting students take ownership of these expectations (Kaplan, Liu, & Kaplan, 2001). Additionally, it confirms the positive influence of parental and student expectations agreeing with each other (Marcenaro-Gutierrez & Lopez-Agudo, 2017).

But the reverse is also true that if both parents and child aspire for less than a college degree, this is associated with lower likelihood of taking the PSAT, entering college, and graduating from college. On the one hand, this can be explained as students and parents having a realistic assessment of the capabilities of the child and/or the socioeconomic situation of the family (Andrew & Hauser, 2011; Stewart, Stewart, & Simons, 2007). On the other hand, it posits that the lack of aspiration from parents can affect the child's motivation, leading to detrimental effects on student outcomes like future educational plans (Breen & Quaglia, 1991; Lazarides, Viljaranta, Aunola, Pesu, & Nurmi, 2016). In either case, this finding highlights the need for higher expectations for both the child and the parent, and how these expectations can be affected by social structural factors like one's financial ability.

Table 4
 Hierarchical Linear Regression of Dependent Variables on Aspiration Inconsistency.
 Source: Education Longitudinal Study (ELS) - 2002, 2004, 2006 and 2012 Waves.

	Odds Ratio of Taking PSAT	Odds Ratio of Entering College	Odds Ratio of Graduating College
<i>Student-level variables</i>			
Inconsistency (Reference group: Parents and child aspire/expect four-year college)			
Parental aspirations higher than child's expectations	0.82* (0.08)	0.77** (0.08)	0.87 ⁺ (0.07)
Parental aspirations lower than child's expectations	1.10 (0.10)	1.06 (0.10)	1.05 (0.09)
Parents and child aspire/expect less than college	0.33*** (0.06)	0.26*** (0.05)	0.25*** (0.06)
Parents and child aspire/expect graduate studies	1.59*** (0.15)	1.71*** (0.16)	1.51*** (0.12)
10th grade math test score	1.06*** (0.00)	1.10*** (0.00)	1.08*** (0.00)
Male	0.77*** (0.05)	0.73*** (0.10)	0.72*** (0.08)
Socioeconomic status	1.55*** (0.08)	2.06*** (0.10)	1.92*** (0.08)
Parental Involvement: (reference group: parents are not or rarely involved)			
helped with homework sometimes	0.86* (0.06)	0.90 (0.06)	1.05 (0.06)
helped with homework often	0.88 (0.09)	0.63*** (0.06)	0.78* (0.07)
discussed course content sometimes	1.29** (0.12)	1.15 (0.11)	1.22** (0.11)
discussed course content often	1.35** (0.15)	1.44*** (0.16)	1.48*** (0.15)
discussed college plans sometimes	1.27* (0.16)	1.46** (0.18)	1.37** (0.17)
discussed college plans often	1.65*** (0.22)	2.15*** (0.29)	1.62*** (0.20)
Ethnicity (Reference group: White)			
Black	1.53** (0.19)	1.36** (0.15)	0.91 (0.09)
Hispanic	1.13 (0.13)	0.72** (0.08)	0.81* (0.08)
Asian	1.96*** (0.26)	1.35* (0.16)	1.49*** (0.14)
Other Ethnicity	1.17 (0.18)	0.95 (0.13)	0.79 (0.10)
<i>School-level variables</i>			
School type (reference: Public School)			
Catholic School	6.17*** (1.20)	2.33*** (0.28)	1.63*** (0.14)
Other Private School	3.06*** (0.65)	1.67** (0.24)	1.47*** (0.15)
School urbanicity (reference: Urban School)			
Suburban	0.77* (0.10)	0.67*** (0.06)	0.85* (0.06)
Rural	0.66* (0.11)	0.63*** (0.08)	0.77** (0.07)
Number of Students	7,635	7,635	7,635
Number of Schools	751	751	751

Notes: The table presents regression coefficients from multilevel models regressing the different outcome variables on student and school-level variables of aspiration inconsistency and other controls. Standard errors are written in parentheses. ⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Third, the study analyzes the impact of parents and students having dissimilar aspirations or expectations. When parents have lower aspirations than the child's expectations, students perform no different from the reference group of students and parents having similar aspirations of a four-year college. This suggests that students can have a better approximation of their abilities, and that effort and achievement are influenced more by the students' motivations and expectations rather than external parental expectations (de Boer & van der Werf, 2015).

On the opposite end, when parents aspire higher than what the child expects, this has substantial negative effects for the odds of taking the PSAT and the odds of entering college. Although the negative effects are still evident for the reduced odds of graduating from college, its statistical power is not as strong. Inasmuch as some "pressure" may healthily challenge students (Cherng & Liu, 2017), unnecessarily high external aspirations from parents can actually hinder them from obtaining higher educational outcomes. When parents aspire higher for the child but the child does not expect this for him or herself, the inconsistency can lower short-term and medium-term academic outcomes. In addition, there are more Blacks and Hispanics in the group where parents have higher aspirations than what the child expects. This suggests that structural forces might lead parents to aspire high for their children but the child fails to see how these aspirations can materialize. Thus, it is not just an issue of students simply having higher psychological expectations but also of them having more realistic structural possibilities.

Thus, the present research highlights the considerable importance of parental aspirations but nuances the need for these aspirations to be tempered by parents engaging the child's expectations and clarifying the family's social situation. Along with the overaspiration research by

Murayama et al. (2016), this study reassesses the question of aspirations' possible negative effects. Since this concept is fairly new, one limitation is the need for replications to ascertain that the possible negative effects are not limited to this dataset. Another limitation is the focus on the aspiration-expectation inconsistency and the non-inclusion of student expectations in the core regressions. In future studies, it is vital to include structural equation modeling (SEM), where parental aspirations and student expectations' interactions are investigated. Using SEM, some studies have found that aspirations, expectations, and achievement can affect each other in a non-linear fashion (Froiland et al., 2013; Jung & Zhang, 2016), and it will be promising to investigate how the inconsistency can influence other variables using SEM.

Some methodological limitations also include the sample being reduced to only those that have data in all four waves of the ELS:2002, the non-representativeness that results from the sample attrition, and the exclusion of those who answered "Don't Know" in the expectations variable. From these factors, there may be a risk of sampling bias since those who had data for all four waves and who knew their expectations have better outcomes.

Another limitation of this present study is that it uses the publicly available data file from the NCES, but the restricted use data file has a variable that could have helped control for students' approximation of their parents' expectation. There was a question in the ELS:2002 asking students how far they think their parents want them to go in school. Obtaining this variable would have strengthened the argument. If the student knows the parents' aspirations accurately and still have inconsistent expectations, this is a sign that it is really inconsistency driving the lower academic results. However, this present study is unable to obtain this restricted data file. Lastly, one limitation is the

inability to show *why* parents with higher aspirations negatively affect their child's long-term outcomes. This present research mentions the possibility of pressure, stress and structural limitations as contributors to this, but the scope of the research does not venture into testing these factors. Thus, there is a need to study these further.

Nuancing the literature on parental aspirations' positive effects on student outcomes, this study highlights two instances when aspirations have negative effects. First is when both parents and student have low aspirations while second is when parents have higher aspirations than the child's expectations. From a theoretical perspective, it highlights the importance of understanding the consistency of parents' aspirations and children's expectations. Aspiration-expectation inconsistency can have negative consequences because of psychological factors like unnecessarily high parental pressures or because of sociological factors (like one's ethnicity and economic position) that prevent a child from

assuming the parents' aspirations. This research highlights that it is often not just about the child expectations *or* the parents' aspirations, but also the consistency between them.

From a practical psychological perspective, it emphasizes the need for parents and children to have open communications about aspirations and expectations, and thus, find where aspirations can be realistic long-term expectations. From a structural perspective, it emphasizes the need to better inform students that structural forces of ethnicity and socioeconomic position should not discourage them from the pursuit of better academic and life outcomes. I argue that aspiration-expectation inconsistency can negatively affect students outcomes but this inconsistency is not an inherent trait and can be addressed with parents and children being better informed about the need for consistency in aspirations and expectations.

Appendix A

Table A1

Descriptive statistics for Education Longitudinal Study across the samples.

Source: Education Longitudinal Study of 2002.

	2002 Sample	2004 Sample	2006 Sample	2012 Sample	Research Sample*
<i>Dependent variables:</i>					
% took/ planned to take PSAT		63.97	65.28	65.93	68.27
% enrolled in college in 2006			51.38	54.03	61.31
% attained bachelors by 2012				40.49	48.34
<i>Individual-level variables:</i>					
<i>Parental aspirations (percent)</i>					
Not graduate four-year college	11.27	9.45	10.64	10.45	7.88
Graduate four-year college	43.72	44.21	43.63	43.48	43.33
Pursue graduate studies	45.01	46.34	45.72	46.07	48.79
<i>Aspirations consistency (percent)</i>					
Parental aspirations higher than child's expectations	27.06	25.35	26.18	26.05	22.92
Parental aspirations lower than child's expectations	19.73	20.28	19.91	19.79	20.89
Parents and child aspire/expect less than four-year college	6.86	5.34	6.36	6.31	4.30
Parents and child aspire/expect four-year college	20.78	21.63	20.90	20.63	21.02
Parents and child aspire/expect graduate studies	25.58	27.39	26.65	27.21	30.87
10th grade math test score	51.09 (9.91)	52.03 (9.69)	51.56 (9.90)	51.76 (9.85)	53.51 (9.38)
<i>Economic background and ethnicity</i>					
SES (mean)	0.07 (0.74)	0.12 (0.74)	0.08 (0.74)	0.10 (0.74)	0.19 (0.73)
% Male	49.27	48.47	47.80	46.79	43.60
% White	57.40	59.26	58.34	59.10	63.67
% Black	13.38	12.54	13.22	12.83	10.20
% Hispanic	14.01	13.05	13.47	13.21	11.33
% Asian	9.49	9.81	9.27	9.25	9.72
% Others	5.73	5.34	5.69	5.60	5.08
<i>School-level variables:</i>					
% Public school students	77.83	75.71	77.14	76.64	73.25
% Catholic school students	13.03	14.60	13.62	13.89	16.96
% Private school students	9.14	9.69	9.24	9.46	9.78
% Urban school students	33.38	32.85	33.57	33.77	32.56
% Suburban school students	48.17	48.62	48.05	47.97	49.38
% Rural school students	18.46	18.53	18.38	18.25	18.06
Students (n)	13,794	11,514	12,152	11,402	7,635
Schools (n)	751	751	751	751	751

Note: The measures represent mean values with standard deviations in parentheses, or the percentage of the sample falling under the category. The numbers presented compares the attrition from the 2002 sample to the different waves for this present research.

Table A2

Hierarchical Linear Regression of Dependent Variables on Student Expectations.

Source: Education Longitudinal Study (ELS) – 2002, 2004, 2006, and 2012 Waves.

	Odds Ratio of Taking PSAT	Odds Ratio of Entering College	Odds Ratio of Graduating College
<i>Student-level variables</i>			
Student expectations (Reference group: Students expect four-year college)			
Student does not expect graduating from a four-year college	0.53*** (0.05)	0.30*** (0.04)	0.34*** (0.04)
Student expects graduate studies	1.15** (0.11)	1.57*** (0.10)	1.42*** (0.08)
Number of Students	7,635	7,635	7,635
Number of Schools	751	751	751

Notes: The table presents regression coefficients from multilevel models regressing the different outcome variables on student and school-level variables of student expectations and other controls. Standard errors are written in parentheses. Covariates include prior academic achievement, SES, parental involvement, ethnicity, and school-level variables^a $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

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Editorial: Measurement Invariance

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Multi-item surveys are frequently used to study scores on latent factors, like human values, attitudes, and behavior. Such studies often include a comparison, between specific groups of individuals or residents of different countries, either at one or multiple points in time (i.e., a cross-sectional or a longitudinal comparison or both). If latent factor means are to be meaningfully compared, the measurement structures of the latent factor and their survey items should be stable, that is “invariant.” As proposed by Mellenbergh (1989), “measurement invariance” (MI) requires that the association between the items (or test scores) and the latent factors (or latent traits) of individuals should not depend on group membership or measurement occasion (i.e., time). In other words, if item scores are (approximately) multivariate normally distributed, conditional on the latent factor scores, the expected values, the covariances between items, and the unexplained variance unrelated to the latent factors should be equal across groups.

Many studies examining MI of survey scales have shown that the MI assumption is very hard to meet. In particular, strict forms of MI rarely hold. With “strict” we refer to a situation in which measurement parameters are exactly the same across groups or measurement occasions, that is an enforcement of zero tolerance with respect to deviations between groups or measurement occasions. Often, researchers just ignore MI issues and compare latent factor means across groups or measurement occasions even though the psychometric basis for such a practice does not hold. However, when a strict form of MI is not established and one must conclude that respondents attach different meanings to survey items, this makes it impossible to make valid comparisons between latent factor means. As such, the potential bias caused by measurement non-invariance obstructs the comparison of latent factor means (if strict MI does not hold) or regression coefficients (if less strict forms of MI do not hold).

Traditionally, MI is tested for in a multiple group confirmatory factor analysis (MG-CFA) with groups defined by unordered categorical (i.e., nominal) between-subject variables. In MG-CFA, MI is tested at each constraint of the latent factor model using a series of nested (latent) factor models. This traditional way of testing for MI originated with Jöreskog (1971), who was the first scholar to thoroughly discuss the invariance of latent factor (or measurement) structures. Additionally, Sörbom (1974, 1978) pioneered the specification and estimation of latent factor means using a multi-group SEM approach in LISREL (Jöreskog and Sörbom, 1996). Following these contributions the multi-group specification of latent factor structures has become widespread in all major SEM software programs (e.g., AMOS Arbuckle, 2006, EQS Bender and Wu, 1995, LAVAAN Rosseel, 2012, Mplus Muthén and Muthén, 2013, STATA STATA, 2015, and OpenMx Boker et al., 2011). Shortly thereafter, Byrne et al. (1989) introduced the distinction between full and partial MI. Although their introduction was of great value, the first formal treatment of different forms of MI and their consequences for the validity of multi-group/multi-time comparisons is attributable to Meredith (1993). So far, a tremendous amount of papers dealing

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with MI have been published. The literature on MI published in the 20th century is nicely summarized by Vandenberg and Lance (2000). Noteworthy is also the overview of applications in cross-cultural studies provided by Davidov et al. (2014), as well as a recent book by Millsap (2011) containing a general systematic treatment of the topic of MI. The traditional MGCFA approach to MI-testing is described by, for example, Byrne (2004), Chen et al. (2005), Gregorich (2006), van de Schoot et al. (2012), Vandenberg (2002) and Wicherts and Dolan (2010). Researchers entering the field of MI are recommended to first consult Meredith (1993) and Millsap (2011) before reading other valuable academic works.

Recent developments in statistics have provided new analytical tools for assessing MI. The aim of this special issue is to provide a forum for a discussion of MI, covering some crucial “themes”: (1) ways to assess and deal with measurement non-invariance; (2) Bayesian and IRT methods employing the concept of approximate MI; and (3) new or adjusted approaches for testing MI to fit increasingly complex statistical models and specific characteristics of survey data.

Dealing with Measurement Non-invariance

If the test for MI indicates that strict MI across groups or time is not established, no sound psychometric basis is provided for the comparison of latent factor means. The absence of such psychometric basis is the first topic dealing with measurement non-invariance. A nice example of a situation in which such psychometric basis is absent is provided in the paper by Lommen et al. (2014). These authors show that comparing posttraumatic stress in soldiers before and after war-zone related traumatic events (the wars in Afghanistan or Iraq) is virtually impossible due to instability in thresholds. For a researcher this conclusion may be hard to digest, especially if the success of the study relies entirely on the possibility to make such meaningful comparisons over time. Within the context of their study the authors recommend considering pre- and post-symptom scores as representing separate constructs.

In the same vein, a failure to establish less strict forms of MI may be worrisome if meaningful comparisons of structural relationships between latent factor means are important to the study (e.g., the comparison of the magnitude of a correlation, regression, or path coefficient across groups/time). Hox et al. (2015), show how the non-establishment of less strict forms of MI can (partly) be explained and corrected for. They show that, in the context of mixed-mode surveys, non-invariance can be the effect of selection or measurement differences due to mode (e.g., web survey, telephone survey, face-to-face interview).

Detecting non-invariant items is the next topic dealing with measurement non-invariance. In the contribution of de Roover et al. (2014) a method is proposed based on cluster-wise simultaneous component analysis (SCA). Their method aims at detecting non-invariant items. Barendse et al. (2014) examined a Bayesian restricted (latent) factor analysis (RFA) method for the same purpose, namely detecting items violating the MI assumption. They concluded that Bayesian RFA methods are especially suited for detecting measurement bias.

Our special issue also contains a discussion on the importance of understanding whether the presence of (in)correctly specified factorial invariance parameters influences the assessment of other factor model parameters (e.g., intercepts, error variances, latent factor variances, and latent factor means). In a simulation study, Guenole and Brown (2014) investigated whether ignoring the non-invariant underlying structure of the latent factor leads to substantial regression parameter bias in categorical item factor analyses (CIFA). The authors urge researchers to avoid ignoring sources of non-invariance in CIFA when non-invariance occurs in *both* loadings and thresholds even if this occurs in only one item.

Approximate Measurement Invariance

A relatively new research avenue in the MI literature deals with the use of Bayesian structural equation models (BSEM) to relax strict forms of MI (see Muthén and Asparouhov, 2012). In particular, exact zero constraints on the cross-group differences between all relevant measurement parameters (e.g., factor loadings and item intercepts) are substituted by “approximate” zero constraints. Instead of forcing item intercepts to be exactly equal across groups, a substantive prior distribution (around zero) is used to bring the parameters closer to one another, while allowing for some “wiggle room.” If there are many small differences between the groups in terms of intercepts or factor loadings, approximate MI seeks a balance between adherence to the requirements of MI, making comparisons possible, and obtaining a well-fitting model (i.e., a model that is more realistic given the data at hand). When the classical MI tests do not hold given the data, approximate MI represents a promising (and more realistic) alternative; the cross-group differences between all relevant measurement parameters are “hopefully” close enough to zero to allow making meaningful latent factor mean comparisons.

A tutorial paper introducing the method of approximate MI is presented by van de Schoot et al. (2013). Further, our special issue contains empirical examples comparing the results of Bayesian approximate MI to the results of the more traditional ways of MI-testing as applied to specific questionnaires: e.g., the Portrait Values Questionnaire, using data from the European Social Survey including data on many countries and many time points (Cieciuch et al., 2014; Zercher et al., 2015), the Hedonic and Eudaimonic Motives for Activities scale (Bujacz et al., 2014), and the Golombok-Rust Inventory of Marital State (Chiorri et al., 2014).

Furthermore, our special issue contains two extensions of approximate MI to the field of IRT (see also Fox and Verhagen, 2010). Instead of using substantive prior distributions as in the Bayesian approximate MI method, the method described by Fox establishes a measurement scale across countries and conceptualizes country-specific non-invariance in item parameters as random deviations through country-specific random item effects. In such conceptualization cross-group comparisons can still be made even in the presence of non-invariant items. Kelcey et al. (2014) developed a method based on Fox’s approximate MI approach which is applicable

whenever measurements are nested within raters and cross-classified among, for instance, countries. Another contribution to our special issue by Muthén and Asparouhov (2014) concerns the use of the *alignment* method (see also Asparouhov and Muthén, 2014) in IRT models, a method which is essential when applying approximate MI. This method minimizes a loss function which makes sure that there are a few large non-invariant measurement parameters instead of many smaller non-invariant measurement parameters, an optimal alignment strategy which resembles the rationale underlying rotation of factor solutions in EFA.

Testing for MI in Increasingly Complex Statistical Models

For some complex statistical models, the traditional multi-group (MG-CFA) approach to MI-testing has to be adjusted to meet the specific requirements of the data and/or the model. Examples of such adjustments can be found in our special issue. An assumption embedded within many methods to test for MI is that the grouping (i.e., auxiliary) variable is unordered (i.e., nominal). Wang et al. (2014) present a method to test for MI in cases in which the auxiliary variable is ordered or continuous. Verdam and Oort (2014) illustrate MI-testing for Kronecker restricted SEM models, which constitute parsimonious models that provide an alternative to longitudinal latent factor models. Adolf et al. (2014) examine MI in the context of multiple-occasion and multiple-subject time series models. In such models, MI has to be established (a) over time within subjects, (b) over subjects within occasions, and (c) over time and subjects simultaneously. Boom (2014) investigated MI in the context of children's development of increasingly advanced strategies over time, in for instance the way they deal with mathematical problems (e.g., strategies on how children learn to multiply numbers below 10). The use of different strategies is scored as a variable and development is seen as the movement from one strategy to a more advanced one and Boom shows how MI plays a crucial role when analyzing such data. Jak (2014) uses a multi-level framework and proposes an extension to the SEM framework, moving from models

describing two-level data to models describing three-level data. Within this framework MI invariance can be tested across level 2 as well as across level 3 clustering variables.

Another application of MI finds its origin in multi-trait multi-method models (MTMM; Eid and Diener, 2006), in which multiple methods (or scales) and raters are used to quantify the set of latent factors under study. Geiser et al. (2014) demonstrate the advantage of moving from an exclusively covariance- or correlation-based MTMM approach to an approach that includes latent factor means. This approach results in more fine-grained information about convergent validity and method effects when testing for MI. Albeit being analyzed differently, a comparable design to the MTMM is the two-way rating design utilized in situations where subjects have to judge to what extent a particular scale or variable pertains to a particular concept or situation. Kroonenberg (2014) presents an approach applicable to the assessment of MI in two-way rating designs. In his approach, a hierarchy of models is proposed, each one conceptualizing a form of MI, varying in terms of strictness.

Conclusion

Our special issue contains numerous simulation studies aiming at demonstrating the possibilities and limitations of different analytical tools to test for various forms of MI; tutorial papers providing the hands-on support needed when using the recent developed analytical tools to test for MI, as well as illustrations of how the analytical tools may be meaningfully applied in different fields of research when addressing issues related to MI across groups or time.

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Children's Daily Well-Being: The Role of Mothers', Teachers', and Siblings' Autonomy Support and Psychological Control

Jolene van der Kaap-Deeder, Maarten Vansteenkiste, Bart Soenens, and Elien Mabbe
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This study examined the unique relations between multiple sources (i.e., mothers, teachers, and siblings) of perceived daily autonomy support and psychological control and children's basic psychological needs and well-being. During 5 consecutive days, 2 children from 154 families (M_{age} youngest child = 8.54 years; $SD = .89$ and M_{age} oldest child = 10.38 years; $SD = .87$) provided daily ratings of the study variables. Multilevel analyses showed that each of the sources of perceived autonomy support and psychological control related uniquely to changes in daily well-being and ill-being. These associations were mediated by experienced psychological need satisfaction and frustration, respectively. Overall, the findings testify to the dynamic role of autonomy support and psychological control in children's development. Implications for future research are discussed.

Keywords: daily autonomy support, daily psychological control, parents, teachers, siblings, Self-Determination Theory

Essential for the healthy psychological development of children is an autonomy-supportive social environment, in which children are encouraged and helped to experience a sense of true ownership regarding their thoughts, feelings, and behaviors (Ryan, Deci, & Vansteenkiste, 2016). Many studies have demonstrated the beneficial effects of an autonomy-supportive environment for children's psychosocial adjustment (e.g., Grolnick, Ryan, & Deci, 1991), whereas a controlling context has been found to be detrimental for children's psychological functioning (Soenens & Vansteenkiste, 2010).

Most studies, however, have focused on one particular source of autonomy support instead of considering the unique relations between multiple sources and children's psychological functioning. In this study, we simultaneously considered the role of mothers, teachers, and siblings. Each of these three types of relationships has unique features, with the mother–child and teacher–child relationships being more vertical in nature and with the sibling relationship being more horizontal in nature (Dunn, 2015; Maccoby, 2015). Still, as explained in the section ‘The Role of Parents, Teachers, and Siblings’, they can all be characterized in terms of autonomy support and psychological control, and they may all have unique associations with child outcomes. Moreover, there is likely substantial daily variation in the degree to which children experience these three sources as autonomy-supportive or controlling, a topic that has not been investigated systematically before. To draw a more dynamic picture of the role of these three

social sources, this study relied on a diary methodology. The study is grounded in Self-Determination Theory (SDT; Deci & Ryan, 2000), a broad theory on human motivation and socialization, according to which the presumed well-being benefits of perceived autonomy support can be accounted for by the satisfaction of children's basic psychological needs for autonomy, competence, and relatedness.

The Importance of Children's Psychological Needs for Psychosocial Adjustment

SDT maintains that all individuals are endowed with three psychological needs; that is, the needs for autonomy, competence, and relatedness. While satisfaction of these needs contributes to children's thriving and growth, the frustration of these same needs is said to engender maladaptive and even psychopathological functioning (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Deci & Ryan, 2000; Vansteenkiste & Ryan, 2013). The need for autonomy concerns experiencing a sense of volition when carrying out activities. While satisfaction of this need is apparent when children experience the freedom to be themselves, frustration of this need involves feeling obliged to act, think, or feel in a certain way. The need for competence entails experiences of mastery in executing daily activities and feeling effective in coping with challenges. This need is satisfied when children feel proficient when performing tasks, while it is frustrated when children feel like a failure. Finally, the need for relatedness involves having warm and trustful relationships. The need for relatedness is satisfied when children feel connected with important others, whereas this need is frustrated when children feel isolated.

The satisfaction of these psychological needs yields diverse benefits (e.g., engagement and well-being), while the frustration of these needs relates to a variety of adverse outcomes (e.g., problem behavior, ill-being; see Deci & Ryan, 2000; Vansteenkiste & Ryan, 2013). These findings emerged across cultures (e.g., in

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countries as culturally diverse as Belgium, China, the United States, and Peru) and even for individuals attaching low importance to the satisfaction of these needs (Chen et al., 2015). Studies on need satisfaction and need frustration among elementary schoolchildren are scarce. This is unfortunate because it can be argued that the psychological needs play an important role in the way children cope with the multiple developmental challenges of middle childhood (Veronneau, Koestner, & Abela, 2005). More specifically, driven by a combination of increasing demands for performance at school and by the maturation of information-processing abilities (e.g., attention, executive functioning, and memory), elementary schoolchildren are rapidly developing cognitive skills (e.g., Kail, 1991). Also, their social network is broadened, with friendships gaining importance and with peer groups becoming larger and more complex (e.g., Ladd, 1999). In one of the few studies addressing the importance of the needs for elementary schoolchildren, Veronneau et al. (2005) showed that need satisfaction related positively to well-being and to positive affect among third to seventh graders. Moreover, autonomy and relatedness satisfaction were related negatively to negative affect, and competence satisfaction was related negatively to depressive symptoms. Similarly, Emery, Toste, and Heath (2015) showed that competence satisfaction in particular was related negatively to depressive symptoms in middle childhood. Although need satisfaction is stated to be universally beneficial within SDT (Deci & Ryan, 2000), more research is needed to determine whether this also applies to younger age groups (such as elementary schoolchildren).

Apart from being limited in number, previous studies among children exclusively focused on experiences of need satisfaction. Yet, it is important to investigate the potentially distinct role of need frustration because the mere absence of need satisfaction does not necessarily involve the presence of need frustration. Conversely, the absence of need frustration does not imply the presence of need satisfaction. To illustrate, although siblings can feel as if they have little in common (i.e., low relatedness satisfaction), this does not mean that they feel isolated and actively excluded by the other sibling (i.e., high relatedness frustration). Consistent with this reasoning, recent studies among adolescent athletes (Bartholomew et al., 2011) and among secondary school students (Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015) indicated that need satisfaction and need frustration represent relatively distinct constructs. That is, while need satisfaction was particularly predictive of positive developmental outcomes, including vitality, positive affect, and autonomous motivation, need frustration was particularly predictive of maladjustment and psychopathology, including disordered eating, burnout, and depression (Bartholomew et al., 2011; Haerens et al., 2015).

Autonomy-Supportive and Psychologically Controlling Social Environments

Within SDT, it is argued that need satisfaction can be fostered through autonomy support from key socialization figures and that need frustration is engendered by a controlling social environment (Grolnick et al., 1991; Vansteenkiste & Ryan, 2013). Autonomy support involves the nurturance of volitional functioning in children (e.g., Grolnick et al., 1991; Ryan et al., 2016). Autonomy-supportive socializing agents take an active interest in and work

from the frame of reference of the child. Doing so helps them to provide child-attuned choices, to stimulate the child to take initiative at his or her own pace of development, and to provide rationales that are meaningful to the child (Grolnick et al., 1991; Soenens & Vansteenkiste, 2010). In contrast, autonomy-suppressing environments are characterized by a controlling style of interaction. Controlling socialization figures minimize, ignore, or deny the child's perspective, thereby imposing their own viewpoint by making use of a variety of domineering strategies (Grolnick & Pomerantz, 2009). One of the most frequently studied forms of a controlling style is psychological control, an interaction style characterized by intrusive and manipulative tactics such as guilt induction, shaming, and love withdrawal (Barber, 1996; Soenens & Vansteenkiste, 2010).

Paralleling the theoretical and empirical distinction between need satisfaction and need frustration, the absence of autonomy support does not imply the presence of psychological control. For instance, the absence of choice (i.e., low autonomy support) is different from forcing a child to behave in a certain way (i.e., high control). Conversely, the lack of psychological control does not imply the presence of autonomy support. In sum, recent theorizing suggests a distinction between a bright pathway (where autonomy support is related to adaptive outcomes via need satisfaction) and a dark pathway (where psychological control is related to maladjustment via need frustration).

Research has shown that perceived autonomy support from key socialization figures is related to adjustment in children through the satisfaction of the psychological needs (e.g., Grolnick, Kurovski, Dunlap, & Hevey, 2000; Taylor & Ntoumanis, 2007). In contrast, (psychological) control has been found to relate particularly to adverse outcomes through the frustration of the psychological needs (e.g., Assor, Kaplan, Kanat-Maymon, & Roth, 2005; Mabbe, Soenens, Vansteenkiste, & Van Leeuwen, 2016). However, because most studies to date have focused either on autonomy support or on psychological control or have relied on composite scores reflecting autonomy support versus psychological control (but see Costa, Cuzzocrea, Gugliandolo, & Larcen, *in press*, for an exception), it remains unclear whether autonomy support and psychological control represent distinct constructs, each involved in a distinct pathway to child outcomes. Also, because most studies focused on one single key socialization figure (e.g., parent or teacher), the relative contribution of different socialization figures' autonomy-supportive and controlling styles has remained understudied. In this study, we focus on the unique role of three important socialization figures in children's lives; namely, mothers, teachers, and siblings.

The Role of Parents, Teachers, and Siblings

These three relationships differ in terms of their nature and developmental functions. As for their nature, the relationship with parents and teachers is rather vertical (e.g., Maccoby, 2015), whereas the relationship with siblings is relatively more horizontal and egalitarian (Dunn, 2015). Still, differences in power do exist between siblings. Indeed, Buhrmester and Furman (1990) showed that children perceived their older siblings to be both more domineering and nurturing.

In terms of their developmental functions, relationships with teachers clearly play a key role in children's lives in middle

childhood, a developmental period in which the development of a sense of competence in school represents a key psychosocial task (Erikson, 1968). Teachers facilitate the acquisition and development of important cognitive skills and at the same time serve as a source of emotional support when difficulties arise during the learning process or in the context of children's social adjustment at school (Hamre & Pianta, 2005; Hughes, Cavell, & Willson, 2001; Verschueren, 2015). During this developmental period, parents are also important reference figures in children's lives (Collins, Madson, & Susman-Stillman, 2002), fulfilling an even broader variety of roles than teachers. Parents introduce societally relevant norms and provide the necessary guidance so children learn to take responsibility for their functioning (Maccoby, 2015). Furthermore, parents' role also involves teaching and protecting their children (Grusec & Davidov, 2010). Testifying to the unique importance of both teachers and parents for children's psychosocial adjustment in middle childhood, research has shown that support provided by both parents and teachers contributes to elementary school students' motivation and performance (e.g., Wentzel, 1998).

Siblings also play a number of important roles in children's lives, one of which is to function as a key source of emotional support (Scholte, van Lieshout, & van Aken, 2001). During middle childhood sibling interactions are numerous and highly intense. Indeed, in middle childhood children spend most of their free time with their siblings (Bank & Kahn, 1982; McHale & Crouter, 1996). Moreover, Buhrmester and Furman (1990) showed that in this period sibling relationships are more intense than during adolescence, as indicated by both more closeness and more conflict between siblings.

Despite the differences in the nature and functions of these relationships, it is assumed in SDT that dynamics of autonomy support and psychological control are relevant in every type of relationship. Much like all people have basic psychological needs, all types of relationships can either support or thwart these universal needs (La Guardia, Ryan, Couchman, & Deci, 2000). As such, the degree of autonomy support and psychological control experienced in each of these relationships may relate to child outcomes.

Unfortunately, most studies on autonomy support and psychological control focused on the role of either parents (e.g., Barber, 1996; Grolnick et al., 1991) or teachers (e.g., Assor et al., 2005). The few studies that focused on siblings found psychological control from adolescent siblings to relate to adjustment problems and reduced self-confidence (Conger, Conger, & Scaramella, 1997) and to anxiety and depressive symptoms (Campione-Barr, Lindell, Greer, & Rose, 2014). Furthermore, the one available study on perceived autonomy support among siblings showed that siblings whose psychological needs were satisfied were more likely to engage in an autonomy-supportive interaction style toward each other (Van der Kaap-Deeder et al., 2015). Although there are no studies that directly examined the effects of autonomy support among siblings on siblings' psychological functioning, many studies provided evidence for the beneficial effects of high-quality sibling relationships (e.g., Gass, Jenkins, & Dunn, 2007) and for the detrimental effects of negative sibling interactions (e.g., bullying between siblings; Bowes, Wolke, Joinson, Lereya, & Lewis, 2014).

While most studies focused on only one single source of autonomy support, a few studies have included multiple sources. For

example, Ferguson, Kasser, and Jahng (2011) showed that autonomy support from both parents (i.e., an averaged score of maternal and paternal autonomy support) and teachers related independently to students' satisfaction with life and school. Guay, Ratelle, Larose, Vallerand, and Vitaro (2013) found that high school students who reported higher levels of autonomy support from their mothers, fathers, and teachers were more autonomously motivated for learning, felt more academically competent, and obtained higher academic grades. Conger et al. (1997) showed that siblings', mothers', and fathers' use of psychological control were related uniquely to maladaptive functioning in adolescents. In short, previous studies including multiple sources have focused mostly on parental and teacher autonomy support, thereby disregarding the potentially supplementary role of siblings above these two socialization figures.

In this study, we included two siblings per family. Doing so also enabled us to examine two additional issues. First, it allowed us to look into the possible moderating role of birth order. Although relations between the quality of sibling relationships and psychological adjustment have been found to be similar for younger and older siblings (Kim, McHale, Crouter, & Osgood, 2007), the potential moderating role of birth order has not been examined with regard to autonomy support and psychological control. Second, inclusion of two siblings per family also enabled us to examine whether there exists significant variation at the family level, meaning that children from one family are more similar with respect to the study variables (e.g., maternal autonomy support) than children from different families.

A Dynamic Perspective on the Psychological Needs and Their Social Support

Most studies on the psychological needs and their contextual antecedents have focused on relatively stable differences between individuals. There are, however, also important within-person day-to-day variations in these constructs, suggesting that need satisfaction constitutes a dynamic and malleable experience susceptible to changes in the social environment (Brown & Ryan, 2006). Research on adults, for example, has shown that there are significant daily fluctuations in need satisfaction, which relate to daily variations in well-being (Ryan, Bernstein, & Brown, 2010). In contrast, daily fluctuations in need frustration among adolescents have been found to relate to daily fluctuations in maladjustment, including binge-eating symptoms (Verstuyf, Vansteenkiste, Soenens, Boone, & Mouratidis, 2013). To the best of our knowledge, no similar diary studies have been conducted among children.

Similarly, the contextual support for these needs may also be characterized by substantial day-to-day variance. Previous diary studies on parental behavior have generally found that daily constructive parent-child interaction patterns are related to daily positive emotions in adolescents, whereas negative patterns are related to daily emotional distress (e.g., Chung, Flook, & Fuligni, 2009; Fuligni & Masten, 2010). Only a few studies provided preliminary support for such a dynamic link between autonomy support and child outcomes. Mabbe, Soenens, Vansteenkiste, Van der Kaap-Deeder, and Mouratidis (2016) showed that there is significant daily variation in parental autonomy support and psychological control as reported by the parents themselves. Aunola,

Tolvanen, Viljaranta, and Nurmi (2013) showed that daily fluctuations in maternal and paternal psychological control (as reported by the parents) were related to daily fluctuations in children's negative emotions. Similarly, Downey, Purdie, and Schaffer-Neitz (1999) found that mothers' reports of negative parenting (including psychological control) related to higher levels of anger experienced among adolescents. Diary studies with regard to parental autonomy support and children's psychological functioning are currently lacking. Also, to the best of our knowledge, there are no studies concerning the daily fluctuations of sibling and teacher autonomy support and psychological control. The present study built on this small literature (a) by examining daily variation in socialization figures' perceived style in three types of relationships at once and (b) by tapping into children's perceptions of daily autonomy support and psychological control. Doing so was deemed important because children's perceptions of socialization figures' style (rather than the socialization figures' own perceptions) ultimately affect their development and adjustment (Pettit, Laird, Dodge, Bates, & Criss, 2001).

The Present Study

The present study sought to investigate the relations between perceived daily autonomy support and psychological control from three crucial social sources (i.e., mothers, teachers, and siblings) and daily changes in children's psychological functioning as indicated by experienced need satisfaction, need frustration, well-being, and ill-being. We formulated three hypotheses and two more exploratory research questions.

First, we anticipated significant variability in the various constructs being assessed (i.e., contextual influences, psychological needs, outcomes; Hypothesis 1). Second, we hypothesized that daily variation in perceived autonomy support and psychological control from mothers, teachers, and siblings would relate uniquely to changes in daily variation in children's psychological functioning (i.e., need satisfaction, need frustration, well-being, and ill-being; Hypothesis 2). We focused on mothers (and not on fathers) because mothers still spend more time with their children nowadays (Bornstein, 2015), in spite of important changes in the specific role and investment of mothers and fathers in children's rearing. As we assessed general (rather than domain-specific) well-being and ill-being as experienced across the day, we did not expect to find significant differences in the strength of the relations (i.e., autonomy support/psychological control to children's psychological functioning) between the three sources. Such differences are more likely to emerge when relying on domain-specific outcomes (with teachers, for instance, being more influential for need satisfaction in the domain of school-related tasks).

Third, we tested a mediation model, thereby examining the possibility of a bright and a dark pathway of socialization. Specifically, we hypothesized that autonomy support would be related most strongly to changes in well-being via experiences of changes in need satisfaction and that psychological control would be related most strongly to changes in ill-being via experiences of changes in need frustration (Hypothesis 3).

In a more explorative fashion, we also investigated whether person-levels of perceived autonomy support and psychological control, as assessed prior to the diary study, would moderate the associations of perceived daily autonomy support and psycholog-

ical control with changes in daily experiences of need satisfaction and need frustration (Research Question 1). According to SDT (Deci & Ryan, 2000), people who have had many experiences of need satisfaction in the past may be more sensitive to subsequent similar experiences and, thus, benefit more from experiences of need satisfaction than individuals who generally have had less such experiences. Few studies have empirically addressed this notion of sensitization (see, e.g., Moller, Deci, & Elliot, 2010, for an exception). Finally, we explored whether gender, age, and birth order (i.e., being the younger or older sibling) moderated the relations between the study variables (Research Question 2).

Method

Participants and Procedure

In total, 154 families from the Dutch-speaking part of Belgium (Flanders) took part in this study. Two children per family ($N = 308$ children) participated. The younger sibling was on average 8.54 years old ($SD = .89$) and the oldest sibling was on average 10.38 years old ($SD = .87$). All children attended elementary school. Of all children, 55% were female and the gender distribution was similar among younger and older participants (53% girls in the younger group and 56% girls in the older group; $\chi^2(1) = .21$, $p = .65$). In most families, there were two (49%) or three (33%) children. The majority of mothers ($M_{age} = 39.45$, $SD = 3.96$) followed higher education (78%) and were married (85%).

Families were recruited as part of an undergraduate course in developmental psychology. In exchange for course credits, students were asked to invite two families (who were not relatives or close friends of the student) with at least two elementary school-children between 8 and 12 years old. If a family had more than two children between 8 and 12 years old, students were asked to select those two children that were closest to each other in terms of age. Students were trained in a 1-hr information session with the first author to approach potentially interested families and to collect the data. Further assistance during the data-collection, when necessary, was provided to the students via e-mail. Students assisted children in filling out the questionnaires during the home visit. They also explained the diary booklet thoroughly. Children were informed that there were no right or wrong answers, that their answers would be treated in a confidential way, and that they could leave an item unanswered if they were unsure. In addition, the diary booklet itself also contained elaborate instructions for the child. Children were instructed to fill out the diary questionnaires each day, thereby noting the date and time of each assessment (if the child was unsure about this information, it was stated that he or she could ask help from the parent), and they were also instructed to check for missing answers each day. Students also asked mothers to remind their children to fill out the diary questionnaires each day as to avoid missing cases. Participation was anonymous, voluntary, and families did not obtain any reward. Furthermore, mothers gave their written consent on behalf of their children. This procedure was in accordance with the guidelines and protocol of the university's Ethical Committee.

Questionnaires were administered via a home visit and a diary booklet and were provided in a paper-and-pencil version. The diary booklet was given at the end of the home visit. Although several measures were filled out by the participants during the

baseline assessment during the home visit, we only focused on perceived autonomy support and psychological control in the current study. The children were also provided with a diary booklet tapping into perceived daily autonomy support and psychological control from three sources (i.e., mothers, teachers, and siblings), need satisfaction and frustration, and well-being and ill-being. They filled out the daily questionnaires in the evening before bedtime during 5 consecutive schooldays; questionnaires were not filled out during the weekend because the unique contribution of perceived teacher autonomy support and control cannot be examined on such days. All items were answered on a Likert scale ranging from 1 (*not at all true*) to 5 (*completely true*). The internal consistencies of all used scales can be found in Table 1.

Measures

Person-level measures. Participants were administered a Dutch version (Vansteenkiste, Zhou, Lens, & Soenens, 2005) of the Autonomy Support Scale of the Perceptions of Parents Scale (POPS; Grolnick et al., 1991). Of the 7 original items, 2 were removed as these assessed psychological control. Furthermore, the 8-item Dutch version (Soenens, Vansteenkiste, Luyckx, & Goossens, 2006) of the Psychological Control Scale–Youth Self-Report (PCS-YSR; Barber, 1996) was used. Items from both scales were slightly simplified to make them appropriate and readable for elementary schoolchildren. Moreover, we ensured that the items could be filled out with regard to the mother (“my mother”), teacher (“my teacher”), and sibling (“my brother or sister”).

Day-level measures.

Autonomy support and psychological control: Mother, teacher, and sibling. Similar to the assessment during the home visit, perceived autonomy support and psychological control were again assessed with, respectively, the POPS (Grolnick et al., 1991) and the PCS-YSR (Barber, 1996). However, we now used two

shortened versions of these scales (each containing 4 items) and adapted the items slightly to assess daily autonomy support (e.g., “Today, whenever possible, my mother/teacher/brother or sister allowed me to choose what to do”) and psychological control (“Today, my mother/teacher/brother or sister was less friendly with me if I did not see things his or her way”). We selected those items from the autonomy support and psychological control scales that were most suitable for daily assessments. Again, these items were filled out three times, that is, with respect to the mother, teacher, and sibling. All scales were reliable across the five days and within each of the days, as can be noticed in Table 1.

Psychological need satisfaction and need frustration. The Basic Psychological Need Satisfaction and Need Frustration scale (Chen et al., 2015) was employed to measure the satisfaction and frustration of the psychological needs for autonomy, competence, and relatedness. We employed a shortened 12-item version of this questionnaire (4 items per need) and adapted them slightly to assess daily need satisfaction and need frustration. Items were also adjusted to match children’s reading and comprehension level. For example, “I feel capable doing what I do” was changed into “Today, I was good at what I did”. Based on a pilot study among six children (aged between 7 and 12 years old; 3 boys) who were individually tested, we made three additional changes (e.g., “people I care for” was changed into “people I like”). Example items are: “Today, I felt a sense of freedom in the things I did” (i.e., autonomy satisfaction) and “Today, I felt forced to do many things I actually didn’t want to do” (i.e., autonomy frustration). The 6 items tapping into need satisfaction were averaged and the 6 items tapping into need frustration were averaged. Both sets of scores were found to be internally consistent (Table 1).

Well-being and ill-being. To assess daily well-being, we used a short scale that was partly based on the Positive and Negative Affect Schedule for Children (Laurent et al., 1999). Three items

Table 1
Descriptives of and Correlations Between the Study Variables at the Day-Level (Top Half) and Person-Level (Bottom Half)

Variable	α	Range	α	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Day-level measures																			
1. AS Mother	.80	.74–.84	—																
2. AS Teacher	.79	.72–.84	.55**	—															
3. AS Sibling	.83	.77–.87	.73**	.40**	—														
4. PC Mother	.68	.57–.77	-.22**	-.02	-.26**	—													
5. PC Teacher	.74	.69–.78	-.06	-.05	-.08	.66**	—												
6. PC Sibling	.72	.68–.80	-.13	.05	-.36**	.71**	.63**	—											
7. Need satisfaction	.72	.60–.77	.47**	.23**	.42**	-.39**	-.27**	-.36**	—										
8. Need frustration	.66	.58–.73	-.23**	-.06	-.28**	.55**	.40**	.45**	-.37**	—									
9. Well-being	.86	.82–.90	.26**	.11	.28**	-.52**	-.39**	-.48**	.62**	-.48**	—								
10. Ill-being	.82	.80–.85	-.12	-.01	-.16	.52**	.41**	.47**	-.44**	.59**	-.82**	—							
Person-level measures																			
11. AS Mother	.60	—	.58**	.38**	.50**	-.15	-.06	-.10	.37**	-.19*	.26**	-.14	—						
12. AS Teacher	.65	—	.35**	.66**	.28**	-.06	-.14	.04	.12	-.10	.13	-.08	.42**	—					
13. AS Sibling	.68	—	.46**	.30**	.57**	-.20*	-.09	-.23**	.33**	-.24**	.24**	-.19**	.53**	.37**	—				
14. PC Mother	.76	—	-.27**	-.12	-.35**	.36**	.29**	.34**	-.26**	.20*	-.20*	.10	-.19*	-.06	-.33**	—			
15. PC Teacher	.73	—	-.12	-.13	-.09	.34**	.52**	.27**	-.22**	.20*	-.22**	.15	-.10	-.12	-.09	.55**	—		
16. PC Sibling	.78	—	-.12	.07	-.25**	.22**	.21*	.43**	-.25**	.23**	-.27**	.21*	-.10	.06	-.32**	.51**	.37**	—	
<i>M</i>			3.54	2.90	3.33	1.46	1.58	1.84	4.10	2.10	4.37	1.47	3.50	2.90	3.22	2.02	1.82	2.93	
<i>SD</i>			.77	.80	.88	.43	.52	.61	.41	.50	.51	.49	.56	.66	.73	.60	.49	.72	

Note. AS = autonomy support; PC = psychological control.

* $p < .05$. ** $p < .01$.

tapped into well-being ("I was joyful and excited today," "I was happy today," "Today was a good day"), and 3 items tapped into ill-being ("I felt bad today," "I felt sad today," "Today was a bad day"). Items were averaged per subscale and were found to be reliable (Table 1).

Plan of Analyses

Because the data were hierarchically structured, with five measurement times (i.e., Level 1) being nested within 308 children (i.e., Level 2), which were nested within 154 families (i.e., Level 3), large dependencies within families and within persons were expected. Therefore, we employed multilevel analyses for our main models. These analyses were performed with the statistical software package MLwiN 2.16 (Rasbash, Steele, Browne, & Goldstein, 2009). All predictor variables were centered around their grand mean to facilitate convergence and interpretation of the models. In total, there were 6.36% missing values in the dataset, most of which were in the diary data (6.17% missing data in the diary data). By default, these missing values were treated as structurally missing (i.e., listwise deletion) by MLwiN. In each of the main models, we started with a random intercepts-only model and then added fixed effects. These random intercepts-only models consist of random intercepts and a constant as the only predictor (Hox, 2010) and decompose the total variation into variation at the family-, person-, and day-level. Furthermore, hypotheses were tested in a conservative fashion by controlling for prior day levels of the outcome. These analyses were conducted on a truncated dataset since the first measurement point (i.e., Day 1) has no previous day.

Results

Descriptive Statistics and Preliminary Analyses

Descriptive statistics and bivariate correlations between the study variables, which were aggregated over the 5 days, can be found in Table 1. The means reveal that on average participants experienced moderate levels of autonomy support, low levels of psychological control, need frustration, and ill-being, and relatively high levels of need satisfaction and well-being. Follow-up paired sample *t* tests indicated that, for each of the three sources, autonomy support was perceived to be more strongly present than psychological control at the general level and at the daily level, with *t*-values (*df* = 153) ranging between 3.06 and 26.80; all *ps* < .01. With respect to the comparison between the three sources of autonomy support, children perceived their mothers, *t*(153) = 11.10 and 10.50 for the person-level and day-level, respectively, and siblings, *t*(153) = 4.98 and 5.76 for the person-level and day-level, respectively, to be more autonomy-supportive than their teachers, all *ps* < .01. Mothers were perceived to be even more autonomy-supportive than the siblings, *t*(153) = 5.38 and 4.16 for the person-level and day-level, respectively; *ps* < .01. As for psychological control, siblings were perceived to be more controlling than the mothers, *t*(153) = 17.07 and 11.01 for the person-level and day-level, respectively) and teachers, *t*(153) = 19.52 and 6.82 for the person-level and day-level, respectively), all *ps* < .01. At the person-level, mothers were more psychologically controlling than teachers, *t*(153) = 4.75, *p* < .01, whereas at the daily

level teachers were perceived to be more psychologically controlling than mothers, *t*(153) = 3.49, *p* < .01.

We also examined, by means of paired-samples *t* tests, whether both siblings would report equal or different levels of perceived autonomy support and psychological control. Both at the person-level and at the day-level, older siblings reported receiving higher levels of autonomy support from all three sources (*t*-values ranging between -3.42 , *ps* < .01), except for sibling autonomy support at the person-level where no difference between the two siblings was found. With regard to psychological control, there were only two differences, with older siblings perceiving less psychological control from their mother at the person-level (*t* = 2.33; *p* < .05) and more psychological control from their sibling at the day-level (*t* = -2.15 ; *p* < .05). Furthermore, age was related positively to autonomy support from all three sources, both at the person- and day-level (*r* ranging between .19 and .30, *ps* < .05), yet was unrelated to the mediating and outcome variables. Finally, independent-samples *t* tests indicated that there were no significant gender effects.¹

Primary Analyses

Hypothesis 1: Daily variability in the assessed constructs.

Ten random intercepts-only models were created as to examine the percentage of variance in perceived daily autonomy support and psychological control (from each social source), need satisfaction, need frustration, well-being, and ill-being that is because of within-person (Level 1), between-person (Level 2), or between-family (Level 3) variation. Results of these analyses are summarized in Table 2. A number of findings deserve being highlighted.

Intraclass correlations, which represent the percentage of variance in a variable at a specific level, indicated that there was significant variability at each level for each of the study variables. It is interesting that there were some parallels and some divergences with respect to the division of the proportion of variance at these three levels across the assessed constructs. For instance, in all of the outcomes the least amount of variance was situated at the between-family level, varying between 13% and 27%. For half of the constructs, the within-person variance exceeded the between-person variance, whereas for the other half this pattern was reversed. It is interesting that differences in perceived autonomy support were more a function of differences between children than a function of day-to-day variation in the child's functioning, while perceptions of psychological control (with the exception of teacher psychological control) were more subjected to such day-to-day variations. Given the significant variations between days, persons, and families with respect to these variables, a multilevel approach,

¹ We also compared mean-level differences in person-level and day-level autonomy support and psychological control from each social source between four groups of sibling dyads: (1) sibling dyads of two sisters (*n* = 44; 28.6%); (2) sibling dyads of two brothers (*n* = 30; 19.5%); (3) sibling dyads of one younger sister and one older brother (*n* = 38; 24.7%); and (4) sibling dyads of one younger brother and one older sister (*n* = 42; 27.3%). Results of a multivariate analysis of variance (MANOVA) showed that there were no differences between these four groups (*F* values ranging between .12 and 2.48, *ps* > .05), with one exception. Older male siblings reported receiving more autonomy support from their younger sibling if that sibling was also male (*M* = 3.82; *SD* = .98) rather than female (*M* = 3.14; *SD* = 1.22); *F*(3, 147) = 2.87, *p* < .05, η^2 = .06.

Table 2
Percentage of Variance in the Study Variables That Is Because of Within-Person, Between-Person, or Between-Family Variance

Variable	Within-person variance		Between-person variance		Between-family variance	
	χ^2	ICC	χ^2	ICC	χ^2	ICC
Perceived autonomy support						
Mother	454.93**	32%	52.20**	40%	17.62**	27%
Teacher	441.04**	27%	58.79**	54%	8.11**	19%
Sibling	456.14**	27%	57.03**	48%	13.06**	25%
Perceived psychological control						
Mother	451.12**	54%	31.80**	25%	16.60**	21%
Teacher	439.79**	38%	48.88**	41%	12.28**	21%
Sibling	450.49**	45%	39.32**	30%	19.55**	26%
Needs						
Need satisfaction	456.47**	41%	50.59**	46%	4.88*	17%
Need frustration	456.51**	46%	39.22**	30%	18.32**	24%
Adjustment						
Well-being	454.66**	61%	29.37**	26%	9.14**	14%
Ill-being	454.05**	64%	25.97**	23%	9.55**	13%

Note. ICC = intraclass correlation.

* $p < .05$. ** $p < .01$.

which takes this hierarchical structure into account, was used in all subsequent analyses.

Hypothesis 2: The unique relations of perceived mothers', teachers', and siblings' daily autonomy support and psychological control. To investigate the unique relations of daily experienced autonomy support and psychological control from the three sources, we analyzed four models, each time including a different outcome, namely daily need satisfaction (Model 1a), daily need frustration (Model 1b), daily well-being (Model 1c), and daily ill-being (Model 1d). Results of these analyses are displayed in Table 3 and a summary of these findings is graphically presented in Figure 1.¹ With respect to the day-level measures, daily autonomy support and psychological control from each social source related uniquely to, respectively, changes in daily need satisfaction and need frustration. Moreover, perceived maternal and sibling psychological control related negatively to changes in need satisfaction, while only maternal autonomy support related negatively to changes in need frustration.

With respect to the outcomes, a similar pattern of findings emerged. Specifically, perceived daily autonomy support from the mothers and siblings (but not from the teachers) related positively to changes in daily well-being, while daily autonomy support did not relate to changes in daily ill-being. Perceived daily psychological control from the mothers and teachers (but not from the siblings) related positively to changes in ill-being and negatively to changes in well-being. With respect to the person-level measures, general levels of experienced autonomy support and psychological control did not relate to the daily measures of need satisfaction, need frustration, well-being and ill-being.

Hypothesis 3: The mediating role of need satisfaction and need frustration. Next, we investigated whether the relations between perceived daily autonomy support and psychological control and children's well-being and ill-being (as shown in Model 1c and 1d) can be accounted for by daily need satisfaction and need frustration (as shown in Model 2c and 2d). Specifically, we tested a series of mediation models with (a) need satisfaction playing an

intervening role in the relation between perceived autonomy support (of each source) and well-being and (b) need frustration playing an intervening role in the relation between perceived psychological control (of each source) and ill-being. This was done by simultaneously adding daily need satisfaction and need frustration as predictors of well-being and ill-being in addition to autonomy support and psychological control. Results of these analyses are shown in Table 3.

First, daily need satisfaction and need frustration were both strongly related to changes in day-to-day well-being and ill-being. Moreover, the strength of the initial relation between experienced autonomy support and psychological control on the one hand and well-being and ill-being on the other hand was reduced substantially after taking into account the role of daily need satisfaction and frustration (compared with Model 1c and Model 1d). Still, the contribution of maternal and teacher psychological control to ill-being remained significant.

To further investigate the significance of the indirect effect of perceived autonomy support on changes in well-being through need satisfaction and the indirect effect of perceived psychological control on changes in ill-being through need frustration, we performed the product-of-coefficient test (MacKinnon, Fairchild, & Fritz, 2007). When the 95% confidence interval (CI) of this test does not contain zero, then the indirect effect is significant. These results are displayed in Table 4 wherein the upper part refers to the relation autonomy support—need satisfaction—well-being and the lower part refers to the relation psychological control—need frustration—ill-being. First, all a-paths (i.e., perceived autonomy support from each social source to changes in need satisfaction and perceived psychological control of each social source to changes in need frustration) and all b-paths (i.e., changes in need satisfaction to changes well-being and changes in need frustration to changes in ill-being) were significant. Furthermore, all c-paths (i.e., perceived autonomy support from each social source to changes in well-being and perceived psychological control from each social source to changes in ill-being) were significant, except for teach-

Table 3

Summary of the Model Estimates for the Three-Level Analyses of the Associations Between Autonomy Support, Psychological Control, Need Satisfaction, Need Frustration, Well-Being, and Ill-Being

Parameter	Need satisfaction Model 1a B (SE)	Need frustration Model 1b B (SE)	Well-being		Ill-being	
			Model 1c B (SE)	Model 2c B (SE)	Model 1d B (SE)	Model 2d B (SE)
Overall intercept	4.12 (.02)**	2.08 (.02)**	3.09 (.12)**	3.78 (.12)**	1.43 (.02)**	1.43 (.03)**
Day-level measures						
AS Mother	.09 (.02)**	-.06 (.03)*	.08 (.03)*	.03 (.03)	-.02 (.03)	.03 (.03)
AS Teacher	.04 (.02)*	-.01 (.02)	.01 (.03)	-.02 (.03)	-.00 (.03)	.01 (.03)
AS Sibling	.04 (.02)*	-.00 (.02)	.06 (.03)*	.04 (.03)	-.04 (.03)	-.03 (.03)
PC Mother	-.13 (.03)**	.23 (.03)**	-.15 (.04)**	-.05 (.04)	.20 (.04)**	.10 (.04)**
PC Teacher	.01 (.03)	.06 (.03)*	-.10 (.04)**	-.11 (.04)**	.13 (.04)**	.12 (.04)**
PC Sibling	-.05 (.02)*	.06 (.03)*	-.05 (.03)	-.03 (.03)	.05 (.03)	.02 (.03)
Need satisfaction				.41 (.04)**		-.24 (.04)**
Need frustration				-.15 (.04)**		.24 (.03)**
Person-level measures						
AS Mother	.03 (.03)	-.01 (.03)	.02 (.04)	-.00 (.05)	.00 (.04)	.02 (.04)
AS Teacher	-.04 (.02)	.01 (.03)	.00 (.04)	.03 (.04)	.00 (.03)	-.01 (.03)
AS Sibling	.00 (.02)	.02 (.03)	-.04 (.03)	-.05 (.04)	.01 (.03)	.00 (.03)
PC Mother	.00 (.03)	.01 (.04)	.03 (.05)	.03 (.05)	-.05 (.04)	-.06 (.04)
PC Teacher	-.05 (.03)	-.07 (.04)	-.01 (.05)	-.00 (.05)	-.00 (.05)	-.00 (.05)
PC Sibling	.00 (.02)	.05 (.03)	-.02 (.03)	-.02 (.04)	.02 (.03)	.00 (.03)
2*loglikelihood	1679.02	2128.17	2733.71	2598.55	2587.64	2465.20

Note. AS = autonomy support; PC = psychological control. Outcomes of the models are (a) daily need satisfaction, (b) daily need frustration, (c), daily well-being, and (d) daily ill-being. Coefficients shown are unstandardized path coefficients (B) with standard errors (SE) reported between brackets.

* $p < .05$. ** $p < .01$.

ers' autonomy support and sibling psychological control. When daily need satisfaction and need frustration were taken into account, only two of these paths remained significant (c'-paths). The product-of-coefficient test showed that all indirect effects, except for one (i.e., teacher psychological control—need frustration—ill-being), were significant, indicating that autonomy support was related to changes in well-being through changes in satisfaction of the psychological needs and that psychological control was related to changes in ill-being through changes in frustration of these needs.

Supplementary analyses: moderating factors. We performed four additional analyses per social source that investigated whether person-level autonomy support or person-level psychological control moderated the relation between perceived daily autonomy support and changes in daily need satisfaction or between perceived daily psychological control and changes in daily need frustration. All interaction terms in these 12 analyses were not significant, $\chi^2(1)$ ranging between .04 and 1.07, all $ps > .05$. Thus, generally experienced autonomy support and psychological control did not moderate the relation

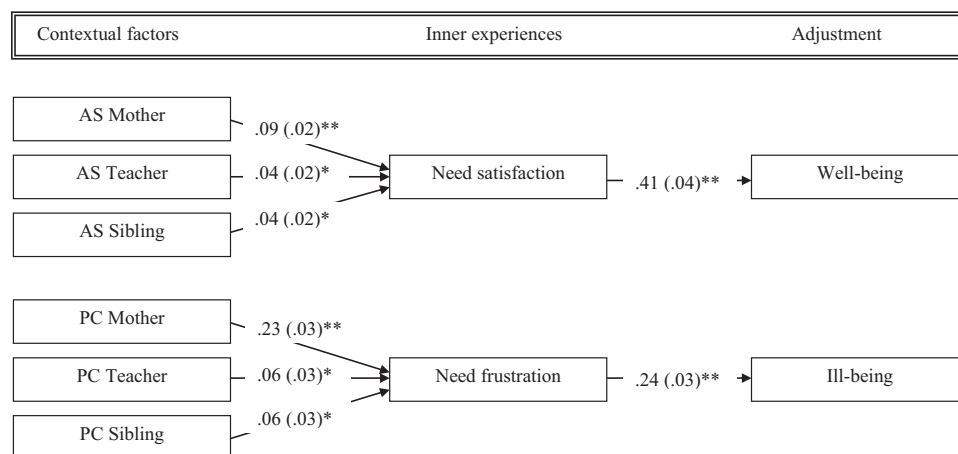


Figure 1. A summary of the results as reported in Table 3. Coefficients shown are unstandardized path coefficients with standard errors reported between brackets. Coefficients are based on the results of the models reported in Table 3. AS = autonomy support; PC = psychological control. * $p < .05$. ** $p < .01$.

Table 4

Mediating Role of Need Satisfaction or Need Frustration in the Relations Between Autonomy Support or Psychological Control and Well-Being or Ill-Being

Variable	c-path		c'-path		a-path		b-path		a*b	
	<i>B</i> (<i>SE</i>)	95% CI	<i>B</i> (<i>SE</i>)	95% CI	<i>B</i> (<i>SE</i>)	95% CI	<i>B</i> (<i>SE</i>)	95% CI	<i>B</i> (<i>SE</i>)	95% CI
Autonomy support—Need satisfaction—Well-being										
Mother	.08 (.03)*	.02, .14	.03 (.03)	-.03, .09	.09 (.02)**	.05, .13	.41 (.04)**	.33, .49	.04 (.01)	.02, .05
Teacher	.01 (.03)	-.05, .06	-.02 (.03)	-.07, .04	.04 (.02)*	.01, .08	.41 (.04)**	.33, .49	.02 (.01)	.00, .03 ¹
Sibling	.06 (.03)*	.00, .11	.04 (.03)	-.02, .09	.04 (.02)*	.01, .08	.41 (.04)**	.33, .49	.02 (.01)	.00, .03 ²
Psychological control—Need frustration—Ill-being										
Mother	.20 (.04)**	.12, .27	.10 (.04)**	.03, .18	.23 (.03)**	.17, .30	.24 (.03)**	.17, .30	.06 (.01)	.03, .08
Teacher	.13 (.04)**	.06, .20	.12 (.04)**	.05, .18	.06 (.03)*	.00, .12	.24 (.03)**	.17, .30	.01 (.01)	.00, .03
Sibling	.05 (.03)	-.01, .12	.02 (.03)	-.04, .09	.06 (.03)*	.01, .10	.24 (.03)**	.17, .30	.01 (.01)	.00, .03 ³

Note. CI = confidence interval. Coefficients shown are unstandardized path coefficients (*B*) with standard errors (*SE*) reported between brackets. The a-path is the relation between autonomy support and psychological control and, respectively, need satisfaction and need frustration; the b-path is the relation between need satisfaction and need frustration and, respectively, well-being and ill-being (while controlling for daily autonomy support and psychological control); the c-path is the initial relation between autonomy support and psychological control and, respectively, well-being and ill-being; and the c'-path is the relation between autonomy support and psychological control and, respectively, well-being and ill-being when the b path is taken into account.

^{1,2,3} When rounded to three numbers, these confidence intervals are respectively (1) .002, .032, (2) .002, .031, and (3) .002, .027, indicating significant effects.

* $p < .05$. ** $p < .01$.

between daily autonomy support and daily need satisfaction or the relation between daily psychological control and daily need frustration.

We also investigated whether associations in the models would differ depending on the gender, age, or birth order (i.e., being a younger or older sibling) of the child. Therefore, we examined interactions between these three variables and all the other predictor variables (i.e., day-level as well as person-level variables) in Models 1a, 1b, 2c, and 2d. Of the 156 interactions we tested, only 17 were significant [that is, 11%; $\chi^2(1)$ ranging between .00 and 3.72 for the nonsignificant interaction terms and ranging between 4.09 and 12.25 for the significant interaction terms]. The significant interactions indicated that the size of the associations was somewhat more pronounced among younger siblings and girls.

Discussion

Fundamental to the optimal psychological development of children is a social environment in which children are encouraged to experience true ownership regarding their thoughts, feelings, and behaviors (i.e., autonomy support) and in which children are not pressured to think, feel, and act in certain ways (e.g., through psychological control). Multiple studies have indicated the beneficial effects of an autonomy-supportive environment for children's psychosocial adjustment (Taylor & Ntoumanis, 2007). In contrast, a psychologically controlling or autonomy-suppressing context has been found to relate to problem behavior (e.g., Barber, 1996). However, this research has typically focused on one particular source of autonomy support and psychological control and has not adopted a diary approach. Such a diary approach is ideally suited to gain insight in the more dynamic nature of autonomy support and psychological control provided by important figures in children's social environment.

Daily Variation in Autonomy Support and Psychological Control

As a main goal of this study involved investigating the relations between the study variables at the day-to-day level, an important first step was to provide evidence for the existence of significant variation in these constructs at the daily level. Documenting such day-to-day variation was particularly important with regard to the perceived socialization styles used by the three social sources because the role played by socialization figures is often described in a rather static fashion (although there is a recent trend toward a more dynamic view on socialization; e.g., Laurenceau & Bolger, 2005; Repetti, Reynolds, & Sears, 2015).

Results of random intercepts-only models, which decompose the total variation in the study variables into variation at the family-, person-, and day-level (Table 2), showed that children do experience significant fluctuations in perceived autonomy support and psychological control from mothers, teachers, and siblings over a period of 5 days. Clearly then, in addition to individual differences between parents, teachers, and siblings, with the one parent/teacher/sibling being generally more autonomy-supportive and controlling than the other, the communication style of socialization figures is characterized by quite a lot of variation on a day-to-day basis. This finding is in contrast with the relatively high rank-order stability of autonomy-supportive parenting (Matte-Gagné, Bernier, & Gagné, 2013) and psychologically controlling parenting (e.g., Barber, 1996) over longer periods of time. These findings point to the importance of taking into account the variability of socialization style across short periods of time and are in line with dynamic models indicating that socialization figures' behavior varies over time and across situations (e.g., Holden & Miller, 1999). These findings also have important implications for prevention and intervention efforts. For instance, as suggested by the current results, parental behavior is not "carved in stone" and labeling parents as

good or bad (a view sometimes encountered in self-help books on parenting) does not do justice to the dynamics of parental behavior (apart from having a stigmatizing effect on parents). In contrast, every parent seems to have the potential to be autonomy-supportive or to have the vulnerability to be psychologically controlling.

In addition to individual differences and daily variation in socialization figures' style, there was significant variation at the family level. Such family level differences indicate that two different family members (i.e., two siblings) perceive the communication style of different socialization figures in a similar way. While such an effect is relatively easy to understand when it comes to mothers' and siblings' socialization style (because mothers and siblings are part of the same family), it is more surprising that there were also family differences in perceived teacher autonomy support and psychological control. This effect indicates that siblings, who have different teachers, tend to perceive their teachers in similar ways. Although future research is needed to clarify this finding, we propose that perceiver effects could be a possible explanation. Indeed, previous research has shown that children and adolescents from one family have the tendency to perceive people in their social environment in a similar manner (e.g., Manders et al., 2009; Van der Kaap-Deeder et al., 2015). In addition, through a process of observational learning, children may learn to apply the interactions observed within their family (e.g., between the parent and a child) in interactions with their sibling or teacher (Erel & Burman, 1995; Jenkins, Dunn, O'Connor, Rasbash, & Behnke, 2005).

The Unique Relations of Three Sources of Autonomy Support and Psychological Control With Child Outcomes

A second aim of this study was to examine whether autonomy support and psychological control from each social source (i.e., mothers, teachers, and siblings) would relate uniquely to, respectively, changes in need satisfaction and need frustration, and to, respectively, changes in well-being and ill-being. We found that the perceived socialization style from each social source had unique associations with children's psychological functioning. Even when considered simultaneously, the effects of the different sources were not cancelled out. This study is the first to show the unique effects of especially sibling autonomy support, but also sibling psychological control above and beyond the effects of both parental and teacher autonomy support and psychological control. These results are in line with other studies showing the unique effects of autonomy support and psychological control experienced in horizontal relations (e.g., relations between peers or romantic partners) above and beyond the effects of autonomy support and psychological control experienced in vertical relations (e.g., parents, teachers, and coaches) on individuals' psychological functioning (Hagger et al., 2009; Ratelle, Simard, & Guay, 2013). Our findings are also in line with the increasing recognition of the important and unique role of siblings in children's psychosocial development (Conger et al., 1997; Kramer & Conger, 2009). Although siblings are recognized as an important source of influence on children's development, with an impact that can be either positive (Scholte et al., 2001) or negative (Buhrmester & Furman, 1990), relatively few studies to date examined the unique role of

siblings over the role of other key socialization figures such as parents and teachers. This is particularly true with regard to the use of an autonomy-supportive and controlling interaction style. Overall, our findings testify to the unique importance of siblings for children's well-being as well as ill-being.

Our findings are also informative with respect to the current debate on the importance of the amount of time parents spend with their children. Milkie, Nomaguchi, and Denny (2015) found that the time mothers spent with their child (by being engaged with the child or simply by being present) was only moderately important for adolescents' delinquent behaviors and even unrelated to younger children's behavioral, emotional and academic functioning. However, as noted by Kalil and Mayer (2016), such findings do not say anything about the quality of these interactions. Indirectly, findings from the current study are in line with the notion that quality matters. Indeed, we found that the quality of the interactions with mothers (as indexed by high levels of autonomy support and low levels of psychological control) was uniquely important for elementary schoolchildren's well-being even though mothers generally spend less time with their child on schooldays than teachers.

Remarkably, the unique associations of each of the three sources of autonomy support and psychological control with the child outcomes were largely unaffected by dispositional levels of perceived autonomy support and psychological control assessed prior to the diary study. All children, even those who generally perceive their parents, teachers or siblings as low on autonomy support or high on psychological control, benefitted from daily experiences of autonomy support. At the same time, it appeared that all children suffer from daily experiences of psychological control. We further examined whether gender, age, and birth order moderated the relations in our models. The observed associations in our models were generally similar for boys and girls and for younger and older children or siblings.

Overall, the lack of moderation observed in this study underscores the strength and the robustness of the observed relations and is consistent with the SDT-based notion that the basic psychological needs play a universal role in associations between contextual influences and children's well-being (Deci & Ryan, 2000; Ryan et al., 2016). However, the robustness of our findings and the observation that each social source is uniquely related to children's well-being does not preclude the possibility that mothers, teachers, and siblings play a more differential role in more specific domains of children's lives. An important reason why we found that each social source mattered to a similar degree may be that we measured children's needs and well-being at a rather general level of abstraction (Vallerand, 1997). A different pattern of findings may emerge when assessing the needs and well-being in more specific domains, such as school, social relationships, and emotion regulation, or at specific moments (e.g., during or after school time). For instance, teacher autonomy support might be especially important for children's academic functioning (Guay et al., 2013). Furthermore, although we did not find strong gender effects, the inclusion of domain-specific measures of well-being might shed more light on possible gender effects. For instance, Lietaert, Roroda, Laevers, Verschueren, and De Fraine (2015) showed that only boys (but not girls) benefitted from teacher autonomy support in terms of their level of behavioral engagement at school. Finally, future research tapping into needs experiences and well-being

several times during the day (e.g., using event sampling methodology) could determine whether, for instance, teacher autonomy support is especially beneficial for well-being during school time.

The Bright and Dark Pathways of Socialization Style

Consistent with recent theorizing (Bartholomew et al., 2011; Vansteenkiste & Ryan, 2013) regarding the distinct roles of need satisfaction and need frustration in, respectively, a “bright” and “dark” pathway of socialization, we found that autonomy support is related to higher well-being through satisfaction of the psychological needs and that psychological control related to more ill-being through frustration of the psychological needs. These findings suggest that the presence of social contexts that actively thwart children’s needs (through psychological control) and that lead to need frustration cannot be equated with contexts that merely lack support of children’s needs and that lead to low need satisfaction.

Although, in general, evidence was found in favor of these two pathways, two sets of findings need to be highlighted. First, daily perceived psychological control from both mothers and teachers continued to have a direct association with changes in daily ill-being even after controlling for daily need frustration. Therefore, need frustration does not seem to be the sole mechanism linking psychological control and ill-being. While we assessed need frustration as experienced at the general level, need frustration experienced specifically within the mother- or teacher-relationship might more fully mediate the relation between psychological control and ill-being than the currently assessed general need frustration. In addition, it could be the case that need frustration is a rather distal mediator with another more proximal mediator intervening in the relation between need frustration and ill-being. In this respect, previous studies have shown a link between need satisfaction and well-being via either authenticity (Thomaes, Sedikides, Van den Bos, Hutteman, & Reijntjes, in press) or mindfulness (Olafsen, 2016). Thus, future studies might focus on both distal and proximal mediators in the link between psychological control and ill-being. A third possibility is that part of the direct association between psychological control and ill-being reflects a child-driven effect (e.g., Belsky, 1984), where children who feel worse about themselves perceive parental and teacher behavior as more controlling and/or elicit more controlling reactions from these socialization figures.

A second finding that deserves being highlighted is that the daily experience of psychological control was related not only to feelings of ill-being, but also to diminished feelings of well-being. This finding is consistent with a presumed asymmetrical relation between autonomy support and psychological control on the one hand and well-being and ill-being on the other hand: Whereas low perceived autonomy support does not necessarily engender ill-being, the presence of perceived psychological control does entail increased ill-being and reduced well-being (Vansteenkiste & Ryan, 2013).

Limitations

This study had several limitations. Although this study was the first to our knowledge to examine three social sources of autonomy support and psychological control simultaneously, there are sev-

eral additional social sources that are important in children’s lives. Studies have shown, for instance, that autonomy support from fathers also contributes to children’s psychological well-being (e.g., Grolnick et al., 1991), albeit in somewhat different domains than mothers (e.g., Guay et al., 2013; Soenens & Vansteenkiste, 2005). Soenens and Vansteenkiste (2005), for example, found that whereas maternal autonomy support related to autonomous motivation for engaging in schoolwork and friendship relationships among adolescents, paternal autonomy support related to autonomous motivation for job search. Furthermore, studies have shown that autonomy support from peers or friends contributed to beneficial outcomes, such as well-being (Ratelle, Simard, & Guay, 2013) and prosocial attitudes within sports (Ntoumanis, Taylor, & Thøgersen-Ntoumani, 2012). Future studies could also include these social figures.

Including multiple informants would also have additional methodological advantages such as the reduction of same-source bias, shared method variance and retrospective bias (although this problem is reduced in diary studies; Bolger, Davis, & Rafaeli, 2003). However, because previous studies have shown that especially child reports are predictive of children’s psychological functioning (Pettit et al., 2001), we thought it was essential to first examine how children’s perceptions of daily parenting relate to children’s daily functioning. Nevertheless, there is a need for future studies to include multiple informants; for example, by having siblings report both on the degree to which they receive and give autonomy support and psychological control toward each other and by having siblings report on the degree to which parents provide autonomy support and psychological control to both of them. In addition, including multiple informants would also shed light on the important question to what extent the observed daily variation is only a function of the child’s perception or whether, conversely, it reflects real variation in the socialization figures’ actual behavior. Because a number of recent studies have documented substantial daily variation in parenting practices, even when parents themselves reported on these practices (Aunola et al., 2013; Mabbe, Soenens, Vansteenkiste, Van der Kaap-Deeder, et al., 2016), it is unlikely, however, that daily variation in socialization figures’ style is accounted fully by children’s perception.

Furthermore, we also noted rather low reliabilities for some of the study variables and in particular for the person-level autonomy support scales. Although these reliabilities are similar to previous studies among such a relatively young age group (e.g., Grolnick et al., 1991), effects of these measures should be interpreted with caution. As the day-level variables were, in general, more reliable than the person-level measures, diary methodology seems especially appropriate for such a relatively young age group. Indeed, because younger (relative to older) participants may experience more problems with memory bias and difficulty aggregating events across time and situations, a diary approach is particularly useful to arrive at more valid and reliable assessments in this age period. Moreover, as daily well-being and ill-being were assessed with rather homogeneous items (e.g., “I felt bad today” and “Today was a bad day”), future studies could further investigate children’s psychological functioning with more differentiated items. Furthermore, as we cannot be entirely confident that the children filled out the questionnaires at the requested time (i.e., in the evening instead of, e.g., the next morning), future studies could employ electronic diaries. In addition, although we found no effect

of birth order, our findings regarding birth order should be interpreted with some caution because we had no information about the siblings' exact place in the birth order in families with more than two children.² Finally, experimental designs could shed further light on the proposed causal link between the study variables, especially because child behavior has also been found to predict the quality of the mother-child relationship (e.g., Pastorelli et al., 2016).

Future Challenges

Given that the number of diary studies concerning autonomy support and psychological control is limited and given that this field is still in its infancy, a number of issues await being tested. We discuss four challenges that could be addressed. First, the finding that each of the three sources of autonomy support and psychological control have unique and rather stable associations with the child outcomes is remarkable because it suggests that autonomy support and psychological are characteristics of relationships that vary widely in terms of their general nature and developmental functions. We would like to note, however, that we do not argue that the way how autonomy support and psychological control manifest is identical, because this manifestation may depend on the type of relationship and on the birth order and absolute age of the children. While some features of autonomy support (e.g., acknowledging the other person's feelings) may apply similarly across types of relationships, other features (e.g., provision of a rationale for introducing a rule) are probably more or less relevant and prevalent depending on the type of relationship. Because our study is among the first to examine these relationship characteristics across different types of relationships, we chose to rely on rather generic items for autonomy support and psychological control. A next step for future research is to gain more detailed insight in the manifestations of these dimensions in specific relationships. Observational studies and qualitative research may be particularly useful in this regard.

Second, this study only focused on autonomy-supportive or -suppressive practices. Future research needs to include other dimensions of socialization style that might contribute to daily need satisfaction and need frustration, including responsiveness/warmth and structure (Grolnick & Pomerantz, 2009; Soenens & Vansteenkiste, 2010). Such research could address the complex interplay between different dimensions of socialization style, including the question whether certain features of socialization style are relatively more relevant to specific individual psychological needs (e.g., with autonomy support being more relevant to the need for autonomy and with responsiveness being more relevant to the need for relatedness).

Third, this study was conducted in a country (Belgium) with a cultural orientation characterized by fairly high levels of independence and individualism (Hofstede, Hofstede, & Minkov, 2010). Previous research comparing Belgium with other, more collectivistic, countries (e.g., China and South Korea) found that the effects of perceived parental autonomy support and psychological control on adolescents' psychological functioning was fairly similar across countries (e.g., Fousiani, Van Petegem, Soenens, Vansteenkiste, & Chen, 2014; Soenens, Park, Vansteenkiste, & Mouratidis, 2012). These findings are in line with SDT's universality claim (Deci & Ryan, 2000), which states that autonomy support and psycholog-

ical control are, respectively, beneficial and detrimental for all individuals, regardless of one's cultural background. However, the way children interpret and cope with parenting practices can be influenced by cultural orientation (see also Soenens, Vansteenkiste, & Van Petegem, 2015 for a discussion on this issue). Future diary studies may provide another look at cross-cultural differences and similarities, for instance by addressing the question whether—in addition to mean-level differences between cultures—there are between-culture differences in the degree of daily variation in the provision of autonomy support and psychological control. Also, cultural orientation might affect to some extent associations of daily autonomy support and control with children's well-being. For instance, stronger endorsement of collectivism may somewhat attenuate associations between daily psychologically controlling socialization and ill-being because children with more collectivistic values have a relatively more benign attribution of psychologically controlling events (Gershoff et al., 2010).

Fourth, given that daily variations in socialization figures' perceived autonomy support and psychological control seem to matter for children's well-being, an important direction for future research is to examine the origins of those daily variations. Possibly, socialization figures' own basic psychological need satisfaction plays a role. de Haan, Soenens, Dekovic, and Prinzie (2013) recently showed that parents who experienced low need satisfaction were more likely to engage in psychologically controlling parenting, possibly because they lack the energy necessary to adopt a more autonomy-supportive style. Ultimately, it would be interesting for future research to assess the psychological needs and the communication styles in both the socialization figures and the children simultaneously. Such a study would allow one to examine not only the degree of convergence in different reporters' perception of communication style but also to examine whether the socialization figures' psychological need experiences transfer to the child's experiences through the figures' communication style. Such research would also allow one to examine reciprocal processes: children's well-being and adjustment may in itself represent a source of need satisfaction for parents and teachers. In contrast, ill-being and problem behavior are likely to increase experiences of need frustration in socialization figures and to elicit a more controlling style. Thus, diary studies including different informants is needed to draw a fuller picture of the complex and bidirectional dynamics involved in daily effects of socialization.

Conclusion

This study showed that daily fluctuations in autonomy support and psychological control from three important social sources (i.e., mothers, teachers, and siblings) are related to changes in daily fluctuations in children's well-being and ill-being through, respectively, changes in the daily satisfaction and frustration of children's basic psychological needs. These findings point to (a) the importance of mothers, teachers, and siblings in the daily well-

² To gain further insight into the role of birth order within the family, we reran our main analyses, as reported in Table 3, while only employing data from families with two children because this subsample includes only siblings who were first- and second-born children within their family. Even when controlling for birth order, results of these analyses were similar to those reported here.

being of elementary school-age children; (b) the relevance of investigating daily processes of autonomy support and psychological control in relationships with different developmental functions; and (c) the differentiation between a bright (i.e., autonomy support—need satisfaction—well-being) and dark (i.e., psychological control—need frustration—ill-being) pathway in socialization.

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Parent Autonomy Support, Academic Achievement, and Psychosocial Functioning: a Meta-analysis of Research

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Abstract A meta-analysis of 36 studies examining the relations between parent autonomy support (PAS) and child outcomes indicated that PAS was related to greater academic achievement and indicators of adaptive psychosocial functioning, including autonomous motivation, psychological health, perceived competence, engagement, and positive attitudes toward school, among other outcomes. The strongest relation emerged between PAS and psychological health. Results indicated that the strength of the PAS relation was stronger when PAS was reflective of both parents, rather than of just mothers or just fathers among five of six outcomes for which moderators could be examined. Moderator analyses also suggested that PAS correlations are stronger when the outcome is better aligned to the predictor and the relation between PAS and psychosocial outcomes may vary by grade level. Implications for theory and future research are discussed.

Keywords Parenting · Autonomy support · Academic achievement · Psychological well-being · Meta-analysis

There is a lot of uncertainty about what makes a “perfect parent.” One glance at your local bookstore and the plethora of parenting books suggests that everyone seems to have an opinion. From the *Battle Hymn of the Tiger Mother*, by Amy Chua to *Beyond the Sling: a Real-Life Guide to Raising Confident, Loving Children the Attachment Parenting Way*, by Mayim Bialik, one could read endless hours and still not have a clear understanding of what

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makes a good parent. However, many people can agree that parents play an important role in shaping a child's social, psychological, and academic functioning. The relationship between parent and child may be one of the most significant relationships over the course of a person's life. The early attachment an infant establishes with parents serve as the foundation for happy and healthy relationships later in life (Burrow-Sanchez and March 2006; Cox 2002) and predicts later development (Linwood 2006). From background characteristics to parenting style, the literature consistently supports the notion that parents influence children's school performance (Ishak et al. 2012; Rivers et al. 2012). The evidence suggests that children who form a strong, trusting, and warm relationship with their parents exhibit greater curiosity, flexibility, and self-reliance in the classroom, as well as higher self-esteem and fewer behavioral problems (Cox 2002; Linwood 2006).

Parents vary greatly in their parenting styles, as well as the extent to which and ways they become involved in their children's lives (Pomerantz et al. 2007). In particular, a growing body of research has suggested that parents who interact with their children in ways that support their experience of autonomy or feeling that their actions are their own (Deci and Ryan 1987) may be particularly effective in supporting adaptive psychological, social, and academic outcomes, including psychosocial functioning (Chirkov and Ryan 2001; Ferguson et al. 2011) and academic achievement (Strage and Brandt 1999).

Parents may use a number of strategies and practices to support their children's experience of autonomy. Autonomy supportive environments are characterized primarily by parents' acknowledgement of children's perspectives, encouragement of children to experiment, provision of opportunity to make choices, and minimal use of controlling language and contingencies with children (Deci and Ryan 2012). Autonomy supportive parents nurture inner motivational resources, rely on flexible language when communicating with their child, and provide explanatory rationales for why it may be personally important or useful for a child to engage in a behavior (Reeve 2009). In an interaction about homework, for example, an autonomy supportive parent might ask for the child's input, try to understand their child's perspective on approaches for solving the homework assignment, and encourage their child to work in their own way. On the other hand, a controlling parent might tell the child exactly how to do the homework and ask for little, if any, input from the child in the discussion.

Although a considerable amount of research examining the relations between parent autonomy support and child psychological, social, and academic functioning has accumulated, this research has yet to be synthesized in order to assess the magnitude of the relation between this style of parent interaction and child outcomes. Likewise, little research has explored the conditions under which parent autonomy support is more or less related to adaptive outcomes. To address this omission in the literature, we conducted a meta-analysis to examine the relation between parent autonomy support and a variety of outcomes indicative of children's adaptive functioning, including their academic achievement and psychosocial functioning.

The Relations Between Autonomy Supportive Parenting and Child Outcomes

According to self-determination theory, there are three universal and basic psychological needs that underlie human motivation and achievement: autonomy, competence, and relatedness (Deci 1980). The need for autonomy is met when a child feels like their actions are their own. Competence is met when children feel the task before them is within their skill set, and they

can readily master their environment. Relatedness is met when a child feels attached and accepted by a community, group, or family. Self-determination theory hypothesizes that social contexts that satisfy these three needs will enhance intrinsic motivation, well-being, and achievement (Beiswenger and Grolnick 2010; Grolnick et al. 2002; Hui et al. 2011), whereas contexts that undermine these needs will diminish adaptive functioning (Bronstein et al. 2005; Jiang et al. 2011). In particular, autonomy reflects “volitional, harmonious, and integrated functioning” (Joussemet et al. 2008, p. 194) and may be particularly important for motivation and psychological well-being. Self-determination theory has traditionally assumed that feelings of competence and relatedness will not enhance motivation and well-being, unless accompanied by a sense of autonomy (Ryan and Deci 2000).

Given the centrality of these psychological needs for human functioning, it would seem reasonable to assume that when a child’s need for autonomy is supported by parents, the child’s motivation, psychological well-being, and academic outcomes are likely to be optimally supported. In fact, a great deal of research has supported this notion (Annear and Yates 2010; Grolnick 2009; Joussemet et al. 2008).

Previous scholarship has examined the relation between parent autonomy support and academic achievement. Using a variety of indicators of achievement, including grade point average (GPA), individual course grades (Cooper et al. 2000; Soenens and Vansteenkiste 2005), and standardized test scores (Bronstein et al. 2005; Halpern-Felsher 1994), researchers have suggested that parental autonomy support has a positive relation with academic achievement. Pomerantz et al. (2007) asserted that autonomy supportive parenting may benefit academic achievement because it provides access to motivational and cognitive resources which can enhance positive engagement in school. While many studies have found a strong relation between parental autonomy support and school achievement, still other studies have not revealed significant relations and the strength of the overall relation remains uncertain (Bronstein et al. 2005; Grolnick et al. 2002; Halpern-Felsher 1994). For example, although Grolnick et al. (1991) found small positive correlations between children’s perceptions of both maternal and paternal autonomy support and school grades, these correlations were not statistically significant. Conducting a meta-analysis can help determine the magnitude of the relation between parental autonomy support and achievement.

Similarly, research has suggested that parental autonomy support may be related to enhanced psychosocial functioning, including autonomous motivation for school (Bronstein et al. 2005; Dai 1998; Grolnick et al. 2000; Hui et al. 2011), greater psychological health in the form of greater perceived well-being and self-esteem (Beiswenger and Grolnick 2010; Ferguson et al. 2011), greater perceived competence, and control in school related tasks (Grolnick et al. 1991; Soenens and Vansteenkiste 2005), increased engagement and effort (Gagné 2003), more positive attitudes toward school (Annear and Yates 2010), and reduced extrinsic motivation (Dai 1998). For example, Borenstein et al. (2005) found that greater parental autonomy support in 5th grade predicted an enhanced intrinsic motivational orientation toward school in 7th grade. Lekes et al. (2010) found that parental autonomy support was associated with greater psychological well-being among both Chinese and North American adolescents. But again, while much research has supported the positive relation between parental autonomy support and adaptive psychosocial functioning, results have not been ubiquitously supportive (e.g., Purdie et al. 2004; Annear and Yates 2010).

Factors that may Explain Variation in the Relations Between Parental Autonomy Support and Child Outcomes

Given mixed findings, it seems likely that a number of factors might moderate the influence of parental autonomy support and potentially explain contradictory findings. Factors such as the child's grade level, the parent agent of the autonomy support, the domain of the autonomy support and outcome, the autonomy support respondent, and the type of outcome measure may influence the relation between parental autonomy support and students' adaptive functioning.

The effectiveness of various parenting techniques can change with children's age, depending on a child's developmental level (Grolnick et al. 1997). Parenting involvement that begins early in children's lives can extend into the adolescent years (Pomerantz et al. 2007) and have differing impacts on school performance. In particular, adolescence is typically marked as a time during which children develop conceptualizations of the self as an autonomous, efficacious individual (Hill and Tyson 2009), accompanied by a shift in child–parent relationships that includes more conflict and renegotiations of authority (Smetana and Asquith 1994). Looking at grade level as a moderator may shed some light on how the relations between parental autonomy support and child outcomes change across developmental levels.

Understanding who is doing the autonomy support is also critical. Unfortunately, researchers often assess the parenting style of mothers exclusively and assume that fathers parent in the same way or simply do not take into account how the parenting styles of mothers and fathers coexist (Simons and Conger 2007). However, the nature and level of interaction with children may be different across mothers and fathers. According to Collins and Russell (1991), fathers' interaction with children during adolescence tends to be more focused and limited in nature relative to mothers, geared toward school and athletic achievement, whereas mothers' interactions with their children tend to be much more varied. Being able to tease apart the link between parental autonomy support and child outcome when mothers', fathers', or both parents' level of autonomy support was assessed may clarify the question of whether parenting practices have similar relations with child outcomes across the agent of autonomy support. Nonetheless, we would expect that parental autonomy support is more powerful when both parents are autonomy supportive.

The autonomy support respondent may also be an important factor in explaining variation in research findings. That is, self-determination theory assumes that the subjective experiences of parent autonomy from the perspective of the child ultimately determine child motivation and engagement (e.g., Ryan and Grolnick 1986). As such, it might matter who is reporting on the autonomy support of the parent. If parents are self-reporting, they might think they are acting in an autonomy supportive manner, but the child might perceive the actions differently. Ultimately, we might expect that larger relations will be revealed when child perceptions are correlated with outcomes.

Finally, the domain of the autonomy support and outcome may be of particular importance in explaining variation. Autonomy support may be focused on particular domains of parents' interaction with children, for example, when interacting over school matters or matters of the home. As such, we may expect for parental autonomy support to yield particularly strong relations with child outcomes when the outcomes align with the domain in which support was given (or measured). That is, parents may become involved in different ways on the school and home fronts, yielding distinct effects on children across outcomes (Pomerantz et al. 2007). The extent to which more distally aligned relations, for example, the relation between parental autonomy support for home matters and children's educational outcomes or between parental

autonomy support for school matters and children's general psychological well-being, is unclear.

Need for a Synthesis on Parental Autonomy Support

A large body of literature on the parental autonomy support and its relation with children's school and life outcomes has accumulated over the last 25 years, making a synthesis of the findings timely. Given the conflicting findings across the various outcomes, a meta-analysis might begin to clarify how autonomy supportive parenting relates to academic achievement and psychosocial functioning. Further, the literature has suggested that a number of theoretical and methodological factors, described above, may influence the relation between parental autonomy support and students' adaptive functioning. A meta-analysis provides a means to assess the impact of these variations that occur both within and between studies.

The following predictions were made concerning the relations between parental autonomy support, autonomous motivation, psychological health, and academic achievement. Parental autonomy support will have a positive overall relation with both adaptive psychosocial outcomes and academic achievement. Further, given the discussed findings regarding the potential moderators, the positive relation of parental autonomy support on adaptive psychosocial outcomes and academic achievement will be stronger when the following moderators are present: (a) when the grade level is middle or high school, (b) when the agent of support is both parents, (c) when the outcome is well aligned with the domain of support, and (d) when the autonomy support respondent is the student.

Method

Literature Search Procedures

We used an assortment of search strategies to retrieve both published and unpublished work examining the influence of parental autonomy support. First, computer searches of the following electronic reference databases were conducted: PsycINFO, Educational Resources Information Clearinghouse (ERIC), Proquest Dissertations and Theses, and Google Scholar. For each database, a series of search terms was employed: *autonom** and (*parent** or *mother** or *father** or *patern** or *matern**), applying the appropriate truncation and Boolean techniques to achieve an inclusive yet focused search. In addition, Social Sciences Citation Index was searched for documents that had cited seminal articles on parent autonomy support: Grolnick and Ryan (1989), Deci and Ryan (1987), Grolnick and Ryan (1987), and Pomerantz et al. (2007). These searches located a total of 6839 non-duplicate, potentially relevant documents.

To supplement searches of electronic databases and obtain any research that might not be found through computer searches, the reference sections of relevant documents were examined for cited works that also might be applicable to the topic. In addition, two direct contact strategies were employed to ensure items were requested from sources that might have access to parental autonomy support research not included in the reference and citation databases. First, requests for unpublished research were sent through the following listservs: Motivation in Education Special Interest Group from the American Education Research Association, Society for Personality and Social Psychology, Society of Research in Child Development,

and Society of Research in Adolescence. Second, requests were sent via electronic mail to prominent researchers in the motivation and autonomy support areas that had two or more reports on the topic regarding access to any relevant data that were not publicly available.

Each title and abstract was examined by the first and third authors. If either researcher judged the abstract to indicate that the paper contained data relevant to the relation between parental autonomy support and an achievement-related or psychosocial outcome, the full document was obtained for further examination.

Criteria for Including Studies

To be included in the meta-analysis, studies were required to meet several criteria. First, all studies must have examined the relation between parental autonomy support and outcomes related to either educational or psychosocial functioning among students in preschool through college.

Academic achievement was the most commonly examined outcome and was measured in the following ways, performance on a specific academic task, non-standardized test score or scores (i.e., end of unit test scores, researcher developed test, or teacher developed test), standardized test scores, course grades, GPA, homework completion, or homework grades. Psychosocial functioning included assessments of children's motivation and emotion, such as autonomous motivation, psychological health, perceived competence, engagement and effort, perceived control, attitudes toward school, extrinsic motivation, executive functioning, and self-regulation. All psychosocial functioning measures were self-reported, with the exception of engagement and effort measures and executive functioning measures, which also included some behavioral observations. Autonomous motivation included measures of academic intrinsic motivation, identified regulation, and the Relative Autonomy Index (RAI), a measure that weights and subtracts extrinsic forms of motivation from intrinsic and identified regulation. All autonomous motivation measures reflected motivation that is generated from inside the individual. Psychological health included both measures of self-esteem and well-being, which broadly encompassed measures of global life satisfaction, positive attitudes toward self, and positive emotions toward life in general. The very small minority of studies (<2) had a non-general assessment of psychological health. Perceived competence was assessed with measures of whether children feel they are able to succeed at an activity or an academic domain. Engagement and effort captured cognitive engagement or the use of cognitive strategies (i.e., elaboration, linking information to prior knowledge) while engaging in academic and non-academic tasks and overall effort placed on a task or activity through both self-reports and observations of the behavior. Perceived control measured children's understanding of the control they have over their actions and their success or failure, also often in the academic domain. Attitudes toward school measured positive school attitudes and school satisfaction. Extrinsic motivation included measures of academic extrinsic motivation and introjected motivation. That is, motivation that is exclusively generated from outside the individual. Executive functioning included measures of higher-order cognitive processes, such as inhibitory control and working memory, all through observations of certain behavior such as on delay of gratification tasks or a baby Stroop test. The single measure of self-regulation examined five aspects: goal setting, self-efficacy for goal achievement, use of task strategies, self-motivation, self-monitoring, and self-evaluation.

Autonomy support could have been measured in many ways, including through observation or self-report by either the child or parent. Although autonomy support was

operationalized in a variety of ways across research studies, autonomy support was broadly defined as parents encouraging and providing children with opportunities for choice making and opinion exchange.

The studies included in the meta-analysis were all correlational in which the extent of parental autonomy support and the level of the outcome were measured, generally, as they naturally occur. The design of the studies must have involved the calculation of a bivariate correlation coefficient between parental autonomy support and achievement or psychosocial functioning or provided enough information for us to compute this effect.

Finally, one sampling restriction was placed on the included studies. Studies may include non-US participants, but only if the study was written in English, given the language limitations of the research team. All non-English studies were excluded.

Due to the requirements that all studies must include a correlation between a measure of parental autonomy support (previously defined) and outcomes related to education or psychosocial functioning (described above), 36 articles were retained for analysis. Most studies were excluded because they measured some other parenting construct and did not measure specifically autonomy supportive parenting. Some studies were excluded because correlations could not be obtained from the information provided. Several studies were excluded because their outcome did not fit within the previously defined outcome list, for example they may have focused on depressive symptoms. A couple studies were excluded because an experimental design was used in which parents were trained to be autonomy-supportive or parental autonomy support was intentionally manipulated. While we would have liked to include and meta-analyze these studies separately, there were so few studies of this nature that we thought it best to exclude them from the analyses presented here.

Information Retrieved from Studies

Numerous characteristics of each study were coded when available. These characteristics encompassed six broad distinctions among studies: (a) the research report, (b) the study characteristics, (c) the characteristics of the participants, (d) the measure of autonomy support, (e) the measure of achievement or psychosocial functioning, and (f) the estimate of the relation between parental autonomy support and the outcome. We used simple bivariate correlation coefficients, r , as measures of the direction and magnitude of the relation. Table 1 presents the characteristics coded.

Coder Reliability

Two of four graduate and undergraduate student coders extracted information from each report selected for inclusion. Discrepancies were noted and discussed by the coders, and if agreement was not reached, the second author was consulted. The agreement between coders averaged 92 % for all the articles coded across all items before discrepancies were resolved. Evidence suggests that the process used results in high reliability (Rosenthal 1987).

Methods of Data Integration

Before conducting any statistical integration of the effect sizes, the number of positive and negative effects was counted and the range of effects was assessed. We examined the distribution of sample sizes and effect sizes to determine whether any studies contained

Table 1 Complete list of information retrieved from studies

Report characteristics

1. Author name
2. Year
3. Type of report (journal article, book, dissertation, thesis, government paper, conference paper, other)
4. Was this peer-reviewed?

Study information

1. Participants location (in the USA, in a country outside the USA)
 - a. Specify
2. Community type (urban, suburban, rural, cannot tell)
3. Setting (home, school, lab, sport, other)

Participant and sample characteristics

1. Student labels (gifted, above average ability/achievement, average ability/achievement, at risk, low ability/below grade level, possessing a learning deficit, other)
2. Socioeconomic status (low, low-middle, middle, middle-upper, upper, mixed, no information)
3. Grade level
4. Sex
5. Ethnicities (White, African American, Asian American, Hispanic, Native American, other)
6. Percentages of ethnicities

Parental autonomy support measure characteristics

1. Domain (general, general academics, mathematics, science, English language arts, sports, social studies, music/arts, other)
2. Agent of support (both parents, mother, father)
3. How was autonomy support measured? (observation, child scale, parent scale)
4. Self-report (existing validated scale, created for the study scale)
5. Name of measure, Cronbach's alpha
6. Type of autonomy support (general multidimensional, offering choice, attending to student perspective, creating relevance, providing encouragement, providing rationale, asking what child wants, providing information feedback, offering hints, other)

Outcome measure

1. Outcome
 - a. Academic achievement (task performance, non-standardized test score, standardized test score, course grades, GPA, homework completion, homework grades, other)
 - b. Psychosocial functioning (intrinsic motivation, identified regulation, integrated regulation, interjected regulation, extrinsic motivation, enjoyment, interest, situational interest, individual interest, positive emotions, negative emotions, perceived competence, expectancies for success, perceived autonomy, cognitive engagement, behavioral engagement, effort, persistence, re-engagement with domain, positive school attitudes, negative school attitudes, task value, intrinsic value, attainment value, utility value, self-esteem/self-worth, self-acceptance, self-concept, creativity, executive functioning)
2. Outcome measured (behavior, self-report)
 - a. Behavioral measure (report from student, observed by teacher, observed by parent, observed by researcher)
 - b. Self-report (existing scale, created for the study scale)
3. Name of measure, Cronbach's alpha
4. Domain of outcome (general non-school, school in general, math, science, English language arts, social studies, sports, music/arts, other)
5. Delay?
6. Attrition?

Table 1 (continued)

Effect size information

1. Total sample size
2. Direction of the effect
3. Effect size

statistical outliers. Grubbs (1950) test was applied, and if outliers were identified, these values were Winsorized by setting them at the value of their next nearest neighbor.

Both published and unpublished studies were included in the synthesis. There is still the possibility that not all studies investigating the relation between parental autonomy support and achievement or psychosocial functioning were obtained. Therefore, Duval and Tweedie's (2000) trim-and-fill procedure was employed. The trim-and-fill procedure tests whether the distribution of effect sizes used in the analyses was consistent with that expected if the estimates were normally distributed.

The inverse-variance weighting procedure was used to calculate average effect sizes across all comparisons. Ninety-five percent confidence intervals were calculated. If the confidence interval did not contain zero, then the null hypothesis that parental autonomy support had no relation to the achievement-related or psychosocial functioning-related outcome was rejected. Possible moderators of the parental autonomy support relation were tested via homogeneity analyses (Cooper and Hedges 1994; Hedges and Olkin 1985). Meta-regression analysis was conducted to examine the role of Cronbach's alpha as a measure of quality of study in explaining variability in correlations. To hold violations of independence to a minimum while retaining as much information as possible, we used a shifting unit of analysis approach (see Cooper 2010 for a description). In this approach, multiple correlations for the same outcome within a sample are averaged so that each sample contributes only one effect to the overall analysis or each category of a moderator.

All analyses were conducted twice, once using fixed-effect assumptions and once employing random-effect assumptions (Hedges and Vevea 1998). In a fixed-effect model, we assume that the only source of error explaining why the effect size varies from one study to another is due to sampling error or differences among participants across studies. However, it is also possible to view studies as containing other random influences. For example, in a random effect model, a study-level variance component is assumed to be an additional source of random variation. Rather than opt for a single model of error, we chose to apply both models to our data. Through conducting these sensitivity analyses (Greenhouse and Iyengar 1994), we could examine the effects of different assumptions on the outcomes of the synthesis.

To limit our discussion of these results, we focus on those moderator analyses that were significant under both fixed-effect and random-effect assumptions. All statistical analyses were conducted with the comprehensive meta-analysis (CMA) statistical software package (Borenstein et al. 2005). Moderator analysis was conducted only when sufficient moderator information was present. Consequently, some outcomes did not have all moderators analyzed due to a lack of data.

Results

Studies Correlating Parental Autonomy Support and Academic Achievement

The literature search uncovered 20 studies that estimated the correlation between parental autonomy support and a measure of academic achievement. The 20 studies reported 88 separate correlations based on 29 independent samples of students. Of those correlations, 25 measured GPA, 34 measured course grades, 28 measured standardized tests, and 1 measured task performance. Of the 88 correlations, 19 were from an elementary school sample, 30 were from a middle school sample, 22 were from a high school sample, 5 were from a college sample, and 12 were from a mixed grade level sample. Thirty-five of the correlations reported had agent of support as both parents, 16 correlations reported father as agent of support, and 37 reported mother as the agent of support. The characteristics of these studies are listed in Table 2.

The 20 studies were published between the years 1986 and 2011. The sample sizes ranged from 48 to 805, with a median size of 77. The mean sample size was 174.68, with a standard deviation of 190.01, suggesting a normal distribution. Grubbs test did not reveal any significant outliers among sample sizes or correlations. The effect sizes of the correlations ranged from $-.33$ to $.50$. There were 72 positive effects, 15 negative effects, and 1 effect for which the correlation was zero.

Overall Correlation The weighted average correlation was $r=.11$ (95 % CI=.08, .13) under a fixed-error model and $r=.12$ (95 % CI=.07, .16) under a random-error model (see Table 3 for overall effects), $Q(28)=94$, $p<.001$. Trim-and-fill analyses indicated that the relation between parental autonomy support and achievement would be positive and significantly different from zero, although the magnitude was reduced slightly, even after imputing six missing values under a fixed-effect model and seven missing values under a random-effect model. The results of the trim and fill analysis for achievement, as well as every other outcome, can be found in Table 4. In addition, a moderator analysis indicated that there was no difference between the average effects of published and unpublished reports (see Table 6). Regarding study quality, meta-regressions assessing whether a sample's Cronbach's alpha for the measure of parental autonomy support moderates the correlation with academic achievement were not significant under fixed or random effects (see Table 5).

Moderator Analyses Next, additional moderator analyses were performed on the relation between parental autonomy support and academic achievement using six moderators: grade level, agent of support, autonomy support respondent, domain of autonomy support, outcome, and domain of outcome (see Table 6). Three moderators, autonomy support respondent, agent of support, and domain of autonomy support, were significant under fixed-effect assumptions, but none of the moderators remained significant when a random-effect model was implemented. Autonomy support respondent, agent of support, and domain of autonomy support did not significantly explain variability in the correlations between autonomy support and achievement under either fixed or random-error assumptions.

Table 2 Characteristics of studies correlating parental autonomy support and reported outcomes

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Anneare and Yates (2010)	Journal article	92	Middle school	No	Parent scale	Mother	General	Positive school attitudes	General academics	+23
Anneare and Yates (2010)	Journal article	92	Middle school	No	Parent scale	Father	General	Positive school attitudes	General academics	+02
Beiswenger and Grolnick (2010)	Journal article	142	Middle school	No	Child scale	Mother	General	Well-being	Non-school	+27
Beiswenger and Grolnick (2010)	Journal article	142	Middle school	No	Child scale	Father	General	Well-being	Non-school	+30
Beiswenger and Grolnick (2010)	Journal article	142	Middle school	No	Child scale	Mother	General	Intrinsic motivation	Non-school	+06
Beiswenger and Grolnick (2010)	Journal article	142	Middle school	No	Child scale	Mother	General	Identified regulation	Non-school	+03
Beiswenger and Grolnick (2010)	Journal article	142	Middle school	No	Child scale	Father	General	Intrinsic motivation	Non-school	+12
Beiswenger and Grolnick (2010)	Journal article	142	Middle school	No	Child scale	Father	General	Identified regulation	Non-school	+02
Beiswenger and Grolnick (2010)	Journal article	142	Middle school	No	Child scale	Mother	General	Relative Autonomy Index	Non-school	0
Beiswenger and Grolnick (2010)	Journal article	142	Middle school	No	Child scale	Father	General	Relative Autonomy Index	Non-school	+07
Beiswenger and Grolnick (2010)	Journal article	142	Middle school	No	Child scale	Mother	General	Perceptions of competence	Non-school	+10
Beiswenger and Grolnick (2010)	Journal article	142	Middle school	No	Child scale	Father	General	Perceptions of competence	Non-school	+14
Beiswenger and Grolnick (2010)	Journal article	142	Middle school	No	Child scale	Mother	General	Extrinsic motivation	Non-school	-11
Beiswenger and Grolnick (2010)	Journal article	142	Middle school	No	Child scale	Mother	General	Interjected regulation	Non-school	+08
Beiswenger and Grolnick (2010)	Journal article	142	Middle school	No	Child scale	Father	General	Extrinsic motivation	Non-school	-12

Table 2 (continued)

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Beiswenger and Grolnick (2010)	Journal article	142	Middle school	No	Child scale	Father	General	Interjected regulation	Non-school	+03
Bemier et al. (2010)	Journal article	80	None reported	Yes	Observation	Mother	General	Executive functioning	Non-school	+38
Bemier et al. (2010)	Journal article	80	None reported	Yes	Observation	Mother	General	Executive functioning	Non-school	+25
Bemier et al. (2010)	Journal article	80	None reported	Yes	Observation	Mother	General	Executive functioning	Non-school	+13
Bemier et al. (2010)	Journal article	80	None reported	Yes	Observation	Mother	General	Executive functioning	Non-school	+31
Birman and Espino (2007)	Journal article	120	High school	No	Parent scale	Both parents	General	GPA	General academics	-33
Blackwelder (2006)	MA Thesis	217	College	No	Child scale	Both parents	General	Course grades	General academics	+15
Blackwelder (2006)	MA Thesis	217	College	No	Child scale	Both parents	General	Perceptions of control	General academics	+26
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale	Mother	Academics	GPA	General academics	-03
Bronstein et al. (2005)	Journal article	77	Middle school	Yes	Child scale	Mother	Academics	GPA	General academics	-07
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale	Mother	Academics	Standardized test scores	General academics	-25
Bronstein et al. (2005)	Journal article	77	Middle school	Yes	Child scale	Mother	Academics	Standardized test scores	General academics	-02
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale	Mother	Academics	GPA	General academics	+24
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale	Mother	Academics	Standardized test scores	General academics	+18
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale, parent scale	Both parents	Academics	GPA	General academics	+19
Bronstein et al. (2005)	Journal article	77	Middle school	Yes	Child scale, parent scale	Both parents	Academics	GPA	General academics	+15
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale, parent scale	Both parents	Academics	Standardized test scores	General academics	+25
Bronstein et al. (2005)	Journal article	77	Middle school	Yes	Child scale, parent scale	Both parents	Academics	Standardized test scores	General academics	+11
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale, parent scale	Both parents	Academics	GPA	General academics	+17

Table 2 (continued)

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale, parent scale	Both parents	Academics	Standardized test scores	General academics	+25
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale, parent scale	Both parents	Academics	GPA	General academics	+15
Bronstein et al. (2005)	Journal article	77	Middle school	Yes	Child scale, parent scale	Both parents	Academics	GPA	General academics	+17
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale, parent scale	Both parents	Academics	Standardized test scores	General academics	+19
Bronstein et al. (2005)	Journal article	77	Middle school	Yes	Child scale, parent scale	Both parents	Academics	Standardized test scores	General academics	+21
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale, parent scale	Both parents	Academics	GPA	General academics	+32
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale, parent scale	Both parents	Academics	Standardized test scores	General academics	+42
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale	Mother	Academics	Perceptions of competence	General academics	+23
Bronstein et al. (2005)	Journal article	77	Middle school	Yes	Child scale	Mother	Academics	Perceptions of competence	General academics	+27
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale	Mother	Academics	Perceptions of competence	General academics	+28
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale	Both parents	Academics	Perceptions of competence	General academics	+27
Bronstein et al. (2005)	Journal article	77	Middle school	Yes	Child scale	Both parents	Academics	Perceptions of competence	General academics	+21
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale	Both parents	Academics	Perceptions of competence	General academics	+24
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale	Both parents	Academics	Perceptions of competence	General academics	+26
Bronstein et al. (2005)	Journal article	77	Middle school	Yes	Child scale	Both parents	Academics	Perceptions of competence	General academics	+25

Table 2 (continued)

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale	Both parents	Academics	Perceptions of competence	General academics	+21
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale	Mother	Academics	Intrinsic motivation	General academics	+18
Bronstein et al. (2005)	Journal article	77	Middle school	Yes	Child scale	Mother	Academics	Intrinsic motivation	General academics	+30
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale	Mother	Academics	Intrinsic motivation	General academics	+29
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale, parent scale	Both parents	Academics	Intrinsic motivation	General academics	+19
Bronstein et al. (2005)	Journal article	77	Middle school	Yes	Child scale, parent scale	Both parents	Academics	Intrinsic motivation	General academics	+12
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale, parent scale	Both parents	Academics	Intrinsic motivation	General academics	+22
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale, parent scale	Both parents	Academics	Intrinsic motivation	General academics	+19
Bronstein et al. (2005)	Journal article	77	Middle school	Yes	Child scale, parent scale	Both parents	Academics	Intrinsic motivation	General academics	+19
Bronstein et al. (2005)	Journal article	77	Middle school	No	Child scale, parent scale	Both parents	Academics	Intrinsic motivation	General academics	+32
Chirkov and Ryan (2001)	Journal article	116	High school	No	Child scale	Both parents	General	Self-esteem	General academics	+40
Chirkov and Ryan (2001)	Journal article	120	High school	No	Child scale	Both parents	General	Self-esteem	General academics	+54
Chirkov and Ryan (2001)	Journal article	116	High school	No	Child scale	Both parents	General	Identified regulation	General academics	+38
Chirkov and Ryan (2001)	Journal article	116	High school	No	Child scale	Both parents	General	Intrinsic motivation	General academics	+14
Chirkov and Ryan (2001)	Journal article	120	High school	No	Child scale	Both parents	General	Identified regulation	General academics	+47
Chirkov and Ryan (2001)	Journal article	120	High school	No	Child scale	Both parents	General	Intrinsic motivation	General academics	+16

Table 2 (continued)

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Chirkov and Ryan (2001)	Journal article	116	High school	No	Child scale	Both parents	General	Extrinsic motivation	General academics	−.21
Chirkov and Ryan (2001)	Journal article	116	High school	No	Child scale	Both parents	General	Interjected regulation	General academics	−.26
Chirkov and Ryan (2001)	Journal article	120	High school	No	Child scale	Both parents	General	Extrinsic motivation	General academics	+.06
Chirkov and Ryan (2001)	Journal article	120	High school	No	Child scale	Both parents	General	Interjected regulation	General academics	+.15
Cleveland et al. (2007)	Journal article	28	Pre-K	Yes	Observation	Both parents	General	Engagement	Non-school	+.38
Cooper et al. (2000)	Journal article	709	Mixed	No	Parent scale	Both parents	Academics	Standardized test scores	General academics	+.15
Cooper et al. (2000)	Journal article	709	Mixed	No	Parent scale	Both parents	Academics	Course grades	General academics	+.13
Cooper et al. (2000)	Journal article	709	Mixed	No	Parent scale	Both parents	Academics	Positive school attitudes	General academics	+.02
Dai (1998)	Dissertation	153	High school	No	Child scale	Both parents	General	Course grades	General academics	+.12
Dai (1998)	Dissertation	266	High school	No	Child scale	Both parents	General	Course grades	General academics	+.07
Dai (1998)	Dissertation	153	High school	No	Child scale	Both parents	General	Self-esteem	General academics	+.28
Dai (1998)	Dissertation	266	High school	No	Child scale	Both parents	General	Self-esteem	General academics	+.15
Dai (1998)	Dissertation	153	High school	No	Child scale	Both parents	General	Identified regulation	General academics	+.21
Dai (1998)	Dissertation	153	High school	No	Child scale	Both parents	General	Intrinsic motivation	General academics	+.20
Dai (1998)	Dissertation	266	High school	No	Child scale	Both parents	General	Identified regulation	General academics	+.41
Dai (1998)	Dissertation	266	High school	No	Child scale	Both parents	General	Intrinsic motivation	General academics	+.22
Dai (1998)	Dissertation	153	High school	No	Child scale	Both parents	General	Engagement	General academics	+.19
Dai (1998)	Dissertation	266	High school	No	Child scale	Both parents	General	Engagement	General academics	+.25
Dai (1998)	Dissertation	153	High school	No	Child scale	Both parents	General	Interjected regulation	General academics	−.25
Dai (1998)	Dissertation	266	High school	No	Child scale	Both parents	General	Interjected regulation	General academics	−.31
d'Ailly (2002)	Conference Paper	805	Mixed	No	Child scale	Mother	General	Course grades	General academics	+.05
d'Ailly (2002)	Conference Paper	805	Mixed	No	Child scale	Father	General	Course grades	General academics	−.01

Table 2 (continued)

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
d'Ailly (2002)	Conference Paper	740	Mixed	No	Child scale	Mother	General	Course grades	General academics	+01
d'Ailly (2002)	Conference Paper	740	Mixed	No	Child scale	Father	General	Course grades	General academics	-01
d'Ailly (2002)	Conference Paper	805	Mixed	No	Child scale	Mother	General	Relative Autonomy Index	General academics	+27
d'Ailly (2002)	Conference Paper	805	Mixed	No	Child scale	Father	General	Relative Autonomy Index	General academics	+10
d'Ailly (2002)	Conference Paper	740	Mixed	No	Child scale	Mother	General	Relative Autonomy Index	General academics	+21
d'Ailly (2002)	Conference Paper	740	Mixed	No	Child scale	Father	General	Relative Autonomy Index	General academics	+07
d'Ailly (2002)	Conference Paper	805	Mixed	No	Child scale	Mother	General	Perceptions of control	General academics	+24
d'Ailly (2002)	Conference Paper	805	Mixed	No	Child scale	Father	General	Perceptions of control	General academics	+10
d'Ailly (2002)	Conference Paper	740	Mixed	No	Child scale	Mother	General	Perceptions of control	General academics	+14
d'Ailly (2002)	Conference Paper	740	Mixed	No	Child scale	Father	General	Perceptions of control	General academics	-02
d'Ailly (2002)	Conference Paper	805	Mixed	No	Child scale	Mother	General	Effort	General academics	+06
d'Ailly (2002)	Conference Paper	805	Mixed	No	Child scale	Father	General	Effort	General academics	+03
d'Ailly (2002)	Conference Paper	740	Mixed	No	Child scale	Mother	General	Effort	General academics	+03
d'Ailly (2002)	Conference Paper	740	Mixed	No	Child scale	Father	General	Effort	General academics	0
Deslandes et al. (1997)	Journal article	525	High school	No	Child scale	Both parents	Academics	GPA	General academics	+13
Downie et al. (2007)	Journal article	105	College	No	Child scale	Both parents	General	Well-being	Non-school	+33
Downie et al. (2007)	Journal article	105	College	No	Child scale	Mother	General	Well-being	Non-school	+31
Downie et al. (2007)	Journal article	105	College	No	Child scale	Father	General	Well-being	Non-school	+30
Downie et al. (2007)	Journal article	125	College	No	Child scale	Both parents	General	Well-being	Non-school	+27
Fei-Yin Ng et al. (2004)	Journal article	121	Elementary school	No	Parent scale	Mother	Academics	Course grades	General academics	-03
Fei-Yin Ng et al. (2004)	Journal article	121	Elementary school	No	Parent scale	Mother	Academics	Course grades	General academics	+12
Fei-Yin Ng et al. (2004)	Journal article	110	Elementary school	No	Parent scale	Mother	Other	Task performance	Digit search task	+39

Table 2 (continued)

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Fei-Yin Ng et al. (2004)	Journal article	110	Elementary school	No	Observation	Mother	Other	Engagement	Digit search task	+21
Ferguson et al. (2011)	Journal article	322	High school	No	Child scale	Both parents	General	Well-being	Non-school	+59
Ferguson et al. (2011)	Journal article	99	High school	No	Child scale	Both parents	General	Well-being	Non-school	+48
Ferguson et al. (2011)	Journal article	125	High school	No	Child scale	Both parents	General	Well-being	Non-school	+46
Ferguson et al. (2011)	Journal article	98	High school	No	Child scale	Both parents	General	Well-being	Non-school	+48
Ferguson et al. (2011)	Journal article	322	High school	No	Child scale	Both parents	General	Positive school attitudes	General academics	+37
Ferguson et al. (2011)	Journal article	99	High school	No	Child scale	Both parents	General	Positive school attitudes	General academics	+45
Ferguson et al. (2011)	Journal article	125	High school	No	Child scale	Both parents	General	Positive school attitudes	General academics	+22
Ferguson et al. (2011)	Journal article	98	High school	No	Child scale	Both parents	General	Positive school attitudes	General academics	+16
Fulton and Turner (2008)	Journal article	85	College	No	Child scale	Both parents	General	GPA	General academics	−03
Fulton and Turner (2008)	Journal article	160	College	No	Child scale	Both parents	General	GPA	General academics	+23
Fulton and Turner (2008)	Journal article	85	College	No	Child scale	Both parents	General	Perceptions of control	General academics	+25
Fulton and Turner (2008)	Journal article	160	College	No	Child scale	Both parents	General	Perceptions of control	General academics	+23
Gagné (2003)	Journal article	118	College	No	Child scale	Both parents	General	Intrinsic motivation	Non-school	+17
Gagné (2003)	Journal article	118	College	No	Child scale	Mother	General	Intrinsic motivation	Non-school	+22
Gagné (2003)	Journal article	118	College	No	Child scale	Father	General	Intrinsic motivation	Non-school	+23
Gagné (2003)	Journal article	118	College	No	Child scale	Both parents	General	Engagement	Non-school	+05
Gagné (2003)	Journal article	118	College	No	Child scale	Mother	General	Engagement	Non-school	+22
Gagné (2003)	Journal article	118	College	No	Child scale	Father	General	Engagement	Non-school	+16
Gonzalez and Wolters (2006)	Journal article	140	High school	No	Child scale	Both parents	General	Relative Autonomy Index	General academics	+29
Grohnick (1986)	Dissertation	48	Elementary school	No	Observation	Mother	General	Standardized test scores	General academics	+10

Table 2 (continued)

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Mother	General	Course grades	General academics	+36
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Father	General	Standardized test scores	General academics	+13
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Father	General	Course grades	General academics	+06
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Both parents	General	Standardized test scores	General academics	+30
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Both parents	General	Course grades	General academics	+46
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Both parents	General	Perceptions of competence	General academics	+10
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Mother	General	Perceptions of competence	General academics	+14
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Father	General	Perceptions of competence	General academics	+26
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Mother	General	Identified regulation	General academics	+13
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Mother	General	Intrinsic motivation	General academics	+10
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Father	General	Identified regulation	General academics	-.04
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Father	General	Intrinsic motivation	General academics	+15
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Both parents	General	Identified regulation	General academics	-.06
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Both parents	General	Intrinsic motivation	General academics	+14
Grolnick (1986)	Dissertation	48	Elementary school	Yes	Observation	Mother	General	Identified regulation	General academics	+11
Grolnick (1986)	Dissertation	48	Elementary school	Yes	Observation	Mother	General	Intrinsic motivation	General academics	+14
Grolnick (1986)	Dissertation	48	Elementary school	Yes	Observation	Father	General	Identified regulation	General academics	+25
Grolnick (1986)	Dissertation	48	Elementary school	Yes	Observation	Father	General	Intrinsic motivation	General academics	+30
Grolnick (1986)	Dissertation	48	Elementary school	Yes	Observation	Both parents	General	Identified regulation	General academics	+12
Grolnick (1986)	Dissertation	48	Elementary school	Yes	Observation	Both parents	General	Intrinsic motivation	General academics	+14
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Mother	General	Extrinsic motivation	General academics	-18
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Mother	General	Interjected regulation	General academics	0
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Father	General	Extrinsic motivation	General academics	-17
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Father	General	Interjected regulation	General academics	-12

Table 2 (continued)

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Both parents	General	Extrinsic motivation	General academics	−.32
Grolnick (1986)	Dissertation	48	Elementary school	No	Observation	Both parents	General	Interjected regulation	General academics	−.13
Grolnick (1986)	Dissertation	48	Elementary school	Yes	Observation	Mother	General	Extrinsic motivation	General academics	−.28
Grolnick (1986)	Dissertation	48	Elementary school	Yes	Observation	Mother	General	Interjected regulation	General academics	+ .06
Grolnick (1986)	Dissertation	48	Elementary school	Yes	Observation	Father	General	Extrinsic motivation	General academics	−.17
Grolnick (1986)	Dissertation	48	Elementary school	Yes	Observation	Father	General	Interjected regulation	General academics	+ .10
Grolnick (1986)	Dissertation	48	Elementary school	Yes	Observation	Both parents	General	Extrinsic motivation	General academics	−.27
Grolnick (1986)	Dissertation	48	Elementary school	Yes	Observation	Both parents	General	Interjected regulation	General academics	+ .11
Grolnick and Ryan (1989)	Journal article	66	Mixed	No	Observation	Mother	General	Standardized test scores	General academics	+ .19
Grolnick and Ryan (1989)	Journal article	66	Mixed	No	Observation	Father	General	Standardized test scores	General academics	+ .34
Grolnick and Ryan (1989)	Journal article	66	Mixed	No	Observation	Both parents	General	Standardized test scores	General academics	+ .30
Grolnick and Ryan (1989)	Journal article	66	Mixed	No	Observation	Mother	General	Course grades	General academics	+ .46
Grolnick and Ryan (1989)	Journal article	66	Mixed	No	Observation	Father	General	Course grades	General academics	+ .33
Grolnick and Ryan (1989)	Journal article	66	Mixed	No	Observation	Both parents	General	Course grades	General academics	+ .46
Grolnick and Ryan (1989)	Journal article	66	Mixed	No	Observation	Both parents	General	Relative Autonomy Index	General academics	+ .36
Grolnick and Ryan (1989)	Journal article	66	Mixed	No	Observation	Mother	General	Relative Autonomy Index	General academics	+ .22
Grolnick and Ryan (1989)	Journal article	66	Mixed	No	Observation	Father	General	Relative Autonomy Index	General academics	+ .34
Grolnick and Ryan (1989)	Journal article	66	Mixed	No	Observation	Both parents	General	Perceptions of competence	General academics	+ .15
Grolnick and Ryan (1989)	Journal article	66	Mixed	No	Observation	Mother	General	Perceptions of competence	General academics	+ .31
Grolnick and Ryan (1989)	Journal article	66	Mixed	No	Observation	Father	General	Perceptions of competence	General academics	+ .26
Grolnick and Ryan (1989)	Journal article	66	Mixed	No	Observation	Both parents	General	Perceptions of control	Non-school	−.27
Grolnick and Ryan (1989)	Journal article	66	Mixed	No	Observation	Mother	General	Perceptions of control	Non-school	−.19

Table 2 (continued)

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Grolnick and Ryan (1989)	Journal article	66	Mixed	No	Observation	Father	General	Perceptions of control	Non-school	-27
Grolnick et al. (1991)	Journal article	456	Elementary school	No	Child scale	Mother	General	Course grades	General academics	+06
Grolnick et al. (1991)	Journal article	456	Elementary school	No	Child scale	Mother	General	Standardized test scores	General academics	+10
Grolnick et al. (1991)	Journal article	456	Elementary school	No	Child scale	Father	General	Course grades	General academics	+03
Grolnick et al. (1991)	Journal article	456	Elementary school	No	Child scale	Father	General	Standardized test scores	General academics	+02
Grolnick et al. (1991)	Journal article	456	Elementary school	No	Child scale	Mother	General	Relative Autonomy Index	General academics	+23
Grolnick et al. (1991)	Journal article	456	Elementary school	No	Child scale	Father	General	Relative Autonomy Index	General academics	+20
Grolnick et al. (1991)	Journal article	456	Elementary school	No	Child scale	Mother	General	Perceptions of competence	General academics	+27
Grolnick et al. (1991)	Journal article	456	Elementary school	No	Child scale	Father	General	Perceptions of competence	General academics	+20
Grolnick et al. (2000)	Journal article	60	Middle school	No	Child scale	Mother	Academics	Course grades	English language arts	+05
Grolnick et al. (2000)	Journal article	60	Middle school	No	Child scale	Mother	Academics	Course grades	Math	-18
Grolnick et al. (2000)	Journal article	60	Middle school	Yes	Child scale	Mother	Academics	Course grades	English language arts	-04
Grolnick et al. (2000)	Journal article	60	Middle school	Yes	Child scale	Mother	Academics	Course grades	Math	0
Grolnick et al. (2000)	Journal article	60	Middle school	No	Child scale	Mother	Academics	Course grades	English language arts	+47
Grolnick et al. (2000)	Journal article	60	Middle school	No	Child scale	Mother	Academics	Course grades	Math	+13
Grolnick et al. (2000)	Journal article	60	Middle school	No	Child scale	Mother	Academics	Self-esteem	Non-school	+14
Grolnick et al. (2000)	Journal article	60	Middle school	Yes	Child scale	Mother	Academics	Self-esteem	Non-school	-05
Grolnick et al. (2000)	Journal article	60	Middle school	No	Child scale	Mother	Academics	Self-esteem	Non-school	+22
Grolnick et al. (2000)	Journal article	60	Middle school	No	Child scale	Mother	Academics	Perceptions of competence	General academics	-15
Grolnick et al. (2000)	Journal article	60	Middle school	Yes	Child scale	Mother	Academics	Perceptions of competence	General academics	+01
Grolnick et al. (2000)	Journal article	60	Middle school	No	Child scale	Mother	Academics	Perceptions of competence	General academics	-01
Grolnick et al. (2000)	Journal article	60	Middle school	No	Child scale	Mother	Academics	Perceptions of control	Non-school	+21
Grolnick et al. (2000)	Journal article	60	Middle school	Yes	Child scale	Mother	Academics	Perceptions of control	Non-school	+16
Grolnick et al. (2000)	Journal article	60	Middle school	No	Child scale	Mother	Academics	Perceptions of control	Non-school	+36

Table 2 (continued)

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Grolnick et al. (2000)	Journal article	60	Middle school	No	Child scale	Mother	Academics	Autonomous motivation	General academics	+35
Grolnick et al. (2000)	Journal article	60	Middle school	Yes	Child scale	Mother	Academics	Autonomous Motivation	General academics	+10
Grolnick et al. (2000)	Journal article	60	Middle school	No	Child scale	Mother	Academics	Autonomous motivation	General academics	+09
Grolnick et al. (2002)	Journal article	60	Elementary school	No	Observation	Mother	Other (verbal)	Course Grades	General academics	-33
Grolnick et al. (2002)	Journal article	60	Elementary school	No	Observation	Mother	Other (verbal)	Course grades	General academics	+37
Grolnick et al. (2002)	Journal article	60	Elementary school	No	Observation	Mother	Other (non-verbal)	Course grades	General academics	-33
Grolnick et al. (2002)	Journal article	60	Elementary school	No	Observation	Mother	Other (non-verbal)	Course grades	General academics	+34
Halpern-Felsher (1994)	Dissertation	66	High school	No	Observation	Father	Academics	GPA	General academics	+34
Halpern-Felsher (1994)	Dissertation	66	High school	No	Observation	Mother	Academics	GPA	General academics	+50
Halpern-Felsher (1994)	Dissertation	66	High school	No	Observation	Father	Academics	Standardized test scores	Math	+24
Halpern-Felsher (1994)	Dissertation	66	High school	No	Observation	Mother	Academics	Standardized test scores	Math	+30
Halpern-Felsher (1994)	Dissertation	66	High school	No	Observation	Father	Academics	Standardized test scores	English language arts	+19
Halpern-Felsher (1994)	Dissertation	66	High school	No	Observation	Mother	Academics	Standardized test scores	English language arts	-07
Halpern-Felsher (1994)	Dissertation	66	High school	No	Observation	Father	Academics	GPA	General academics	+13
Halpern-Felsher (1994)	Dissertation	66	High school	No	Observation	Mother	Academics	GPA	General academics	+06
Halpern-Felsher (1994)	Dissertation	66	High school	No	Observation	Father	Academics	Standardized test scores	Math	+27
Halpern-Felsher (1994)	Dissertation	66	High school	No	Observation	Mother	Academics	Standardized test scores	Math	+21
Halpern-Felsher (1994)	Dissertation	66	High school	No	Observation	Father	Academics	Standardized test scores	English language arts	+32
Halpern-Felsher (1994)	Dissertation	66	High school	No	Observation	Mother	Academics	Standardized test scores	English language arts	+19
Halpern-Felsher (1994)	Dissertation	66	High school	No	Observation	Father	Academics	Self-esteem	Non-school	+20
Halpern-Felsher (1994)	Dissertation	66	High school	No	Observation	Mother	Academics	Self-esteem	Non-school	+40
Halpern-Felsher (1994)	Dissertation	66	High school	No	Observation	Father	Academics	Self-esteem	Non-school	+17
Halpern-Felsher (1994)	Dissertation	66	High school	No	Observation	Mother	Academics	Self-esteem	Non-school	+04
Hui et al. (2011)	Journal article	461	High school	No	Child scale	Mother	General Academics	Perceptions of competence	General academics	+31
Hui et al. (2011)	Journal article	461	High school	No	Child scale	Both parents	General Academics	Intrinsic motivation	General academics	+23
Jiang et al. (2011)	Journal article	218	High school	No	Child scale	Both parents	Academics	GPA	General academics	+10

Table 2 (continued)

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Jiang et al. (2011)	Journal article	271	High school	No	Child scale	Both parents	Academics	GPA	General academics	+22
Jiang et al. (2011)	Journal article	218	High school	No	Child scale	Both parents	Academics	Self-esteem	Non-school	+33
Jiang et al. (2011)	Journal article	271	High school	No	Child scale	Both parents	Academics	Self-esteem	Non-school	+18
Jiang et al. (2011)	Journal article	218	High school	No	Child scale	Both parents	Academics	Relative Autonomy Index	General academics	+23
Jiang et al. (2011)	Journal article	271	High school	No	Child scale	Both parents	Academics	Relative Autonomy Index	General academics	+35
Joussemet et al. (2005)	Journal article	132	Elementary school	No	Observation	Mother	General	Standardized test scores	Math	−06
Joussemet et al. (2005)	Journal article	132	Elementary school	No	Observation	Mother	General	Standardized test scores	English language arts	+16
Lekes et al. (2010)	Journal article	567	High school	No	Child scale	Both parents	General	Well-being	Non-school	+43
Lekes et al. (2010)	Journal article	515	High school	No	Child scale	Both parents	General	Well-being	Non-school	+36
Matte-Gagne and Bernier (2011)	Journal article	53	None reported	Yes	Observation	Mother	General	Executive functioning - conflict	Non-school	+46
Matte-Gagne and Bernier (2011)	Journal article	53	None reported	Yes	Observation	Mother	General	Executive functioning—impulse control	Non-school	+32
Purdie et al. (2004)	Journal article	214	High school	No	Parent scale	Both parents	General	Perceptions of competence	Non-school	+17
Purdie et al. (2004)	Journal article	214	High school	No	Child scale	Both parents	General	Perceptions of competence	Non-school	+04
Purdie et al. (2004)	Journal article	214	High school	No	Child scale	Both parents	General	Self-regulation	General academics	+26
Purdie et al. (2004)	Journal article	214	High school	No	Parent scale	Both parents	General	Self-regulation	General academics	+17
Robbins (1995)	Dissertation	177	College	No	Child scale	Both parents	General	Self-esteem	Non-school	+29
Robbins (1995)	Dissertation	177	College	No	Child scale	Mother	General	Self-esteem	Non-school	+25
Robbins (1995)	Dissertation	177	College	No	Child scale	Father	General	Self-esteem	Non-school	+25
Sheldon et al. (2009)	Journal article	1289	High school	No	Child scale	Mother	General	Intrinsic motivation	General academics	+17
Sheldon et al. (2009)	Journal article	1289	High school	No	Child scale	Father	General	Intrinsic motivation	General academics	+08
Sheldon et al. (2009)	Journal article	1289	High school	No	Child scale	Mother	General	Perceptions of competence	General academics	+24
Sheldon et al. (2009)	Journal article	1289	High school	No	Child scale	Father	General	Perceptions of competence	General academics	+24

Table 2 (continued)

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Soenens and Vansteenkiste (2005)	Journal article	328	High school	No	Child scale	Mother	General	GPA	General academics	+14
Soenens and Vansteenkiste (2005)	Journal article	328	High school	No	Child scale	Father	General	GPA	General academics	+09
Soenens and Vansteenkiste (2005)	Journal article	285	High school	No	Child scale	Mother	General	GPA	General academics	+13
Soenens and Vansteenkiste (2005)	Journal article	285	High school	No	Child scale	Father	General	GPA	General academics	+13
Soenens and Vansteenkiste (2005)	Journal article	328	High school	No	Child scale	Mother	General	Relative Autonomy Index	General academics	+14
Soenens and Vansteenkiste (2005)	Journal article	328	High school	No	Child scale	Mother	General	Relative Autonomy Index	Non-school	+15
Soenens and Vansteenkiste (2005)	Journal article	328	High school	No	Child scale	Father	General	Relative Autonomy Index	General academics	+15
Soenens and Vansteenkiste (2005)	Journal article	328	High school	No	Child scale	Father	General	Relative Autonomy Index	Non-school	+10
Soenens and Vansteenkiste (2005)	Journal article	285	High school	No	Child scale	Mother	General	Relative Autonomy Index	General academics	+24
Soenens and Vansteenkiste (2005)	Journal article	285	High school	No	Child scale	Mother	General	Relative Autonomy Index	Non-school	+26
Soenens and Vansteenkiste (2005)	Journal article	285	High school	No	Child scale	Father	General	Relative Autonomy Index	General academics	+16
Soenens and Vansteenkiste (2005)	Journal article	285	High school	No	Child scale	Father	General	Relative Autonomy Index	Non-school	+23
Soenens and Vansteenkiste (2005)	Journal article	328	High school	No	Child scale	Mother	General	Perceptions of competence	General academics	+14
Soenens and Vansteenkiste (2005)	Journal article	285	High school	No	Child scale	Mother	General	Perceptions of competence	Non-school	+09
Soenens and Vansteenkiste (2005)	Journal article	328	High school	No	Child scale	Father	General	Perceptions of competence	General academics	+13

Table 2 (continued)

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Soenens and Vansteenkiste (2005)	Journal article	285	High school	No	Child scale	Father	General	Perceptions of competence	Non-school	+09
Stiller and Ryan (1992)	Conference Paper	624	Middle school	No	Child scale	Both parents	General	Perceptions of control	Non-school	+22
Stiller and Ryan (1992)	Conference Paper	624	Middle school	No	Child scale	Both parents	General	Engagement	General academics	+24
Stiller and Ryan (1992)	Conference Paper	624	Middle school	No	Child scale	Both parents	General	Intrinsic motivation	General academics	+15
Strage and Brandt (1999)	Journal article	236	College	No	Child scale	Both parents	General	Overall GPA	General academics	+15
Strage and Brandt (1999)	Journal article	236	College	No	Child scale	Both parents	General	Major GPA	General academics	+03
Wang (2006)	Dissertation	433	Middle school	No	Child scale	Both parents	General	Course grades	General academics	+14
Wang (2006)	Dissertation	433	Middle school	Yes	Child scale	Both parents	General	Course grades	General academics	+17
Wang (2006)	Dissertation	433	Middle school	No	Child scale	Both parents	General	Course grades	General academics	+17
Wang (2006)	Dissertation	373	Middle school	No	Child scale	Both parents	General	Course grades	General academics	+28
Wang (2006)	Dissertation	373	Middle school	Yes	Child scale	Both parents	General	Course grades	General academics	+28
Wang (2006)	Dissertation	373	Middle school	No	Child scale	Both parents	General	Course grades	General academics	+24
Wang (2006)	Dissertation	433	Middle school	No	Child scale	Both parents	General	Well-being	Non-school	+47
Wang (2006)	Dissertation	433	Middle school	Yes	Child scale	Both parents	General	Well-being	Non-school	+45
Wang (2006)	Dissertation	433	Middle school	No	Child scale	Both parents	General	Well-being	Non-school	+44
Wang (2006)	Dissertation	373	Middle school	No	Child scale	Both parents	General	Well-being	Non-school	+47
Wang (2006)	Dissertation	373	Middle school	Yes	Child scale	Both parents	General	Well-being	Non-school	+50
Wang (2006)	Dissertation	373	Middle school	No	Child scale	Both parents	General	Well-being	Non-school	+55

Table 3 Results of overall analyses examining the correlation between parental autonomy support and reported outcomes

Outcome	<i>k</i>	<i>r</i>	95 % confidence interval		<i>Q</i>
			Low estimate	High estimate	
Academic achievement	29	.11*** (.12***)	.08 (.07)	.13 (.16)	94.00***
Autonomous motivation	22	.19** (.20**)	.17 (.17)	.21 (.24)	35.88*
Psychological health	21	.38*** (.36***)	.36 (.30)	.41 (.42)	98.70***
Perceived competence	10	.21*** (.20***)	.17 (.14)	.25 (.25)	15.92
Engagement and effort	8	.12*** (.16**)	.09 (.07)	.16 (.24)	30.85***
Perceived control	7	.15*** (.16***)	.12 (.09)	.18 (.23)	26.50**
Attitudes toward school	6	.22*** (.23**)	.16 (.08)	.28 (.37)	29.63***
Extrinsic motivation	6	.22*** (.23**)	.16 (.08)	.28 (.37)	29.63***
Executive functioning	2	.32** (.32**)	.16 (.16)	.47 (.47)	.58
Self-regulation	1	.22*** (.22***)	.08 (.08)	.34 (.34)	—

Note. Random-effect *Q* values and point estimates are presented in parentheses

* $p < .05$; ** $p < .01$; *** $p < .0001$

Studies Correlating Parental Autonomy Support and Autonomous Motivation

The literature search uncovered 16 studies that estimated the correlation between parental autonomy support and autonomous motivation. The 16 studies reported 65 separate correlations based on 22 independent samples of students (see Table 2). Of those correlations, 12 measured identified regulation as the outcome, 30 measured intrinsic motivation as the outcome, and 23 were measured using the RAI, which is a composite of intrinsic and identified motivation weighted against extrinsic motivation. Fourteen of the correlations represented an elementary school sample, 19 represented a middle school sample, 21 represented a high

Table 4 Trim-and-fill results

Outcome	Fixed effects trim-and-fill	Random effects trim-and-fill
Academic achievement	6 missing values FE: $r = .08$; CI = .06/.11 RE: $r = .08$; CI = .03/.13	7 missing values FE: $r = .08$; CI = .06/.10 RE: $r = .07$; CI = .03/.12
Autonomous motivation	None missing	None missing
Psychological health	None missing	None missing
Perceived competence	None missing	None missing
Engagement and effort	4 missing values FE: $r = .05$; CI = .02/.08 RE: $r = .07$; CI = -.03/.16	1 missing value FE: $r = .12$; CI = .08/.16 RE: $r = .15$; CI = .06/.23
Perceived control	2 missing values FE: $r = .14$; CI = .11/.17 RE: $r = .14$; CI = .07/.20	2 missing values FE: $r = .14$; CI = .11/.17 RE: $r = .14$; CI = .07/.20
Attitudes toward school	None missing	None missing
Extrinsic motivation	None missing	None missing

Table 5 Meta-regression analysis for Cronbach's alpha

Outcome	<i>k</i>	Fixed effects		Random effects	
		β	CI	β	CI
Academic achievement					
Measures of parental autonomy support	13	-.03	-.29/.24	-.13	-.62/.36
Autonomous motivation					
Measures of parental autonomy support	19	-.30*	-.54/-.05	-.17	-.59/.26
Measures of autonomous motivation	13	.28**	.13/.42	.30	-.03/.63
Psychological health					
Measures of parental autonomy support	14	1.77**	1.22/2.31	1.65**	.79/2.5
Measures of psychological health	13	-.36	-1.00/.28	-.05	-1.06/.96
Perceived competence					
Measures of perceived competence	6	-.01	-.22/.20	-.05	-.60/.50
Perceived control					
Measures of parental autonomy support	8	.37*	.001/.73	.37*	.001/.73
Measures of perceived control	10	-.19	-1.28/.91	-.48	-2.37/1.40

* $p < .05$; ** $p < .001$

school sample, 3 represented a college sample, and 1 represented a mixed grade level sample. Twenty-five of the correlations had both parents as the agent of support, while 17 reported the father and 23 reported the mother. The 16 studies were published between the years 1986 and 2011. The sample sizes ranged from 48 to 1289, with a median size of 120. The mean sample size was 223.80, with a standard deviation of 266.59. Grubbs test revealed a significant sample size outlier (a sample of 1289 was Winsorized to 805). There were no significant outliers among the correlations. The effects sizes of the correlations ranged from $-.06$ to $.47$. There were 2 negative effects and 63 positive effects.

Overall Correlation The weighted average correlation was $r = .19$ (95 % CI = .17, .21) with a fixed-error model and $r = .20$ (95 % CI = .17, .24) with a random-error model (see Table 3 for overall effects), $Q(21) = 35.88$, $p = .02$. No additional correlations were imputed under either error model for trim-and-fill analyses (see Table 4). There was no difference between the average effects of published and unpublished reports (see Table 7). Meta-regressions (Table 5) examining whether Cronbach's alpha for the measure of parental autonomy support moderated the correlation with autonomous motivation were significant under fixed but not under random effects, suggesting that the correlation decreased with more reliable measurement of parent autonomy support. Results from the meta-regressions assessing the role of Cronbach's alpha for the measures of autonomous motivation were also significant under fixed but not under random effects, but this time suggesting that the correlation increased with more reliable measurement of autonomous motivation.

Moderator Analyses Next seven additional moderator analyses were conducted for grade level, autonomy support respondent, agent of support, domain of autonomy support, outcome, domain of outcome, and predictor-outcome domain alignment.

Table 6 Results of analyses examining the correlation between parent autonomy support and academic achievement

Moderators	<i>k</i>	<i>r</i>	95 % confidence interval		<i>Q_b</i>
			Low estimate	High estimate	
Publication type					
Published	19	.12*** (.11***)	.08 (.05)	.15 (.17)	.84 (.15)
Unpublished	10	.09*** (.13***)	.06 (.06)	.13 (.19)	
Grade level					
Elementary (K–4)	7	.10*** (.12)	.03 (–.04)	.16 (.26)	6.60 (4.30)
Middle school (5–8)	4	.20*** (.20***)	.14 (.14)	.26 (.26)	
High school (9–12)	10	.11*** (.10**)	.07 (.02)	.15 (.18)	
College	4	.13*** (.13**)	.05 (.03)	.20 (.21)	
Autonomy support respondent					
Child scale	18	.10*** (.11***)	.07 (.07)	.13 (.15)	6.37* (2.18)
Parent scale	3	.07* (–.04)	0 (–.32)	.13 (.23)	
Observation	8	.20*** (.19*)	.12 (.03)	.27 (.35)	
Agent of support					
Both parents	16	.14*** (.14***)	.11 (.08)	.17 (.20)	17.95*** (1.73)
Mother	16	.08*** (.12***)	.05 (.05)	.12 (.18)	
Father	9	.04* (.08*)	.01 (.02)	.08 (.15)	
Domain of autonomy support					
General	16	.08*** (.09***)	.05 (.03)	.11 (.14)	7.79** (3.47)
Academics	10	.15*** (.15***)	.11 (.11)	.19 (.19)	
Outcome					
Course grades/GPA	35	.09*** (.12***)	.07 (.07)	.11 (.17)	2.08 (.11)
Standardized test scores	13	.12*** (.13***)	.08 (.08)	.16 (.18)	
Domain of outcome					
English language arts	4	.18** (.18**)	.07 (.07)	.28 (.28)	1.89 (1.23)
Math	4	.08 (.11)	–.03 (–.07)	.19 (.27)	
General academics	26	.10*** (.11***)	.08 (.06)	.13 (.16)	

Note. Random-effect *Q* values and point estimates are presented in parentheses. *Q_b* is an index of the heterogeneity between the group mean effect sizes. If *Q_b* is significant, it indicates that the mean effect sizes across categories differ by more than sampling error; that is there is a statistical difference between groups

p*<.05; *p*<.01; ****p*<.001

Four moderator analysis were significant under both fixed and random-effect assumptions, agent of support, domain of autonomy support, domain of outcome, and predictor-outcome domain alignment (see Table 7). Pairwise comparisons revealed that the average correlation between parental autonomy support and autonomous motivation for mothers was significantly different from the average correlation for fathers under both fixed, $Q(1)=18.01$, $p<.001$ and random assumptions, $Q(1)=8.56$, $p<.05$. In addition, the average correlation was significantly greater when parental autonomy support reflected both parents' support compared with only mothers (fixed-effect (FE): $Q(1)=5.56$, $p<.05$; random effects (RE): $Q(1)=4.63$, $p<.05$) or only fathers (FE: $Q(1)=33.70$, $p<.001$; RE: $Q(1)=29.28$, $p<.001$). In addition, moderator analyses revealed that the correlation between parental autonomy support and children's

Table 7 Results of analyses examining the correlation between parental autonomy support and autonomous motivation

Moderators	<i>k</i>	<i>r</i>	95 % confidence interval		<i>Q_b</i>
			Low estimate	High estimate	
Publication type					
Published	16	.19** (.21**)	.16 (.16)	.28 (.25)	.04 (.23)
Unpublished	6	.18** (.19**)	.14 (.14)	.22 (.24)	
Grade level					
Elementary and middle school (K–8)	10	.17** (.17**)	.13 (.13)	.20 (.24)	2.19 (4.04*)
High school (9–12)	10	.20** (.24**)	.17 (.17)	.24 (.30)	
Autonomy support respondent					
Child scale	27	.19** (.20**)	.17 (.16)	.21 (.24)	.28 (.49)
Observation	7	.16** (.16**)	.05 (.05)	.26 (.26)	
Agent of support					
Both parents	13	.26** (.26**)	.22 (.22)	.30 (.30)	37.80** (30.12**)
Mother	13	.20** (.20**)	.17 (.15)	.23 (.24)	
Father	11	.11** (.12**)	.08 (.08)	.14 (.15)	
Domain of autonomy support					
General	29	.18** (.19**)	.16 (.15)	.20 (.22)	7.20** (5.53*)
Academic	5	.28** (.28**)	.21 (.21)	.35 (.35)	
Outcome					
Intrinsic motivation	15	.16** (.16**)	.13 (.13)	.19 (.19)	7.54* (2.53)
Relative Autonomy Index	10	.20** (.20**)	.16 (.15)	.23 (.25)	
Identified regulation	9	.25** (.22**)	.19 (.08)	.31 (.34)	
Domain of outcome					
General	7	.13** (.13**)	.08 (.06)	.18 (.19)	5.58* (5.88*)
Academic	28	.20** (.22**)	.18 (.18)	.22 (.25)	
Predictor-outcome domain alignment					
Both academic	5	.28** (.28**)	.21 (.21)	.35 (.35)	11.01** (10.06**)
Both general	7	.13** (.13**)	.08 (.06)	.18 (.19)	
Unmatched	24	.19** (.20**)	.16 (.16)	.21 (.24)	

* $p < .05$; ** $p < .01$

autonomous motivation was greater when parents' support was specific to the academic domain relative to in general. This same pattern held for the domain of the outcome measure, results revealed that the correlation between parental autonomy support and children's autonomous motivation was greater when the autonomous motivation was focused on academics versus life in general, this general grouping included examining autonomous motivation in general life, friendships, work, and non-academic tasks. Moderator analyses revealed that the average correlation between parental autonomy support and children's autonomous motivation varied significantly depending on whether the domain of the predictor and outcome matched. Most commonly, domains were mismatched by the parental autonomy support predictor being for life in general and the autonomous motivation outcome being specific to the academic domain. Pairwise comparisons revealed that the average correlation between parental autonomy support and autonomous motivation when both domains focused on academics was

significantly greater than the average correlation when both domains focused on life in general, under fixed $Q(1)=10.98$, $p<.01$, and random assumptions, $Q(1)=10.01$, $p<.01$. In addition, the average correlation was significantly greater when both the predictor and outcome focused on the academic domain compared with when domains were mismatched (FE: $Q(1)=5.92$, $p<.05$; RE: $Q(1)=3.65$, $p=.05$). Surprisingly, the average correlation was greater when domains were mismatched compared with when both domains focused on life in general (FE: $Q(1)=3.73$, $p=.05$; RE: $Q(1)=3.90$, $p=.05$).

Studies Correlating Parental Autonomy Support and Psychological Health

The literature search uncovered 11 studies that estimated the correlation between parental autonomy support and a measure of psychological health. The 11 studies reported 34 separate correlations based on 21 separate samples. Of those correlations, 18 measured well-being and 16 measured self-esteem. Eleven correlations were from middle school grade levels, 16 were from high school, and 7 were from college. Twenty-one correlations reported the agent of support as both parents, while five correlations were for father as agent of support and eight correlations were for mother as the agent of support. The characteristics of these studies are listed in Table 2.

The 11 studies appeared between the years 1994 and 2011. The sample sizes ranged from 60 to 567, with a median size of 142. The mean sample size was 205.56, with a standard deviation of 148.03, suggesting a normal distribution. The Grubbs test did not reveal any significant outliers in samples sizes or correlations. The effects sizes of the correlations ranged from $-.05$ to $.59$. There were 1 negative effect and 33 positive effects.

Overall Correlation The weighted average correlation was $r=.38$ (95 % CI=.36, .41) under a fixed-error model and $r=.36$ (95 % CI=.30, .42) under a random-error model (see Table 3 for overall effects), $Q(20)=98.70$, $p<.001$. Trim-and-fill analyses indicated that no additional correlations were missing. There was no difference between the average effects of published and unpublished reports (see Table 8). Meta-regressions (see Table 5) examining whether a sample's Cronbach's alphas for the measure of parental autonomy support moderated the correlation between parental autonomy support and psychological health were significant under both fixed and random effects, suggesting that the magnitude of the correlation increased with more internally consistent measures of parental autonomy support. Results from the meta-regressions assessing whether a sample's Cronbach's alpha for the measure of psychological health moderated the correlation between parental autonomy support and psychological health were not significant under fixed or random effects.

Moderator Analyses Next, moderator analyses on the relation between parental autonomy support and psychological health were conducted using five moderators: grade level, agent of support, autonomy support respondent, domain of autonomy support, and outcome. All five moderator analyses were significant under fixed-effects assumptions, and three moderators, agent of support, domain of autonomy support, and outcome, remained significant when a random-effect model was implemented (see Table 8). More specifically, moderator analyses revealed that the correlation between parental autonomy support and children's psychological health was greater for psychological well-being relative to self-esteem outcomes. Well-being

Table 8 Results of analyses examining the correlation between parental autonomy support and psychological health

Moderators	<i>k</i>	<i>r</i>	95 % confidence interval		<i>Q_b</i>
			Low estimate	High estimate	
Publication type					
Published	14	.39*** (.39***)	.36 (.32)	.43 (.45)	1.28 (1.02)
Unpublished	7	.36*** (.31***)	.32 (.18)	.41 (.43)	
Grade level					
Middle school (5–8)	4	.44*** (.38***)	.39 (.25)	.49 (.51)	10.13* (2.9)
High school (9–12)	14	.38*** (.37***)	.35 (.29)	.41 (.45)	
College	3	.28*** (.28***)	.19 (.19)	.37 (.37)	
Autonomy support respondent					
Child scale	19	.39*** (.37***)	.36 (.31)	.41 (.43)	5.03* (2.84)
Observation	2	.21* (.21*)	.03 (.01)	.36 (.39)	
Agent of support					
Both parents	17	.40*** (.39***)	.37 (.33)	.42 (.45)	23.20*** (9.93*)
Mother	6	.25*** (.25***)	.17 (.16)	.32 (.33)	
Father	5	.26*** (.26***)	.18 (.18)	.33 (.33)	
Domain of autonomy support					
General	16	.41*** (.40***)	.38 (.34)	.44 (.46)	22.73*** (10.07**)
Academics	5	.23*** (.23***)	.16 (.14)	.30 (.31)	
Outcome					
Well-being	11	.44*** (.43***)	.41 (.37)	.47 (.49)	39.09*** (9.37*)
Self-esteem	10	.27*** (.28***)	.22 (.19)	.31 (.36)	

* $p < .05$; ** $p < .01$; *** $p < .001$

was characterized by global life satisfaction, while self-esteem encompasses more positive attitudes toward the self and feelings of self-worth. Also in line with our hypotheses, psychological health was greater when support was aligned with the outcome and for the general domain rather than focused on the academic domain and schoolwork. Pairwise comparisons revealed that the average correlation for mothers was not different from the average correlation for fathers under either fixed, $Q(1)=.02, p=.88$, or random error assumptions, $Q(1)=.03, p=.87$. However, the average correlation between parental autonomy support and psychological health was significantly greater when both parents were reported as the agent of support compared with when only mothers were reported (FE: $Q(1)=14.31, p<.001$; RE: $Q(1)=7.25, p<.01$) or only fathers were reported (FE: $Q(1)=97.16, p<.001$; RE: $Q(1)=6.82, p<.01$).

Studies Correlating Parental Autonomy Support and Perceived Competence

The literature search revealed ten studies that estimated the correlation between parental autonomy support and perceptions of competence. The 10 studies reported 31 separate correlations of perceived competence based on 10 samples (see Table 2). Twenty-three of the correlations reported an elementary or middle school sample, and eight reported a high

school sample. For agent of support, 11 correlations reported both parents as the agent of support, while 7 reported the father and 13 reported the mother. The studies were published between 1986 and 2011. The Grubbs test revealed one significant outlier among sample sizes (1289 Winsorized to 461) and one significant outlier among the correlations (correlation of $-.15$ Winsorized to $-.01$). The effect sizes ranged from $-.15$ to $.31$.

Overall Correlation The weighted average correlation was $r=.21$ (95 % CI=.17, .25) with a fixed-error model and $r=.20$ (95 % CI=.14, .25) with a random-error model (see Table 3 for overall effects), $Q(9)=15.92$, $p=.07$. Trim-and-fill analyses suggest no values were missing. There was no difference between the average effects of published and unpublished reports (see Table 9). Meta-regression results (see Table 5) suggested that the Cronbach's alphas for the measure of perceived competence did not significantly explain variability in the correlation with parental autonomy support under fixed or random effects. Lack of variability limited the ability to run the analysis examining the role of the Cronbach's alphas for the measure of parental autonomy support.

Moderator Analyses Moderator analyses on the relation between parental autonomy support and perceived competence were conducted using two moderators: grade level and agent of support. Moderator tests were conducted despite a non-significant test of heterogeneity, given our moderator findings for other outcomes. However, neither moderator was significant under either model (see Table 9).

Studies Correlating Parental Autonomy Support and Engagement or Effort

The literature search uncovered six studies that estimated the correlation between parental autonomy support and engagement and effort. The 6 studies reported 12 separate correlations based on 8 samples of students (see Table 2). Five of the correlations were from an elementary school sample, one was from a middle school, two were high school, three were college, and one correlation did not report a grade level. For the agent of support, five correlations were for both parents as agent of support, while three were father and four were mother. The six studies were published between 1992 and 2007. The sample sizes ranged from 28 to 805, with a median size of 209.50. The mean sample size was 385.42, with a standard deviation of 322.90. The effect sizes ranged from 0 to $.38$, all were positive. Grubbs test did not reveal any significant outliers.

Overall Correlation The weighted average correlation was $r=.12$ (95 % CI=.09, .16) under a fixed-error model and $r=.16$ (95 % CI=.07, .24) under a random-error model (see Table 3 for overall effects), $Q(7)=30.85$, $p<.001$. Trim-and-fill analyses suggested 1 value might be missing, though the relation between parental autonomy support and engagement/effort would remain statistically significant (see Table 4). There was no difference between the average effects of published and unpublished reports (see Table 9). It was not possible to run meta-regression moderator analysis on engagement and effort because there were not enough studies for the number of covariates.

Moderator Analyses Two additional moderator analyses were conducted: autonomy support respondent and agent of support (see Table 9). One moderator analysis was significant

Table 9 Results of analyses examining the correlation between parental autonomy support and perceived competence, engagement and effort, and perceived control

Moderators	<i>k</i>	<i>r</i>	95 % confidence interval		<i>Q_b</i>
			Low estimate	High estimate	
Perceived competence					
Publication type					
Published	9	.21*** (.20***)	.17 (.14)	.25 (.26)	.09 (.04)
Unpublished	1	.17 (.17)	−.12 (−.12)	.43 (.43)	
Grade level					
Elementary and middle (K–8)	6	.20*** (.19***)	.13 (.12)	.26 (.26)	.54 (.03)
High school (9–12)	4	.22*** (.20***)	.19 (.11)	.26 (.29)	
Agent of support					
Both parents	6	.25*** (.24***)	.18 (.15)	.31 (.31)	1.13 (.98)
Father	6	.21*** (.20***)	.17 (.15)	.25 (.25)	
Mother	8	.21*** (.18***)	.17 (.12)	.25 (.25)	
Engagement and effort					
Publication type					
Published	3	.20** (.20**)	.08 (.08)	.31 (.31)	1.65 (.45)
Unpublished	5	.11** (.14*)	.08 (.04)	.15 (.25)	
Autonomy support respondent					
Child scale	6	.12*** (.14**)	.08 (.05)	.15 (.24)	2.21 (1.10)
Observation	2	.24** (.24**)	.08 (.08)	.40 (.40)	
Agent of support					
Both parents	5	.23*** (.23***)	.18 (.18)	.28 (.28)	32.81*** (24.75***)
Father	3	.03 (.05)	−.02 (−.04)	.08 (.13)	
Mother	4	.06* (.06*)	.01 (.01)	.10 (.11)	
Perceived control					
Publication type					
Published	5	.14*** (.13)	.07 (−.01)	.20 (.27)	.20 (.18)
Unpublished	4	.16*** (.17***)	.12 (.09)	.19 (.25)	
Grade level					
Elementary and middle (K–8)	6	.14*** (.12***)	.10 (.04)	.17 (.21)	5.34* (4.13*)
College	3	.25*** (.25***)	.16 (.16)	.33 (.33)	
Agent of support					
Both parents	5	.20*** (.17*)	.15 (.03)	.26 (.29)	26.68*** (4.36)
Father	3	.03 (0)	−.02 (−.12)	.08 (.12)	
Mother	7	.17*** (.15***)	.13 (.05)	.21 (.24)	

* $p < .05$; ** $p < .01$; *** $p < .001$

under both fixed and random-effect assumptions, agent of support. Pairwise comparisons revealed that the average correlation between parental autonomy support and engagement and effort for mothers was not different from the average correlation for fathers under either fixed, $Q(1)=.58$, $p=.45$ or random assumptions, $Q(1)=.03$, $p=.86$. However, the average correlation was significantly greater when parental autonomy support reflected the support of

both parents compared with just mothers (FE: $Q(1)=22.69$, $p<.001$; RE: $Q(1)=21.66$, $p<.001$) or just fathers (FE: $Q(1)=29.00$, $p<.001$; RE: $Q(1)=12.77$, $p<.001$).

Studies Correlating Parental Autonomy Support and Perceived Control

The literature search uncovered seven studies that estimated the correlation between parental autonomy support and perceived control. The 7 studies reported 15 separate correlations based on 7 samples (see Table 2). Of those correlations, 12 reported correlations relevant to elementary and middle school and 3 reported correlations for a college sample. For agent of support, five correlations reported the agent of support as both parents, while three reported the father and seven reported the mother. The studies were published between 1989 and 2008. The sample sizes ranged from 60 to 805, with a median size of 160. The mean sample size was 342.67, with a standard deviation of 330.79. The effect sizes ranged from $-.26$ to $.36$, with four negative-effect sizes and the rest positive. The Grubbs test did not reveal any significant outliers in sample size or correlations.

Overall Correlation The weighted average correlation was $r=.15$ (95 % CI=.12, .18) with a fixed-error model and $r=.16$ (95 % CI=.09, .23) with a random-error model (see Table 3 for overall effects), $Q(8)=26.50$, $p<.001$. Trim-and-fill analyses revealed 2 possible missing values under both error models, though the relation would remain significantly different from zero (see Table 4). In addition, a moderator analysis indicated that there was no difference between the average effects of published and unpublished reports (see Table 9). Meta-regression results (see Table 5) suggested that the correlation between parent autonomy support and perceived control increased as the Cronbach's alpha for the measure of parental autonomy support increased under both fixed and random effects. Results from the meta-regression assessing whether the Cronbach's alpha for the measure of perceived control moderated the correlation were not significant.

Moderator Analyses Next, moderator analyses on the relation between parental autonomy support and perceived control were conducted using three moderators: publication type, grade level, and agent of support (see Table 9). Only one moderator, grade level, remained significant under both fixed-effect and random-effect assumptions. The analysis revealed that the relation between parental autonomy support and perceived control was greater for college students compared with elementary through high school age students.

Studies Correlating Parental Autonomy Support and Other Outcomes

In addition to the outcomes reported previously, several other relevant outcomes were examined, though less frequently, in research studies focused on parents' autonomy support. Meta-analyses of these outcomes indicated that there were small, statistically significant correlations between parental autonomy support and children's positive attitudes toward school, extrinsic motivation, executive functioning, and self-regulation, under both error models (see Table 3). Moderator analyses were not conducted for these outcomes given the small number of independent samples contributing to each outcome (six or fewer).

Discussion

In line with self-determination theory, the results of this meta-analysis suggest that parental autonomy support has a positive relation with a variety of desirable academic and social outcomes including academic achievement, autonomous motivation, psychological health, perceived competence, perceived control, engagement and effort, attitudes toward school, self-regulation, and executive functioning. Surprisingly, parental autonomy support was also positively related to children's extrinsic motivation about as strongly as it is related to their autonomous motivation. That is, the finding of this meta-analysis suggests that autonomy support may more broadly support all forms of motivation and positive functioning, not just motivation that is derived from an individual feeling autonomous. This may conflict with motivation theory to the extent that self-determination theory would hypothesize that autonomy support should be most strongly correlated with autonomous forms of motivation and unrelated or negatively related to extrinsic motivation. We suspect that this result reflects the likelihood that any type of involvement by parents, whether focused on autonomy-support or not, increases all types of motivation. This may be particularly likely when parents' involvement and students' motivation is targeted toward school, a domain that includes many activities for which little autonomous motivation may exist or the tension between extrinsic and intrinsic forms of motivation is apparent. That is, the mere act of parents highlighting their role in supporting students' efforts in school may lead students to focus on extrinsic reasons for engaging in school activities. When that involvement is also autonomy-supportive, it also seems related to students' greater focus on intrinsic reasons for engaging. This possibility is reflected in some research examining parent involvement more broadly than just that which is autonomy supportive. For example, Ginsburg and Bronstein (1993) found that parents who were more involved in their children's academic lives had students who reported being more extrinsically motivated and dependent on external sources of academic guidance and evaluation. It is also worth noting that consistent with our suggestion that involvement is likely to enhance extrinsic motivation particularly in the academic domain, most of the extrinsic motivation outcome measures in this meta-analysis were in the academic domain.

Several patterns emerged from moderator analyses across outcomes. Namely, the trend in average correlations across every outcome suggested that the correlation between parental autonomy support and academic and psychosocial outcomes was stronger when the autonomy support measure reflected the support of both parents versus one or the other. This trend was significant for three out of six outcomes under both error models and for two additional outcomes under fixed effects only. That is, when both parents were simultaneously assessed as agents of support, the relation between autonomy support and achievement was stronger compared with when autonomy supportive of either parent was assessed independently. This is an especially important implication for future research. Researchers often focused on mothers over fathers in many cases, but these findings indicate that both parents are important and the strength of autonomy support is better revealed when the combined support of both parents is assessed. Our observation that the relation between parental autonomy support and students' outcomes is stronger when the measure of parental autonomy support is a reflection of both parents' behavior may emerge for a number of reasons. However, it seems unlikely that the finding is a matter of mere reduction in measurement error, as rarely did the measure of both parents' autonomy support involve multiple informants. Rather, a majority of the articles in this data set had children rate their parents' autonomy support, being instructed to think specifically about their mother, father, or both parents. Improvements in measurement

notwithstanding, we speculate that our findings reflect the likelihood that the effects of autonomy support are more powerful when both parents are consistent in their practice and likewise, that the autonomy supportive efforts of one parent could be undermined if the other is controlling. The additive and interactive effects of **mothers and fathers autonomy support** would seem to be an important direction for future research to explore. As noted by other scholars, there is very little focus on the ways that mothers' and fathers' parenting styles co-exist and interact (Simons and Conger 2007). However, evidence from the parenting style literature may provide some support for our speculation. **For example, in a study examining the parenting style of mothers and fathers separately, Simons and Conger (2007) found that having two authoritative parents was associated with the most positive outcomes in delinquency, depression and commitment to school among adolescents, though having one parent with this style buffered against the negative consequences associated with the second parent having a less optimal parenting style.**

The moderating relation between parental autonomy support and grade level also showed a similar pattern across the various outcomes. Across all outcomes (except for psychological health for which there were no studies with elementary school children and engagement and effort for which we could not examine this moderator), the pattern of correlations suggested that autonomy support may have a stronger relation with children's outcomes in middle school and later into high school and college. Unfortunately, it was often not possible to get a clearer picture into the differences between elementary, middle, and high school from the current data. Several studies reported results from mixed grade levels, such as upper elementary and middle school students. For perceived control this trend was statistically significant under both fixed and random effects and for autonomous motivation it was significant under random effects only. Given adolescents' emerging desire to be autonomous individuals, autonomy support would appear to be especially important for supporting autonomous motivation during this developmental period. Interestingly, parent's autonomy support appears to continue to be equally important, or more important in the case of perceived control, even as children leave the home and go off to college.

In addition, it is worth noting that for the three outcomes for which we could examine our hypothesis about alignment between parental autonomy support and outcome domains, we found support for our hypothesis that better aligned parental autonomy support and outcomes would demonstrate stronger relations. That is, the correlation between parental autonomy support and general psychological health was greater when the focus of parental autonomy support was general, rather than specific to academics. Likewise, the correlation between parental autonomy support and academic achievement was greater when the focus of parental autonomy support was academic rather than general; however, this moderator was significant under fixed effects only. In addition, under both fixed and random effects, the correlation between parental autonomy support and autonomous motivation was greater when the focus was academic for both the domain of the autonomy support measure and the domain of the outcome measure. More specifically, our moderator analysis for autonomous motivation examining the alignment between the predictor and outcome variable suggested that the strongest effects emerged when variables were matched in the academic domain specifically, with mismatched relations and matched relations in other domains of life being smaller. Given that autonomous motivation is highly relevant to learning contexts in particular, this finding that the strongest relations emerged for matched relations within the academic domain is hardly surprising.

While the strength of the two moderating factors above consistently tells an interesting story about when the correlation between parental autonomy support and outcomes may be the strongest, the information we received on the strength of the overall correlations is also important to note. Parental autonomy support has the strongest relation with global psychological health. Not surprisingly, the strength of the relation between parental autonomy support and academic achievement was smaller than the motivation and psychosocial functioning outcomes. The reason for this smaller relation could be that academic achievement is determined by a multitude of factors beyond autonomy support. Likewise, the relation between parental autonomy support and academic achievement may be small because achievement, along with engagement during school, is a distal outcome of parents' support that will be mediated by children's own motivation, self-regulation, and cognitive functioning. That said, the results of this meta-analysis suggest that parental autonomy support is a small but likely important contributor to students' success in school. As such, parental autonomy support may be of particular interest for intervention and practice given that it is a strategy that requires few material resources and may be relatively effectively implemented by parents compared with other forms of parent involvement in school that may more readily depend on parents' level of education or academic training.

Future Directions and Limitations

Overall, the information gained from the results of this meta-analysis is important and provides a fuller picture of conditions under which parental autonomy support relates to important child outcomes. However, there are limitations to be considered. An important limitation to note is that some of the findings presented were based on small numbers of independent samples, making it difficult to place a great deal of confidence in the specific magnitude of the estimated effects. This is especially true for the relations with attitudes toward school, extrinsic motivation, executive functioning, and self-regulation. It is also important to note that all studies were correlational in nature and should not be taken to imply a causal relation between parental autonomy support and child outcomes. In our review of the literature of parent autonomy support, we found few experimental studies in which parental autonomy support was intentionally manipulated or parents were randomly assigned to receive training (or not) regarding how to be autonomy-supportive. Interventions that manipulate parents' autonomy-supportive practice would be particularly useful in exploring the causal effects of parent autonomy support on child outcomes (see Su and Reeve 2011 for a synthesis of autonomy support intervention programs).

Along the same lines, our meta-analysis pointed to a number of moderators, such as agent of support and grade level, which appeared to be promising factors related to variation in effects. However again, these factors should not be interpreted to imply causation given that they were not manipulated within studies or across studies included in the meta-analysis. Carefully designed intervention research that conscientiously takes moderators into consideration by, for example, targeting samples that span multiple grade levels and intentionally manipulating which parent receives training or whether both parents receive training, are likely to be particularly helpful in exploring the role of the moderators identified in this meta-analysis. In particular, since there were so few elementary-aged samples, more research needs to be done on the relation between parental autonomy support and academic achievement and psychosocial functioning in the elementary school age range.

For several of the outcomes, moderators could not be tested due to small number of studies with variation on that factor. We were particularly disappointed that it was not possible to test whether the nature of parents' autonomy support was associated with variation in the correlations between parental autonomy support and child outcomes, because many studies did not specify the specific nature of the autonomy supportive practices. Autonomy support across a variety of contexts has been defined in theoretical and empirical literature to reflect a combination of related, yet independent practices, including providing choices and support for independent or collaborative decision-making, perspective-taking, careful listening, provision of rationales that appeal to personal interests and goals, among other practices (Deci and Ryan 1987; Grolnick et al. 1997; Pomerantz et al. 2007). It is possible that these practices are not all equal and that some support autonomy and subsequent child outcomes better than others. **Future research should focus on identifying specifically what it is about parental autonomy support that impacts motivation and achievement.**

Related to this issue, we collected information about studies along other number of dimensions of theoretical or methodological relevance to explain variability in findings. For example, we coded the ethnicity and socioeconomic status of samples, given research suggesting that the autonomy relevant experiences vary across cultures (e.g., Iyengar and Lepper 1999; Stephens et al. 2007). We coded the ability level of students given the possibility that autonomy support may not be equally effective across different populations of students. We also collected information relevant to the quality of studies, including the appropriateness of conceptual and operational definitions of the parent autonomy support variable, the timing of measurement for outcomes relative to the predictor, and whether attrition occurred in longitudinal research. However, the limited reporting or variability along many of these characteristics prevented us from conducting moderator analyses. In fact, one of the few methodological characteristics relevant to study quality that we were able to assess as a moderator was the internal consistency of measures. Not surprisingly, most of these moderator analyses suggested that studies with poorer measurement might be underestimating correlations between parental autonomy support and student outcomes or that the small amount of variability in internal consistency for some measures did not matter much.

Finally, given our unexpected finding that **parent autonomy support was positively correlated with extrinsic motivation**, it might be useful for **future research to explore not only the relations between parent autonomy support and various indicators of motivation, achievement, and psychological adjustment, but also the relation between parent autonomy support and amotivation (or the lack of motivation)**. This meta-analysis revealed that parent autonomy support was related to all forms of motivation. However, we would expect that differential effects might emerge when examining various forms of motivation compared with amotivation. Parental autonomy support seems to increase all types of motivation, including extrinsic motivation, and what is lacking in the research is how parental autonomy support may also influence and likely decrease a lack of motivation.

In sum, parent autonomy support seems to be a promising strategy for enhancing children's academic, psychological, and social outcomes. The findings of this research synthesis provide some guidance for future investigations that will be both useful and illuminating of the underlying social and psychological dynamics of parent autonomy support.

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The Relationship Between Adolescents' Perceived Parental Involvement, Self-Efficacy Beliefs, and Subjective Well-Being: A Multiple Mediator Model

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Abstract The aim of this study was to examine the mediation roles of academic self-efficacy, social self-efficacy, and emotional self-efficacy on the relationships between parental involvement (i.e., paternal involvement and maternal involvement) and subjective well-being (i.e., positive affect, negative affect, and life satisfaction) in Malaysian adolescents. Participants were 802 Malaysian high school students from 14 public schools, with an age range of 15–17 years. Results of a multiple mediator model indicated that academic self-efficacy and social self-efficacy were unique mediators in the relationships between parental involvement (both paternal involvement and maternal involvement) and adolescent positive affect. Besides, academic self-efficacy was found to be the only unique mediator in the relationships between parental involvement and adolescent life satisfaction. Emotional self-efficacy did not uniquely mediate the relationships between parental involvement and adolescent positive affect and life satisfaction. None of the proposed mediators uniquely mediated the relationships between parental involvement and adolescent negative affect. This study suggests that paternal involvement is just as crucial to adolescent positive development as maternal involvement. In addition, this study also extends our insight into the specific roles of academic, social, and emotional self-efficacy in the relationship between parental involvement and the components of subjective well-being among adolescents.

Keywords Parenting · Self-efficacy · Positive affect · Negative affect · Life satisfaction · Multiple mediator model

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1 Introduction

In recent years, subjective well-being (SWB) has become a new focus of inquiry in mainstream psychology. SWB is defined as a subjective appraisal of one's life (Diener 2000). It is a tripartite entity that comprises an affective aspect that reflects the pleasant (positive affect, PA) and unpleasant (negative affect, NA) emotional experiences in one's life, as well as a cognitive aspect that entails cognitive evaluation of one's overall level of life satisfaction (LS). To our knowledge, there have been relatively few investigations of PA and NA with respect to LS. Although no consensus exists yet on a definitive structure of SWB, researchers (e.g., Busseri and Sadava 2011; Diener et al. 1999; Morgan et al. 2011) have emphasized that components of SWB are correlated, but have separable dimensions. Furthermore, it appears important to include PA, NA, and LS within the same study to provide a more complete depiction of SWB.

In the past, research on SWB has focused primarily on adult populations. Nonetheless, there has been increasing research evidence on the SWB of adolescents in recent years. SWB is as crucial in adolescence as it is in other stages of human development (Eryilmaz 2012). Low levels of SWB in adolescents have been associated with various problems such as suicide, sexual risk-taking behaviors, violent behaviors, aggression, depression, and problematic Internet use (Cao et al. 2011; Heisel and Flett 2004; MacDonald et al. 2005; Suldo and Huebner 2006; Valois et al. 2002). In contrast, a high level of SWB in adolescents has been associated with benefits such as school satisfaction, academic achievement and aspirations, self-esteem, life meaning, gratitude, and self-efficacy (Proctor et al. 2010; Suldo and Huebner 2006). Adolescence is considered an opportune time to establish a strong foundation for positive well-being to lead a satisfying life in adulthood (McCabe et al. 2011). Thus, researchers' continuing efforts to examine adolescent SWB are crucial. Specifically, determining the underlying factors that link to adolescent SWB would be helpful in promoting positive well-being.

Thus far, SWB studies on Malaysian populations have comprised young adults, adults, older people, and indigenous people, in relation to variables such as loneliness and depression (Swami et al. 2007), materialism (Ang et al. 2014; Rakrachakarn et al. 2013), marital satisfaction (Ng et al. 2009), religiosity and spiritual engagement (Mellor et al. 2012), wealth (Howell et al. 2006), and living arrangements (Kooshar et al. 2012). There is, however, relatively little SWB research on Malaysian adolescents, to our knowledge. A study conducted by Muhamad and Jaafar (2009) demonstrated the relationship between personality and SWB in Malaysian youths. In particular, conscientiousness, neuroticism, and extraversion appeared to be the best predictors for PA, NA, and LS. Furthermore, Yaacob, Tan, Tan, and Juhari (2012) discovered differences in LS among Malaysian adolescents, when grouped by sociodemographic factors such as sex, ethnicity, age group, and religion. However, SWB research in Malaysia seems to be in its preliminary stages. Little is known about the possible underlying variables that may account for Malaysian adolescent SWB.

The National Health Mobility Survey (III) that was conducted by the Ministry of Health in Malaysia highlighted an increase in mental health problems from 13 % (in 1996) to 20.32 % (in 2006) among Malaysian adolescents. The highest prevalence of acute suicidal ideation was also among youth. Moreover, teenage crime, such as snatch thefts, blackmail, gang activity, rape, murder, and drug abuse are all on the rise in Malaysia (Cheng 2014). From the perspective of positive psychology, SWB has been shown not only to be advantageous for adolescent adaptive functioning, but also, to serve as a protective factor against maladaptive functioning (Cao et al. 2011; Heisel and Flett 2004; Proctor et al.

2010; Suldo and Huebner 2004a, b, 2006; Valois et al. 2002). Therefore, there is a need to determine underlying factors that may contribute to SWB in Malaysian adolescents.

One of the crucial developmental milestones in adolescence is to gain autonomy, in which adolescents spend increasingly more time with peers (Rubin et al. 2006). Extant research, however, has identified a significant contribution of parenting behaviors to adolescent SWB (e.g., Cacioppo et al. 2013; Leung et al. 2010; Rasmi et al. 2012; Saha et al. 2010). Furthermore, internal resources such as self-efficacy, gratitude, optimism, self-esteem, hope, and resilience have been identified as psychological strengths that promote adolescent SWB (Khan 2013; Lightsey et al. 2013; Merkaš and Brajša-Žganec 2011; Siviš-Cetinkaya 2013; Suldo and Shaffer 2007; Sun and Shek 2012; Vecchio et al. 2007). Previous studies have suggested that parenting behaviors may affect adolescent developmental outcomes directly or indirectly via internal resources. For instance, parental control was found to influence adolescent developmental outcomes via attributional style (Schleider et al. 2014) and self-regulation (Lee et al. 2012).

The present study examined whether paternal involvement and maternal involvement are associated with PA, NA, and LS in Malaysian adolescents via the following self-efficacy beliefs: academic self-efficacy, social self-efficacy, and emotional self-efficacy. There is no single definition of parental involvement in the past literature. In the present study, “parental involvement” refers to parental interaction and engagement in various facets of their children’s lives (e.g., emotional development; intellectual development; developing independence and responsibility; leisure, fun, play; companionship), which may promote some aspects of development in children (Finley and Schwartz 2004). Rohner and his colleagues used a successful approach that showed a unique association between children’s retrospective perceptions of parental acceptance-rejection and various aspects of their development (e.g., Khaleque and Rohner 2002; Rohner and Veneziano 2001). By adapting this approach, other researchers have sought to confirm that the assessment of parental involvement, from the perspective of the adolescents themselves, can best capture the overall long-term impact of parental involvement on the adolescents’ development and well-being (Finley and Schwartz 2006). Aside from the work of Finley and colleagues (see Finley et al. 2008; Finley and Schwartz 2004, 2006, 2007, 2010), other studies (e.g., Allgood et al. 2012; Yeoh and Woo 2010) have used the same conceptualization of parental involvement and examined its associations with aspects of adolescent development.

Social cognitive theory (Bandura 1993, 1997, 1999, 2002, 2012) was used as the theoretical framework to guide the present study. Fundamentally, this theory asserts that human functioning has its foundation in the social environment and self-influences, in which self-efficacy is a constituent, concerning people’s beliefs about their capabilities to exercise control over their functioning. Adolescents exist within social environments and are continuously interacting with their parents. According to Schunk and Miller (2002), adolescents acquire much of their self-efficacy information from their families and home environment. Parental support and knowledge have been shown to correlate positively with adolescent efficacious belief (Frank et al. 2010), whereas the opposite was found for maternal rejection (Niditch and Varela 2012). Notably, self-efficacy is best understood as domain specific. The importance of specific efficacy domains varies by developmental phase (Berry and West 1993). Academic self-efficacy, social self-efficacy, and emotional self-efficacy are considered the most salient domains of efficacy belief in adolescents (Suldo and Shaffer 2007). Self-efficacy enhances the quality of human functioning via cognitive, affective, motivational, and decisional processes (Bandura 2012). Self-efficacy in different domains such as academic, social, emotional, regulating stress, and anger, has

been shown to have significant relationships with components of SWB in adolescents (Lackaye et al. 2006; Lightsey et al. 2013; Meng et al. 2014; Putwain et al. 2013; Steca et al. 2011; Suldo and Shaffer 2007; Vecchio et al. 2007). To date, evidence has begun to accumulate on the links between parental involvement, self-efficacy beliefs, and the components of SWB in adolescents (Di Maggio and Zappulla 2013; Finley and Schwartz 2007, 2010; Weiser and Riggio 2010). Previous studies have identified self-efficacy as a mediator in promoting SWB among adolescents in both Western and non-Western settings (e.g., Fogle et al. 2002; Sun et al. 2014; Wang et al. 2014). Though efficacious beliefs have universal functional values, culture does play a role in shaping them (Bandura 2002).

Borrowing perspectives from social cognitive theory and extant empirical evidence, the present study proposes that adolescent functioning (SWB and self-efficacy) has its foundation in the social environment, in which parental involvement is an influential socio environmental factor in adolescent lives. Operating within a social environment, self-efficacy beliefs were envisioned as potential underlying self-influencing factors in the parental involvement–SWB link among adolescents. Importantly, self-efficacy beliefs vary across domains. The present study considered self-efficacy across three domains: academic, social, and emotional, leading to three proposed mediators. Instead of examining the mediation effects of academic self-efficacy, social self-efficacy, and emotional self-efficacy in three separate simple mediation models, the current study adopted the recommendations of Preacher and Hayes (2008) to propose a multiple mediator model (see Fig. 1). A multiple mediator model that allows mediators to be tested simultaneously can reduce the likelihood of parameter bias due to omitted variables. In addition, a multiple mediator model is more precise and parsimonious than separate simple mediation models. A proliferation of extant research has examined the separate influences of paternal parenting and maternal parenting. In reality, mothers and fathers do not parent in separate vacuums. Stolz, Barber, and Olsen (2005) emphasized the importance of considering both paternal and maternal parenting and suggested that they be included in the same model. In line with this suggestion, previous studies (e.g., Bean et al. 2006; Bean and Northrup 2009; Plunkett et al. 2009) assessed the unique influence of paternal and maternal parenting in the

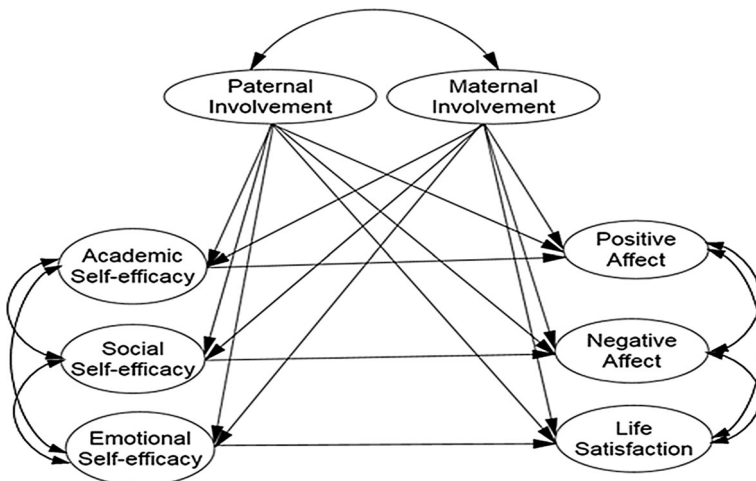


Fig. 1 Hypothesized multiple mediator model

presence of each other using a single structural model. Hence, in the current study, paternal involvement and maternal involvement were included in the same model, as shown in Fig. 1. We hypothesized that self-efficacy beliefs would mediate the relationships of paternal involvement and maternal involvement to PA, NA, and LS. Given the limited amount of research that includes all of these self-efficacy beliefs, we did not formulate specific hypotheses about which self-efficacy beliefs would emerge as mediators.

2 Method

2.1 Participants and Procedure

A total of 905 high-school adolescents participated in the current study. They were selected through a multi-stage cluster sampling approach. At the first stage, schools were selected randomly from all three zones in the Territory of Kuala Lumpur, Malaysia, according to the proportion of enrollment size in each zone. As a result, a total of 14 schools were selected (i.e., seven schools from Zone Bangsar Pudu, four schools from Zone Sentul, three schools from Zone Keramat). At the second stage, two classes of Grade 11 students in each selected school took part in the survey. The survey administration took place during regular school hours. To maintain anonymity, questionnaires did not contain a space for participant names, and participants were assured of the confidentiality of their responses.

Of the questionnaires collected, 103 data sets were excluded from the analyses because of problems such as major incompleteness, untrustworthy responses (i.e., placed the same value for all items under the same section), and absent data for gender and residency. As a result, a total of 802 participants were retained for further analyses. Of these participants, 55 % were female, 45 % were male, and the mean age was 16 years.

2.2 Instruments

2.2.1 *Paternal Involvement and Maternal Involvement*

Paternal involvement was measured using the Father Involvement Scale (Finley and Schwartz 2004). The scale measures a person's perception of paternal involvement in 20 domains of life, such as emotional development; caregiving; leisure, play, fun; and mentoring/teaching. The same scale was used to assess maternal involvement by replacing the word "father" with "mother". Items are rated on a five-point scale from 1 (never involved) to 5 (always involved). The Cronbach's alpha coefficient based on the current sample was .94 for the father version and .92 for the mother version.

2.2.2 *Self-Efficacy*

Self-efficacy was assessed using the Self-Efficacy Questionnaire for Children (Muris 2001). The scale consists of three subscales: academic self-efficacy, social self-efficacy, and emotional self-efficacy. There are seven items in each subscale, rated on a five-point scale from 1 (not at all) to 5 (very well). Examples of items include: "How well do you succeed in understanding all subjects in school?" (academic self-efficacy); "How well can you work in harmony with your classmates?" (social self-efficacy); and "How well do you succeed in becoming calm again when you are very scared?" (emotional self-efficacy). In

the present study, the Cronbach's alpha coefficients for the overall scale and subscales of academic self-efficacy, social self-efficacy, and emotional self-efficacy were .83, .74, .67, and .72, respectively.

2.2.3 Positive Affect and Negative Affect

PA and NA were measured using the Positive and Negative Affect Schedule (PANAS; Watson et al. 1988). The scale consists of 10 items for PA (e.g., enthusiastic, determined, active) and 10 items for NA (e.g., upset, guilty, hostile). Participants indicated "in general" the degree to which they experienced each affect on a five-point scale from 1(never) to 5 (all the time). In this study, the Cronbach's alpha coefficient was .80 for PA and .72 for NA.

2.2.4 Life Satisfaction

LS was assessed using the Students' Life Satisfaction Scale (SLSS; Huebner 1991). The scale consists of seven items that are rated on a six-point scale from 1 (strongly disagree) to 6 (strongly agree). Examples of items include: "My life is going well" and "I have what I want in life". In the present study, the Cronbach's alpha coefficient for the SLSS was .75.

2.2.5 Control Variables

The present study considered a number of sociodemographic variables as potential control variables: gender (1 = male; 2 = female), ethnicity (1 = Malay; 2 = non-Malay), religion (1 = Muslim; 2 = non-Muslim), family form (1 = intact family; 2 = non-intact family), fathers' and mothers' highest level of education (1 = no formal education to 7 = graduate degree), number of children at home (ranging from 1 to 12), and family monthly income (ranging from RM 0 to RM 107,000, approximately US\$ 0 to US\$ 33,170). These variables have been shown to influence parental involvement and/or adolescent SWB in past studies (Finley and Schwartz 2010; Gray et al. 2013; Gugl and Welling 2012; Juhari et al. 2013; Schwartz and Finley 2009; Updegraff et al. 2009; Wilcox 2002; Yaacob et al. 2012). Furthermore, these variables have also been used frequently as control variables in research that investigated relationships between parenting behaviors and adolescent developmental outcomes (Baker 2014; Gault-Sherman 2012; Harper 2010; Karre and Mounts 2012; Moon et al. 2014; Padilla-Walker et al. 2011).

2.3 Analysis Strategy

Following the two-step procedure introduced by Anderson and Gerbing (1988), the measurement model was first evaluated using confirmatory factor analysis. Specifically, convergent and discriminant validity were examined following Fornell and Larcker's (1981) technique. Factor loadings and average variance extracted (AVE) values of ≥ 0.5 and composite reliabilities of ≥ 0.6 suggest that a construct fulfills convergent validity. In addition, a squared correlation between two constructs that is less than the constructs' AVE scores suggests that discriminant validity can be assumed between those constructs. To control for inflated measurement errors as a result of having multiple items for the latent variables, item parcels were created. Specifically, according to Little, Cunningham, Shahar, and Widaman (2002), the item-to-construct balance approach was applied to create

parcels for the latent variables PA, NA, LS, academic self-efficacy, social self-efficacy, and emotional self-efficacy. The domain-representative approach was used to create parcels for the latent variables of paternal involvement and maternal involvement. According to Little and his collaborators (2002), item parceling is appropriate when researchers are interested in relationships between the latent constructs and not among the items. Two to four parcels per latent construct can be created.

The structural model was evaluated after the measurement model was accepted. To test mediation effects in the context of a multiple mediator model, the approach introduced by Preacher and Hayes (2008) was followed. Specifically, total indirect effects, specific indirect effects, and pairwise contrasts were estimated. Total indirect effect is the mediation effect of the set of mediators. Specific indirect effect is the unique mediator effect of a mediator above and beyond other mediators in the model. Pairwise contrasts compare the strengths of each specific indirect effect in relation to all other specific indirect effects. Bias-corrected bootstrapped 95 % confidence intervals of the indirect effects were derived from 10,000 resamples. If the interval does not include zero, a mediated effect is considered significant. The bootstrap method is preferred over other methods as it does not impose the assumption of normality of the sampling distribution of indirect effects, has a lower type I error rate, and has greater power to detect mediation (MacKinnon et al. 2002, 2004). According to Hayes (2009), unstandardized metrics are preferred in the mediation model. Hence, unstandardized regression coefficients are reported in this article.

All the analyses were conducted in Mplus 7 (Muthén and Muthén 1998–2012). As recommended by Hair, Black, Babin, and Anderson (2010), the extent of missing data can be determined for individual cases, individual variables, and the overall data set. In the present study, 54.5 % of the cases had complete data. The remaining cases were missing up to 8.33 % of their data. According to Hair et al. (2010), missing data under 10 % for an individual case can generally be ignored. Each key variable had between 0.00 and 3.24 % of missing values. Only 0.97 % of the entire data set contained missing values. No consistent relationships were found for the missing data among the variables. The full information maximum likelihood (FIML) estimate procedure was used to address missing values as it produces less biased estimates than list-wise deletion or mean substitution (Acocck 2005) under the assumption of missing at random (MAR). It was not possible to confirm that the missing data in the present study were, in fact, missing at random. Hence, the MAR assumption is possibly violated. However, FIML is an appropriate method as it is robust even when the assumption of MAR is not fully met (Schafer and Graham 2002). The fit of the model was evaluated using the comparative fit index (CFI), Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). The criteria of an acceptable model fit were CFI and TLI > .90; RMSEA < .06, and SRMR < .08 (Hu and Bentler 1999).

3 Results

3.1 Preliminary Analyses

Means, standard deviations, skewness, kurtosis, and correlations among the variables are presented in Table 1. The skewness and kurtosis values of all the variables, except for family income, were acceptably normal with no item possessing absolute skewness and kurtosis higher than 3 and 5, respectively (Kline 2011). Family income was transformed using natural log transformation and the resulting variable was well within acceptable

Table 1 Means, standard deviations, skewness, kurtosis, and correlations among variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Gender																	
2. Ethnicity	-.05																
3. Religion	-.05	.98**															
4. FF	.00	-.04	-.04														
5. FEL	-.04*	-.07*	-.07	-.02													
6. MEL	-.07*	-.07	-.07	.02	.68**												
7. NOC	.06	-.45**	-.45**	-.02	.01	-.07											
8. FI	-.11*	.08	.08	.10*	.51**	.52**	-.14**										
9. FI ^a	-.06	.02	.03	.08	.31**	.34**	-.17**	.63**									
10. PI	.12*	-.22**	-.21**	-.16**	.23**	.17**	.11*	.05	.06								
11. MI	.23**	-.21**	-.21**	-.04	.15**	.19**	.05	-.01	.04	.53**							
12. ASE	.19**	-.07	-.07	-.02	.13**	.18**	-.02	.05	-.01	.23**	.31**						
13. SSE	.09	-.09	-.09	.08	.10*	.13**	.00	.04	.01	.27**	.30**	.33**					
14. ESE	-.01	-.18**	-.17**	.00	.11**	.15**	.14**	.01	-.02	.28**	.26**	.39**	.52**				
15. PA	.10*	-.23**	-.23**	.00	.16**	.20**	.12*	.02	-.01	.35**	.39**	.37**	.48**	.48**			
16. NA	.14**	-.13**	-.12*	.00	.01	-.06	.10*	-.07	-.08	-.03	.05	-.10*	-.09	-.14**	.03		
17. LS	.03	.07	.07	-.13**	.08**	.04	-.03	.03	-.04	.33**	.26**	.27**	.12*	.21**	.16**	-.27**	
M	-	-	-	-	4.36	4.27	3.65	4.625,90 ^b	6.96	72.92	79.81	23.16	23.80	23.39	36.60	27.70	26.59
SD	-	-	-	-	1.51	1.41	1.62	7,341.55 ^b	2.83	15.24	12.95	4.52	4.43	4.62	5.72	5.43	5.62
Skewness	-.22	.43	.46	2.61	-.01	.04	1.05	8.96	-1.81	-.85	-.51	-.14	-.05	.02	-.14	.24	-.42
Kurtosis	-1.96	-1.82	-1.80	4.82	-.54	-.40	2.10	111.15	1.96	1.55	.01	.24	-.20	-.28	.15	.35	.30

FF family form, FEL fathers' education level, MEL mothers' education level, NOC number of children at home, FI family income, FI^a family income after natural log transformation; PI paternal involvement, MI maternal involvement, ASE academic self-efficacy, SSE social self-efficacy, ESE emotional self-efficacy, PA positive affect, NA negative affect, LS life satisfaction

* $p < .05$; ** $p < .01$

^b In Ringgit Malaysia (RM); 1 RM = approximately 0.31 USD

skewness and kurtosis ranges (Kline 2011). Examination of the correlation matrix indicated that correlations between the key variables were of low to moderate degree ($r = -.03$ to $.53$). A series of multiple regressions were conducted with parental involvement and self-efficacy beliefs as the predictors of PA, NA, and LS. The collinearity statistics were well within the acceptable ranges (Hair et al. 2010) with no tolerance values less than $.60$ and no VIF values greater than 1.6 , suggesting that the data of the present study did not exhibit a statistically significant multicollinearity problem. Adolescent gender, race, religion, family form, fathers' and mothers' education level, and number of children at home were significantly related to at least one of the independent and dependent variables. Therefore, these variables were controlled for when testing the mediation model to reduce confounding effects. Family income was not included as a control variable because it was not significantly related to any key variables. According to Becker (2005), control variables are recommended for inclusion only in cases of significant correlation with focal variables, to avoid spurious suppression.

3.2 Measurement Model

Confirmatory factor analysis showed that the measurement model fit the data well (CFI = 0.974 , TLI = 0.966 , RMSEA = 0.039 and SRMR = 0.029). Factor loadings for each of the indicators, AVE estimates, and construct reliabilities are shown in Table 2. All the factor loadings for the indicators on the latent variables were greater than $.50$ and significant ($p < .001$). Although the AVE estimate of NA was lower than $.50$, it is considered acceptable as its composite reliability was adequate ($.711$). None of the squared correlations (see Table 3) were higher than the AVE estimates. Overall, convergent and discriminant validity were supported.

3.3 Structural Model

The test of the hypothesized multiple mediator model as depicted in Fig. 1 resulted in a good fit to the data (CFI = 0.939 , TLI = 0.925 , RMSEA = 0.050 and SRMR = 0.045). Table 4 shows the bootstrap results for indirect effects and pairwise contrasts. Inspection of the total indirect effects indicated that the set of the proposed mediators significantly mediated the relationships of paternal and maternal involvement to PA (paternal involvement: CI_{.95} $.020$, $.064$; maternal involvement: CI_{.95} $.034$, $.072$), NA (paternal involvement: CI_{.95} $-.022$, $-.004$; maternal involvement: CI_{.95} $-.029$, $-.006$), and LS (paternal involvement: CI_{.95} $.006$, $.054$; maternal involvement: CI_{.95} $.018$, $.067$).

Examination of specific indirect effects revealed that academic self-efficacy and social self-efficacy reached statistical significance as unique mediators of the paternal involvement–PA relationship (academic self-efficacy: CI_{.95} $.004$, $.024$; social self-efficacy: CI_{.95} $.011$, $.048$). Comparable results were found in the maternal involvement–PA relationship (academic self-efficacy: CI_{.95} $.006$, $.031$; academic self-efficacy: CI_{.95} $.019$, $.053$). There were no significant specific indirect effects detected in the relationships of paternal involvement and maternal involvement to NA. Academic self-efficacy was found to be a unique mediator in the relationships of paternal involvement and maternal involvement to LS (paternal involvement: CI_{.95} $.015$, $.068$; maternal involvement: CI_{.95} $.031$, $.086$).

Inspection of pairwise contrasts showed a few statistically significant results. However, these results deserved minimal attention because only one mediator was found to be significant in all pairwise comparisons. For example, the pairwise comparison between academic self-efficacy and social self-efficacy was significant in the relationship of

Table 2 Results of the convergent and discriminant validity analyses

Construct	Indicators	Standardized factor loadings	AVE	CR
Paternal involvement	Parcel 1	.924	.857	.947
	Parcel 2	.920		
	Parcel 3	.933		
Maternal involvement	Parcel 1	.881	.820	.932
	Parcel 2	.900		
	Parcel 3	.935		
Academic self-efficacy	Parcel 1	.738	.547	.707
	Parcel 2	.741		
Social self-efficacy	Parcel 1	.707	.530	.692
	Parcel 2	.748		
Emotional self-efficacy	Parcel 1	.751	.564	.721
	Parcel 2	.751		
Positive affect	Parcel 1	.786	.613	.826
	Parcel 2	.805		
	Parcel 3	.757		
Negative affect	Parcel 1	.638	.451	.711
	Parcel 2	.648		
	Parcel 3	.726		
Life satisfaction	Parcel 1	.803	.686	.814
	Parcel 2	.853		

AVE average variance extracted, CR composite reliability

Table 3 Squared correlations between the constructs

	1	2	3	4	5	6	7
1. Paternal involvement							
2. Maternal involvement	.306						
3. Academic self-efficacy	.093	.141					
4. Social self-efficacy	.114	.145	.275				
5. Emotional self-efficacy	.108	.108	.364	.523			
6. Positive affect	.154	.210	.289	.403	.367		
7. Negative affect	.001	.008	.006	.009	.017	.002	
8. Life satisfaction	.160	.128	.194	.051	.097	.064	.052

paternal involvement to LS. However, in the specific indirect results, academic self-efficacy was identified as a unique mediator, whereas social self-efficacy was not.

Effects of control variables on the mediators and dependent variables in the structural model are presented in Table 5. A few significant effects were detected. Specifically, adolescent gender was found to be significantly related to academic self-efficacy ($\beta_{\text{unstandardized}} = .339, p < .05$), PA ($\beta_{\text{unstandardized}} = -.291, p < .05$), and NA ($\beta_{\text{unstandardized}} = .343, p < .05$). These results suggest that female adolescents had higher academic self-efficacy and NA but lower PA than male adolescents. In addition, family form

Table 4 Bootstrap results for indirect effects and pairwise contrasts

	Paternal involvement			Maternal involvement		
	EST	SE	95 % CIs	EST	SE	95 % CIs
<i>Positive affect</i>						
Indirect effects						
Total	.040	.011	(.020, .064) ^a	.051	.010	(.034, .072) ^a
ASE	.011	.005	(.004, .024) ^a	.016	.006	(.006, .031) ^a
SSE	.026	.009	(.011, .048) ^a	.033	.009	(.019, .053) ^a
ESE	.002	.002	(.000, .006)	.002	.001	(.000, .006)
Contrasts						
ASE versus SSE	-.015	.010	(-.038, .002)	-.017	.011	(-.040, .003)
ASE versus ESE	.009	.005	(.001, .022) ^a	.014	.006	(.004, .029) ^a
SSE versus ESE	.024	.010	(.009, .046) ^a	.031	.009	(.017, .052) ^a
<i>Negative affect</i>						
Indirect effects						
Total	-.011	.005	(-.022, -.004) ^a	-.015	.006	(-.029, -.006) ^a
ASE	-.004	.004	(-.014, .002)	-.006	.005	(-.018, .004)
SSE	-.008	.005	(-.021, .001)	-.010	.007	(-.025, .001)
ESE	.001	.002	(-.003, .005)	.001	.002	(-.002, .004)
Contrasts						
ASE versus SSE	.004	.008	(-.011, .021)	.004	.010	(-.015, .025)
ASE versus ESE	-.005	.005	(-.016, .003)	-.007	.006	(-.019, .004)
SSE versus ESE	-.009	.006	(-.024, .001)	-.010	.007	(-.027, .001)
<i>Life satisfaction</i>						
Indirect effects						
Total	.027	.012	(.006, .054) ^a	.040	.013	(.018, .067) ^a
ASE	.036	.013	(.015, .068) ^a	.053	.014	(.031, .086) ^a
SSE	-.011	.008	(-.032, .002)	-.013	.010	(-.037, .003)
ESE	.001	.003	(-.005, .007)	.001	.002	(-.004, .006)
Contrasts						
ASE versus SSE	.047	.018	(.019, .091) ^a	.066	.020	(.034, .115) ^a
ASE versus ESE	.036	.013	(.014, .068) ^a	.052	.014	(.030, .086) ^a
SSE versus ESE	-.011	.010	(-.036, .004)	-.014	.011	(-.040, .005)

ASE academic self-efficacy, SSE social self-efficacy, ESE emotional self-efficacy, EST estimates, SE standard error

^a 95 % CI does not include 0

was found to be significantly related to LS ($\beta_{\text{unstandardized}} = -1.172, p < .05$), suggesting that adolescents from intact families had higher LS than those from non-intact families.

4 Discussion

The primary purpose of the current study was to examine the extent to which academic self-efficacy, social self-efficacy, and emotional self-efficacy explain the associations

Table 5 Effects of control variables on the mediators and dependent variables in the structural model

	ASE	SSE	ESE	PA	NA	LS
Gender	.339*	.064	-.200	-.291*	.343*	-.338
Ethnicity	-.202	.100	-.519	-.086	-.371	.914
Religion	.347	.088	.240	-.318	-.067	.259
FEL	.062	.076	-.002	.081	.085	.170
MEL	.081	.035	.107	-.012	-.066	-.194
NOC	-.076	-.007	.026	.021	.023	.037
FF	-.156	.432	.243	.070	-.228	-1.172*

FEL fathers' education level, *MEL* mothers' education level, *NOC* number of children at home, *FF* family form, *ASE* academic self-efficacy, *SSE* social self-efficacy, *ESE* emotional self-efficacy, *PA* positive affect, *NA* negative affect, *LS* life satisfaction

* $p < .05$

between parental involvement and SWB in adolescents. The overall picture illustrated by the current study suggests that PA, NA, and LS are influenced differently. This provides support for the recommendations of other researchers (e.g., Busseri and Sadava 2011; Diener et al. 1999; Morgan et al. 2011) that investigating all three components of SWB within the same study and treating them as separate dimensions is crucial. In addition, the present study adds to a growing body of literature suggesting that paternal involvement is just as important to adolescent positive development as maternal involvement. In line with the ultimate goal of positive psychology to discover factors that promote human well-being, the results of the current study suggest that self-efficacy could be an internal resource that promotes adolescent well-being.

A multiple mediator model provided information on the mediation effect of the set of proposed mediators, the mediation effect of each mediator above and beyond other proposed mediators, and the relative magnitude of each mediator (Preacher and Hayes 2008). In the present study, the significant total indirect effects suggest that parental involvement may have beneficial effects on adolescent academic self-efficacy, social self-efficacy, and emotional self-efficacy. This effect suggests also, to some extent, these self-efficacy beliefs may come into play, influence each other, and together contribute to adolescent SWB. The results for specific indirect effects revealed that paternal and maternal involvement may increase adolescent efficacious beliefs in the academic field and social relationships and that, therefore, each of these beliefs may play a unique role in promoting PA and/or LS.

According to Bandura (2005), individual functioning has its foundation in the social environment. Self-efficacy is developed through mastery experiences, social modeling, and persuasions (Bandura 2012). Despite the occurrence of the individuation process in the adolescence period, parents continue to be salient within the adolescent social environment (Schwarz et al. 2012). Past studies have demonstrated that parental advice and encouragement have positive impacts on adolescent academic self-efficacy (Fan and Williams 2010; Mena 2011). In addition, parental guidance for social problem-solving and the provision of social opportunities predicted children's social competence (McDowell and Parke 2009). Moreover, parents may contribute to adolescent emotional competence by being role model, demonstrating social referencing, providing optimal encouragement, and coaching adolescents in expressing and regulating emotions (Morris et al. 2007). Hence, it may be via positive involvement in various aspects of adolescent children's lives that a parent communicates efficacious beliefs through being a role model, providing guidance,

and being encouraging in difficult encounters and accomplishments. Thus, this behavior creates opportunities for efficacious actions and support of mastery experiences, which are then internalized by adolescent children to develop their own efficacy level (Weiser and Riggio 2010; Whitbeck 1987). In turn, these efficacious beliefs serve as an internal resource that enhances adolescent SWB.

Self-efficacy has been posited to enhance human functioning via affective, cognitive, motivational, and decisional processes (Bandura 2012). Higher self-efficacy establishes a sense of control through beliefs that positive outcomes are achievable, resulting in positive guides, support for performance, less vulnerability to stress and disturbing thought patterns, and perseverance in the face of difficulty, thus promoting accomplishments. With accomplishments, one experiences PA (Snyder 2002; Snyder et al. 1996) and derives satisfaction from life (Sahan et al. 2012). Adolescence has been recognized as a particularly stressful period of life (Hostinar and Gunnar 2013). Increased academic demands are one of the achievement-related stressors reported at this life stage (Hankin et al. 2007; Mezulis et al. 2010). Additionally, time spent in academic learning accounts for a large portion of adolescent life (Bassi et al. 2011). Empirical findings corroborate the positive contribution of adolescent academic self-efficacy to PA (e.g., Lackaye et al. 2006; Putwain et al. 2013; Steca et al. 2011) and LS (e.g., Suldo and Shaffer 2007; Vecchio et al. 2007). It is possible that adolescents with a strong sense of academic self-efficacy possess greater academic interest and motivation, manage academic stressors more successfully, expend greater efforts, and remain persistent in the face of difficulty and failure (Bandura 1997; Bandura et al. 1996; Bassi et al. 2007; Zimmerman 1995; Zimmerman and Bandura 1994). These qualities likely lead to accomplishment, which in turn leads to PA and satisfaction. These arguments support the unique mediation role of academic self-efficacy in the relationship between parental involvement and adolescent PA and LS.

During adolescence, relationships with nonparental figures such as peers take on increased meaning (Roeser et al. 1998). In this study, social self-efficacy refers to perceived capabilities for peer relationships (Muris 2001). Fundamentally, social connectedness and positive interactions contribute to one's PA (Hawkey et al. 2003, 2007; Ingersoll-Dayton et al. 1997; Newsom et al. 2003; Rook 2001). Extant literature corroborates the positive relationship between social self-efficacy and PA in adolescents (e.g., Caprara et al. 2006; Meng et al. 2014). Further, adolescent peer relations have been shown to be associated with higher PA (e.g., Proctor et al. 2010). It is plausible that adolescents with a strong sense of social self-efficacy are higher in sociability and able to make more friends. They may interact more frequently and effectively with their peers and have a greater sense of control over the outcome of a conflict situation (Connolly 1989; Gresham 1984; Proctor et al. 2009; Torquati and Vazsonyi 1999). This might lead them to be more socially connected and increase their chances of having more positive interactions with peers, thereby increasing their PA. These arguments shed light on the unique mediation role of social self-efficacy in the relationship between parental involvement and adolescent PA.

Despite some past studies (e.g., Meng et al. 2014; Suldo and Shaffer 2007; Vecchio et al. 2007; Wright and Perrone 2010) indicating positive contributions of social self-efficacy to adolescent LS, this study did not find support for social self-efficacy as a unique mediator in the relationship between parental involvement and adolescent LS. Joint consideration of this result and the significant mediation role of social self-efficacy in the relationship between parental involvement and adolescent PA suggests that perceived competency in peer relations may contribute to adolescents' pleasant emotions but may not necessarily affect overall LS like perceived competency in the academic domain. These findings are consistent with a study conducted by Morgan et al. (2011) which found

that distal variables such as peers only influence adolescent PA but not LS. As adolescents spend a lot of time in school, it is understandable that their perceived abilities in dealing with academics and peers may influence their day-to-day affective feelings (e.g., PA). According to Haybron (2008), LS is closely linked to one's priorities. Correspondingly, Diener, Napa Scollon, and Lucas (2009) argued that domains perceived as being very important to an individual are likely to serve as a source of information used to evaluate LS. As in many Asian countries, particular emphasis is placed on academic achievement in Malaysia (Chew et al. 2012; Chong 2007; Dzulkifli and Alias 2012; Remali et al. 2013), as it is considered a ladder to future success, e.g., gaining admission to a university, receiving a scholarship, securing a good job, having a high standard of living (Ismail 1998; Lau et al. 2000; Yuen and Fong 2013). Hence, it is plausible that Malaysian adolescents perceive academic achievement as important and of higher priority than other aspects of life (e.g., peer relations), and therefore, the adolescents' evaluation of overall LS (e.g., "My life is going well") is judged primarily by how well they can perform academically at school.

Notably, in the presence of academic self-efficacy and social self-efficacy, emotional self-efficacy did not mediate the relationship of paternal involvement and maternal involvement to PA and LS. In this study, emotional self-efficacy refers to the perceived capability of regulating negative emotions (Muris 2001). Existing literature (e.g., Diener and Emmons 1984; Lucas et al. 1996) suggests that there is some degree of independence between positive and negative emotions (e.g., people with low negative emotions are not necessarily full of positive emotions) and affect and LS (e.g., people may report low LS in conjunction with frequent PA). Besides, the experience of positive emotions was more strongly related to LS than the absence of negative emotions (Kuppens et al. 2008). Hence, regulation of negative emotions may not result in a corresponding increase in PA and LS. Further, Suh, Diener, Oishi, and Triandis (1998) found that emotions played less of a role in LS judgments among collectivists. Together, these offer a plausible explanation of why emotional self-efficacy played a less potent mediation role when tested simultaneously with academic self-efficacy and social self-efficacy in the relationship of paternal involvement and maternal involvement to adolescent PA and LS.

As a set, academic self-efficacy, social self-efficacy, and emotional self-efficacy mediated the relationships of paternal involvement and maternal involvement to NA. However, none of the proposed mediators uniquely mediated the relationships of paternal involvement and maternal involvement to NA. Negative emotions are highly differentiated in nature (Ben-Ze'ev 2000; Fredrickson 1998; Grandey 2008). Furthermore, when the specificity of self-efficacy has low correspondence to the criterion variable, the predictive power of self-efficacy is weakened (Bandura 1986). Researchers (e.g., Lightsey et al. 2013) suggest that self-efficacy beliefs targeted to more specific negative emotions could be more accountable. Correspondingly, the null result could be attributed to a lack of specificity of the self-efficacy measures in relation to NA. Alternatively, the present study viewed the development of adolescent SWB as rooted in the social environment, and the null findings could be due to this perspective. Past studies (e.g., Goldsmith et al. 1999; Novgorodovaa et al. 2013) demonstrated a strong genetic influence on negative emotions, whereas there was a strong environmental influence on PA.

The results of this study need to be considered in light of a number of limitations. First, this was a cross-sectional study, which limits any causal inferences. Parenting, self-efficacy beliefs, and SWB are dynamic constructs that could change over time (Bandura and Wood 1989; Bastaitis and Mortelmans 2014; Busseri and Sadava 2013), and their interplay is also dynamic (Bandura 2012). The data of the present study were interpreted in fairly

unidirectional terms, with parenting and internal resources affecting adolescent well-being. However, the reverse could also be true. For instance, using longitudinal data, Saha et al. (2010) showed that after controlling for baseline levels of LS, none of the parenting behaviors at Time 1 predicted changes in adolescent LS. Nevertheless, the reverse direction was supported, with baseline LS predicting positive changes in parental support. Hence, it remains unclear whether the mediation effects found in the present study would be supported in a longitudinal study. Future studies could consider testing reciprocal models using longitudinal design to provide a better understanding of the relationships between parental involvement, self-efficacy beliefs, and SWB, as well as the function of self-efficacy beliefs serving as mediators over time.

Second, because all information was derived from adolescent self-reports, future studies that simultaneously employ a multiple-informants approach are recommended. Third, as all the students in the selected classes were involved in the current study, students from the same class may share similar characteristics. Hence, the demographic backgrounds of the sample in the present study may not be as diverse as they could have been, had a simple random sampling approach been used. Fourth, there might be other psychological constructs connecting parental involvement and adolescent SWB. Some possible mediators may include (but are not limited to) optimism, self-esteem, and resilience, which have been shown to be related to parenting behaviors and SWB (e.g., Ben-Zur 2003; Kong et al. 2013; Palomar-Lever and Victorio-Estrada 2014). Fifth, although the present study included various sociodemographic variables as control variables, the obtained results may still be subject to omitted variable bias, because of the inability to control for some factors (e.g., personality, genetics, and academic performance) that have been identified in previous literature (e.g., Baker et al. 1992; Cheng and Furnham 2002; Goldsmith et al. 1999; Goswami 2014; Lykken and Tellegen 1996; Novgorodova et al. 2013; Schimmack et al. 2008; Weiss et al. 2008) as important correlates of and/or contributors to SWB.

Finally, our sample presented several challenges in terms of generalizability. The samples were obtained from high school students who resided in the Territory of Kuala Lumpur (an urban area in Malaysia), limiting the generalizability of the results to Malaysian adolescents who are not enrolled in schools, individuals of other age groups, and/or people from rural areas. Furthermore, although the characteristics of collectivistic culture offer plausible explanations for the findings of the present study, cautious interpretation is needed, as the survey was administered in a school setting where much social interaction occurs and students are expected to achieve. Therefore, participants could place extra weight on the importance of academic self-efficacy and social self-efficacy when reporting PA and/or LS. This could cause an overestimation of these particular efficacious beliefs in relation to the components of SWB. Moreover, as the plausible explanations were interpreted using rather general collectivistic cultural values shared by Malaysians as a whole (ethnicity and religion were controlled for), valuable information concerning the variations in ethnicity and religion, as they relate to Malaysian SWB, was lost. Thus, these specific cultural aspects could be further examined in future studies. As cultural differences influence parenting, self-efficacy beliefs, and SWB, the results of this study should also be interpreted carefully in populations with different cultural origins.

Despite these limitations, the present study extends our insight into the roles of academic, social, and emotional self-efficacy in the relationships between parental involvement and the components of SWB among adolescents. Future psychological interventions

aiming to promote adolescent SWB could consider the specific roles of these efficacy beliefs in promoting specific aspects of SWB.

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Fathers are helping, mothers are hovering: Differential effects of helicopter parenting in college first-year students

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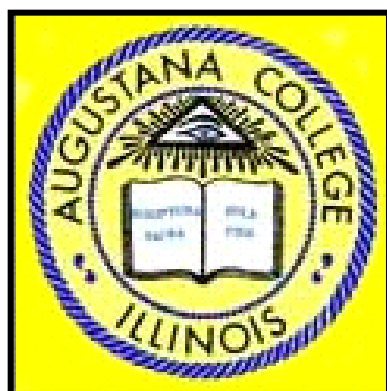
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Fathers are helping, mothers are hovering: Differential effects of helicopter parenting in college first-year students

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BACKGROUND

- Self-Determination Theory (SDT; Deci & Ryan, 1985/1991) states that humans have three critical needs – autonomy, competence, and relatedness – that are necessary for optimal development.
- The current study posits that helicopter parenting may interfere with the development of these needs. Helicopter parenting is defined as excessive parental involvement, attention, and investment (Padilla-Walker & Nelson, 2012); these parental practices have been linked with adolescent negative outcomes, including greater mental health symptomatology and decreased autonomy (Schiffrin et al., 2014).
- The current study intentionally focused on first-year college students who were experiencing significant developmental changes in social and academic domains and were away from home for the first time.
- We examined both mothers and fathers given the different roles they may play in adolescents' lives.
- Because helicopter parenting theoretically and empirically impinges on SDT needs, it was hypothesized that first-year students with helicopter parents would be more likely to experience negative outcomes (i.e., greater depression, panic, social anxiety, sexual and substance risk taking, peer insecurity, and less social and academic competence).

METHOD

Participants and Procedure

- First-year college students ($N = 156$; 45 Males, 111 Females) completed a forty-five minute online questionnaire.
- After the completion of the questionnaires, the participants were rewarded with either course credit or a five dollar gift card.

Measures

- The *Helicopter Parenting Behaviors* (Schiffrin et al., 2014; 9 items for each parent) and *Helicopter Parenting* (Padilla-Walker & Nelson, 2012; 5 items for each parent) questionnaires were standardized and aggregated to examine perceived helicopter parenting behaviors of mothers ($M = .15$, $SD = .88$) and fathers ($M = .13$, $SD = .93$).
- The *Inventory of Depression and Anxiety Symptoms* (Watson et al., 2007; 64 items) assessed depression ($M = 45.15$, $SD = 14.23$, possible range = 20–100), social anxiety ($M = 11.03$, $SD = 5.02$, possible range=5-25), and panic ($M = 11.66$, $SD = 4.43$, possible range = 8-40).
- Substance Use Risk-Taking* questions (4 items) were created to assess alcohol and drug use ($M = 5.10$, $SD = 1.64$, possible range = 4-16).
- Sexual Risk-Taking* questions (3 items) were created to assess participants' risk-taking in sexual domains (i.e., use of protection, number of partners; $M = 1.75$, $SD = 1.93$, possible range = 0-8).
- The *Inventory of Parent and Peer Attachment* (Armsden & Greenberg, 1987/2009; 25 items) was used to assess security to peers ($M = 100.64$, $SD = 13.45$, possible range = 25-125).

METHOD (continued)

Measures (continued)

- The *Self-Perception Profile for College Students* (Messer & Harter, 1986; Neemann & Harter, 2012) questionnaire was used to assess social competence (8 items; $M = 2.60$, $SD = .54$, possible range = 1-4) and academic competence (8 items; $M = 2.79$, $SD = .66$, possible range = 1-4).

RESULTS

Correlations

- Correlations among all variables can be found in Table 1. Of note, mothers' helicopter parenting was positively associated with fathers' helicopter parenting, social competence was positively associated with academic competence, and indices of internalizing problems were all associated with one another.

Table 1

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. M Helicopter	--								
2. F Helicopter	.71***	--							
3. Social Competence	-.12	.11	--						
4. Academic Competence	-.03	.10	.17*	--					
5. Substance Use	-.04	.05	.32***	-.12	--				
6. Sexual Risks	-.11	.06	.31***	-.10	.26***	--			
7. Peer Security	-.10	-.01	.43***	.14	.17*	.07	--		
8. Depression	.10	-.07	-.25**	-.51***	.04	.02	-.20*	--	
9. Social Anxiety	.15	.01	-.45***	-.31***	-.09	.05	-.25***	.63***	--
10. Panic	.13	.03	-.14	-.24**	-.05	.02	-.12	.64***	.61***

*** $p < .001$, ** $p < .01$, * $p < .05$, + $p < .10$; M=Mother, F=Father

Regression Analyses

- Eight multiple regressions (Table 2) were conducted examining the impact helicopter parenting has on first-year college students. The same predictors (i.e., gender, mothers' and fathers' helicopter parenting) were examined in each regression. The outcomes included depression, panic, social anxiety, substance use, sexual risk-taking, peer security, academic competence, and social competence.
- Higher scores in *mothers'* helicopter parenting were associated with greater depression and social anxiety.
- Higher scores in *fathers'* helicopter parenting were associated with greater social competence and peer security and less depression.
- Thus, the pattern of results suggests that mothers' helicopter parenting was associated with negative outcomes, whereas fathers' helicopter parenting was associated with positive outcomes.

RESULTS (continued)

Table 2

Outcome: Depression				Outcome: Social Anxiety			
Predictors	B	SE	p	Predictors	B	SE	p
Gender	-.00	.19	.99	Gender	-.14	.18	.46
M Helicopter	.37	.14	.01**	M Helicopter	.31	.13	.02*
F Helicopter	-.32	.13	.02*	F Helicopter	-.19	.13	.14
$F(3, 147) = 2.76, p < .05, R^2 = .05$				$F(3, 147) = 2.38, p < .07, R^2 = .05$			
Outcome: Panic				Outcome: Sexual Risk-Taking			
Predictors	B	SE	p	Predictors	B	SE	p
Gender	-.22	.17	.20	Gender	-.14	.19	.46
M Helicopter	.22	.12	.07	M Helicopter	-.32	.14	.02*
F Helicopter	-.10	.12	.41	F Helicopter	.29	.13	.03*
$F(3, 147) = 2.14, p < .10, R^2 = .04$				$F(3, 147) = 2.01, p < .12, R^2 = .04$			
Outcome: Social Competence				Outcome: Academic Competence			
Predictors	B	SE	p	Predictors	B	SE	p
Gender	-.27	.18	.14	Gender	-.14	.18	.44
M Helicopter	-.46	.13	.001***	M Helicopter	-.29	.13	.03*
F Helicopter	.45	.13	.00***	F Helicopter	.31	.13	.02*
$F(3, 147) = 5.03, p < .00, R^2 = .09$				$F(3, 147) = 2.12, p < .10, R^2 = .04$			
Outcome: Peer Security				Outcome: Substance Use			
Predictors	B	SE	p	Predictors	B	SE	p
Gender	-.67	.18	.00***	Gender	.14	.17	.41
M Helicopter	-.34	.13	.01**	M Helicopter	-.11	.12	.36
F Helicopter	.29	.13	.02*	F Helicopter	.10	.12	.37
$F(3, 147) = 5.71, p < .00, R^2 = .10$				$F(3, 147) = .76, p < .52, R^2 = .02$			

CONCLUSIONS

- Previous research has generally found that helicopter parenting is problematic for development; our research found that, at least in first-year students, mothers' and fathers' parenting may be viewed differently.
- Mothers may have been perceived as being intrusive, and their parenting negatively impacted the student; fathers may have been seen as protective, and their parenting was positively received. Future research should examine the different perceptions of mothers' and fathers' helicopter parenting and examine why these different perceptions exist.
- Although this study relied exclusively on self-reports, this method was crucial to our research questions – we obtained insight into adolescents' parenting perceptions and answers to sensitive questions (e.g., sexual behavior) to which other informants would not have had such insight.

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