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Trajectories of School Engagement During Adolescence: Implications for Grades, Depression, Delinquency, and Substance Use

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Using longitudinal data from the 4-H Study of Positive Youth Development, the authors assessed 1,977 adolescents across Grades 5 to 8 to determine if there were distinctive developmental paths for behavioral and emotional school engagement; if these paths varied in relation to sex, race/ethnicity, and family socioeconomic status (SES); and whether links existed between trajectories of school engagement and grades, depression, substance use, and delinquency. Four trajectories for behavioral school engagement and four trajectories of emotional engagement were identified using a semiparametric mixture model. These trajectories were distinct with regard to initial levels of and changes in engagement, as well as to their shapes. Trajectories varied in regard to sex, SES, and race/ethnicity. Different trajectories of behavioral and emotional engagement were linked to grades, depression, delinquency, and substance use. Directions for future research and application are discussed.

Keywords: school engagement, depression, delinquency, substance use, grades

Among American youth, early adolescence often involves decreases in academic achievement (Fredricks & Eccles, 2002; Ryan & Patrick, 2001) and marked increases in adjustment problems, such as depression (Graber, 2004), delinquency, and substance use (Farrington, 2004). Young people of color and from disadvantaged backgrounds in particular are found to have a greater likelihood of being alienated from school and at risk for academic failure (Finn, 1993; McDermott, Mordell, & Stolzfus, 2001). These problematic trends may be a result of youth not taking advantage of opportunities available in their contexts, such as the school, the family, or the community (Eccles & Roeser, 2009). For instance, failing to engage in school-based instructional and social activities may be linked to decreased academic achievement and increased adjustment problems. Students may not only miss the opportunity to acquire knowledge but also be exposed to risky activities.

Given the link between profiting from one's experiences in school and successes in life, the concept of school engagement—the extent to which students participate in the academic and nonacademic activities of school, feel connected at school, and value the goals of education (Finn, 1989; Glanville & Wildhagen, 2007)—is of fundamental significance for understanding positive development among youth. There are at least two well-measured components of school engagement: behavioral and emotional (Fredricks, Blumenfeld, & Paris, 2004; Li, Bebiroglu, Phelps, Lerner, & Lerner, 2008).[1] Behavioral school engagement entails involvement in academic activities, participation in school-based social activities, positive conduct, and the absence of disruptive behaviors (Fredricks et al., 2004). Emotional engagement involves a student's emotional reactions to the school, the teacher, and schoolmates (Stipek, 2002). These two dimensions of school engagement have been found to be positively linked, albeit conceptually distinct (Fredricks et al., 2004).

On the basis of past research, we expected the two dimensions of school engagement to be positively related. Nevertheless, we anticipated that both components of engagement have different antecedents and may develop differently across adolescence, given the young person's changing relations within a developmental system involving peers, parents, the school, and other components of the ecology of human development (Lerner, 2002). For instance, one may expect that although boys are not as behaviorally engaged as are girls with the academic facets of school (e.g., they may be more disruptive in class or may fail to complete homework more frequently), they may enjoy (have positive emotional engagement with) the social and extracurricular (e.g., sports) facets of school. In turn, it may arguably be the case that students from wealthier families might be better behaved in school but may not necessarily feel better about school than do youth from less affluent families. As such, studies that investigate the role of both types of engagement would provide a richer characterization of youth and their relationships with the school context. Measuring both components would also benefit the study of school engagement by allowing a more nuanced understanding of the associations between each type of engagement and other characteristics of youth.

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[1] Some scholars have suggested that cognitive engagement represents a third component of this construct. However, a consensus on how cognitive engagement should be conceptualized and defined is yet to emerge. In addition to conceptual disputes about this component (Fredricks et al., 2004), a psychometrically useful index of cognitive engagement does not presently exist.

Unfortunately, with only a few exceptions, prior research has either combined conceptually different engagement measures into a general index or only tested one of the components of engagement. Both approaches have missed the opportunity to reveal potentially important differences in antecedents of engagement and to disentangle the unique contribution of each type of school engagement for different developmental outcomes, such as depressive symptoms and externalizing behaviors—two problematic covariates of decreases in school engagement and academic achievement (Ma, Phelps, Lerner, & Lerner, 2009; Simmons & Blyth, 1987). Accordingly, to address this gap in literature, we made examining behavioral and emotional engagement simultaneously the first of our three goals in the current study.

Given the complexity of context and the diversity among individual characteristics, heterogeneity in the nature and trajectories of behavioral and emotional school engagement are likely to exist. For instance, it may be that there is a group of youth that continues to be highly involved in school behaviorally and another group of youth that loses interest in academic work as their educational career progresses. Another group of adolescents may not feel connected early on but may gradually develop positive affects toward school. However, most research on school engagement has been conducted with cross-sectional designs (Fredricks et al., 2004), and thus there is limited empirical information about how behavioral and emotional forms of school engagement develop during adolescent years and about the individual differences in such development (Ladd & Dinella, 2009). One study providing at least initial elucidation of this variation was conducted by Janosz, Archambault, Morizot, and Pagani (2008). Studying high school adolescents, they found links between unstable pathways of school engagement and the likelihood of dropping out of school. The study provided insight into how "individual variations in the nature and course of school engagement can culminate in dropping out" (Janosz et al., 2008, p. 24) and challenged the conception that adolescents experience a common developmental pattern of growth or decline. Given such findings, the use of process- and person-centered methods would be useful in identifying variation in the development of school engagement (Bergman & Trost, 2006). For instance, group-based mixture models lend themselves to identifying the various trajectories of school engagement that may be qualitatively different among subpopulations of adolescents (Nagin, 2005).

A limitation of the Janosz et al. (2008) study is that, by combining items that index behavior and emotion into a general scale, it precluded the possibility of identifying differences among distinct types of school engagement. Accordingly, in the present study, we sought to ascertain whether trajectories of behavioral and emotional school engagement existed. If, as anticipated, these different pathways did exist, we intended to explore whether the pathways were distinct with regard to the initial levels (intercepts) of engagement and the slopes of change, as well as to the patterns of change (shapes) in school engagement. On the basis of the Janosz et al. (2008) findings, expectations may be formulated about the nature of distinct pathway groups that might exist. That is, these findings suggest that there may be groups of students who will manifest problematic trajectories of school engagement, for instance, by reporting rapid decreases in behavioral or emotional school engagement or by exhibiting consistently low levels of engagement. In turn, logically, another group might report relatively stable pathways of behavioral or emotional engagement, and still another group might show increasing engagement over the adolescent years. Because of the scarcity of empirical evidence on the differential developmental trajectories of different types of school engagement, we did not make predictions on the specific number of trajectory groups we might find in regard to behavioral and emotional engagement. We did expect that relative to behavioral engagement, which is often monitored by teachers and parents, emotional engagement is more likely to fluctuate or, more specifically, to deteriorate over time. In other words, we expected that youth would be more likely to experience unstable trajectories of emotional engagement than unstable pathways of behavioral engagement.

We had two additional goals for the present research. The second goal was to investigate if and how core demographic variables, such as sex, race/ethnicity, and family socioeconomic status (SES), covary with positive or problematic pathways of school engagement. This assessment may elucidate potential markers of risk and protective factors associated with the development of school engagement. For instance, levels of school engagement have been found to vary in relation to these demographic characteristics. M. K. Johnson, Crosnoe, and Elder (2001) found that SES, as measured by parents' educational attainment, was positively linked to behavioral school engagement. Conversely, adolescents from low SES families are often found to experience severe emotional disengagement from school and are at higher risk of academic failure (Kalil & Ziol-Guest, 2008; McLoyd, 1998; Rumberger & Larson, 1998). The risks of experiencing academic difficulties and school failure during early adolescence increase considerably for students of color and youth from low SES families (Murray, 2009). Latino and African American youth are more likely than European American youth to report poor grades, to drop out of school, and to suffer from disengagement from school (Luthar, 1999; McLoyd, 1998; Ogbu, 2003). Furthermore, boys have higher dropout rates and more severe behavioral disengagement from school than do girls (National Center for Education Statistics, 2002). In addition, boys have been found to have lower levels of emotional school engagement than girls (Whitlock, 2006). Of course, we did not expect that all Latino and African American youth or youth from low SES families would fall prey to problematic trajectories of engagement. Some would remain highly engaged or even increase their engagement over time. We did expect, however, that a student's demographic characteristics would be associated with different likelihoods for him or her to experience different trajectories.

Despite such demographic variations in levels of school engagement, no studies have examined whether demographic variables are linked to adolescents having different trajectories of development. Accordingly, given that the second goal of this study was to assess how school engagement trajectories varied in relation to these demographic variables, we aimed to ascertain if boys were more likely than girls to experience problematic pathways of behavioral or emotional school engagement or if higher levels of maternal education and family income predicted higher levels of and positive changes in behavioral or emotional engagement during adolescence. On the basis of the extant literature (e.g., Fredricks et al., 2004; Whitlock, 2006), we hypothesized that boys would exhibit lower behavioral school engagement but not lower emotional engagement than girls and that any decline in behavioral but not emotional engagement would be more pronounced in boys. Similarly, we also hypothesized that youth of color and youth from lower SES families would be more likely to experience lower behavioral or emotional engagement and more pronounced decreases in both types of engagement than youth from wealthier families.

The third goal of the present research was to assess the extent to which trajectories of emotional and behavioral school engagement matter for both academic and nonacademic outcomes. In other words, we sought to ascertain if distinct pathways of behavioral and emotional engagement were differently associated with the positive and problematic outcomes we assessed. By extrapolating from the point-in-time literature about positive covariation between school engagement and academic and nonacademic functioning (e.g., Catalano, Haggerty, Oesterle, Fleming, & Hawkins, 2004; Skinner, Wellborn, & Connell, 1990) to infer how these relationships might change developmentally, we hypothesized that higher levels of behavioral or emotional school engagement and more pronounced increases in school engagement would be associated with positive developmental outcomes. Similarly, we hypothesized that youth reporting persistently low and more pronounced declines in behavioral or emotional engagement would experience more problematic development. This dual focus on differentially valenced outcomes of behavioral and emotional school engagement is important because of unaddressed complexities in the school engagement literature.

On the one hand, there is ample evidence that school engagement positively covaries with academic outcomes (e.g., Finn & Rock, 1997; Marks, 2000; Whitlock, 2006). For example, W. Johnson, McGue, and Iacono (2006) found that behavioral school engagement was directly associated with changes in academic achievement during adolescence, above and beyond familial factors. In addition, students' problems with behavioral engagement in the first grade were associated with lower achievement four years later and their eventual decision to drop out of high school (Alexander, Entwisle, & Horsey, 1997). On the other hand, evidence is much scarcer about the link between emotional engagement and achievement (Fredricks et al., 2004). In other words, most of the evidence about the relations between school engagement and achievement derives from studies of behavioral engagement (Finn & Rock, 1997) or from studies that apply a general measure of all types of engagement (e.g., Skinner et al., 1990). Studies that allow for an examination of the unique contribution of emotional engagement, in addition to that of behavioral engagement, on academic achievement are needed.

Moreover, although school engagement is perceived mainly as a critical factor in promoting academic achievement during adolescence, its role as a protective factor in a broad spectrum of healthy youth development has also been recognized (Catalano et al., 2004). From a social control theory perspective, emotionally engaged youth are less likely to develop emotional problems, because they are protected by the supportive relationships they have formed with teachers and peers. This theory has received support from several empirical studies (e.g., Loukas, Ripperger-Suhler, & Horton, 2009; Whitlock, 2006). For instance, a study conducted by Shochet, Dadds, Ham, and Montague (2006) found that decreased emotional engagement was predictive of subsequent increased depression among Australian adolescents. Another study also documented negative concurrent associations between emotional school engagement and depression among high school freshmen (Li et al., 2008). However, to our knowledge, no theories presently exist to guide expectations about how behavioral engagement is linked to depression, nor has this link been examined empirically. Depressive symptoms and inhibition of behaviors, although not academic-related behaviors per se, may co-occur. It is often posited that increased depression leads to inhibited behaviors. It is plausible to hypothesize that being involved in organized activities that often involve peers and supportive adult figures may distract a young person from concentrating on his or her own emotional distress. However, the question of whether adolescents who actively participate in school activities are less depressed than the ones who do not participate remains largely unanswered.

The association between emotional school engagement and delinquency or other externalizing behaviors such as substance use has also been investigated (e.g., Catalano et al., 2004; Loukas et al., 2009; Resnick et al., 1997; Shochet et al., 2006). Social control theory provides a theoretical framework that links social connection to adolescent deviance. According to social control theory, adolescents who are connected or emotionally attached to school may show less deviance, because they strive to meet schools' expectations (Hirschi, 1969; Resnick et al., 1997). Empirically, emotional engagement has been found to be associated with reduced adolescent involvement in deviant behavior, such as the use of alcohol, marijuana, cigarettes, and violence (Shochet et al., 2006).

However, the association between behavioral engagement and externalizing behaviors such as delinquency and substance abuse remains rarely examined or assumed without testing. This is at least partially because most of the extant research has focused on how lack of behavioral engagement leads to academic failure or impacts the decision to drop out of school (Connell, Spencer, & Aber, 1994; Finn, 1993). Behaviors such as interrupting class, skipping school, or suspension have received much more attention than have other nonacademic-orientated or -focused forms of problematic behaviors. The potential for behavioral engagement as a protective factor in reducing a broader spectrum of externalizing behaviors is yet to be realized.

The current literature, therefore, is limited in important ways. Chief among these is that little is known about the associations between emotional school engagement and academic outcomes or the associations between behavioral engagement and nonacademic outcomes. Second, most studies of school engagement and developmental outcomes have only involved prediction analysis and have not fully exploited the richness of longitudinal data sets. In other words, the process in which both types of school engagement are linked to outcomes of interest has been omitted in most of the past research. For example, we know little about whether consistent increases in emotional engagement across adolescence are associated with better academic achievement, less frequent involvement in deviant behavior such as substance use and delinquency, or less severe symptoms of depression, or whether a high and stable pathway of behavioral engagement is positively linked to better grades, lower levels of depression, or less frequent substance use or involvement in delinquency.

In sum, in the present study, we assessed, first, whether distinct developmental trajectories for both behavioral and emotional school engagement existed in early adolescence. Second, we assessed whether the membership of behavioral and emotional engagement trajectories varied in relation to sex, race/ethnicity, and SES. Third, we examined whether different developmental pathways of behavioral or emotional engagement were related to variation in levels of academic achievement (indexed by self-reported grades), depression, and externalizing behaviors such as delinquency and substance use. We used data from the first four waves (Grades 5–8) of the 4-H Study of Positive Youth Development (PYD; e.g., Lerner et al., 2005; Zimmerman, Phelps, & Lerner, 2008) to address these questions.

Method

The present investigation was conducted as a part of the 4-H Study of PYD, an ongoing longitudinal project in the United States that began in 2002. We present here the features of the methodology that pertain to the goals of the current study. Full details of the method can be found in prior publications (e.g., Gestsdóttir & Lerner, 2007; Lerner et al., 2005; Phelps et al., 2009).

Participants

This report is based on a longitudinal sample of 1,977 adolescents (42.6% female) who participated in at least two of the first four waves of assessment (Grades 5–8). The mean age of youth in this sample at Grade 5 was 11.0 years ($SD = 0.52$ years). The participants were from diverse racial/ethnic backgrounds: European American (62.6%), Latino/a (13.7%), African American (7.6%), Asian American (3.1%), Native American (2.9%), and multiethnic/multiracial participants (4.1%). In addition, 6.0% of youth self identified as other or did not report their race/ethnicity. Among languages other than English spoken in the home, there were Spanish (34.1%), Chinese (6.3%), Russian (1.1%), Vietnamese (2.1%), Creole (1.9%), and other (58.7%). The 4-H study sample was gathered from schools and youth program sites from 13 states.

Attrition in the 4-H sample is not randomly distributed across schools and after-school program sites. In the second and later waves of data collection, some principals withdrew consent for their schools to participate, and thus students from these schools dropped out without having had the opportunity to be asked if they wanted to remain in the study. For example, 561 adolescents were lost from the Grade 5 wave to the Grade 6 wave because of the absence of their schools' permission for them to continue. The attrition from Grade 5 to Grade 6 for students who were allowed to be asked to remain in the study was only 2%. Out of 1,967 participants tested during the Grade 6 wave, 337 participants (17.1%) dropped out because of school/site attrition in the Grade 7 wave, and the individual attrition rate was 21.5%. For the Grade 8 wave, 746 (36.1%) of the 2,072 participants tested in the Grade 7 wave were lost because of site nonparticipation, and 145 youth (6%) dropped out because of individual attrition. The individual attrition from Grade 6 to Grade 7 was higher relative to the attrition from Grade 5 to Grade 6 and from the seventh to eighth grades. This difference might have occurred because many students attended different schools across the sixth and seventh grades because of elementary to middle school transitions; these changes made it more difficult to follow participants.

Comparison of the longitudinal and dropout participants—that is, those who participated in the study twice or more and those who were one-time participants—was conducted and resulted in no statistically significant differences. A series of *t* tests indicated that the adolescents who continued in the study and those who dropped out were not different with regard to their sex, race/ethnicity, or family SES, which was indexed by maternal education and household income. In addition, the sample included in the analyses was representative of the cross-sectional samples at all points in time in terms of adolescents' reports of school engagement and developmental outcomes.

Procedures and Design

For the first three waves of data collection, teachers or program staff gave each child an envelope to take home to the parent or guardian. The envelope contained a letter explaining the study, two consent forms (one that was returned to the school and one that could be kept for the records of the parent or guardian), a parent questionnaire, and a self-addressed stamped manila envelope for returning the parent questionnaire and consent form. Data collection was conducted by trained study staff or assistants hired at more distant locations. A detailed protocol was used to ensure that data collection was administered uniformly and to ensure the return of all study materials. The procedure began with reading the instructions for the student questionnaire to the youth. Participants were instructed that they could skip any questions they did not wish to answer. A 2-hr block of time was allotted for data collection, which included one or two short rest periods. During the Grade 6 and Grade 7 waves, students who were unable to be surveyed at their school or 4-H site, in that they were either absent during the day of testing or the school superintendent did not allow testing to occur in the school, received a survey in the mail.

For the Grade 8 wave, youth were surveyed in their schools or youth programs following the same procedure as in the first three waves. Parent questionnaires continued to be taken home to parents to fill out. Youth who were absent on the day of the survey or were from schools who did not allow on-site testing and their parents were contacted by e-mail, mail, or phone and were asked to complete and return the survey to us.

Measures

There were many standard demographic questions about the youth and their families (date of birth, sex, race/ethnicity, mother's education, household income, etc.). In addition to the demographic measures, the present study used measures that pertain to assessment of the behavioral and emotional facets of school engagement and youth's self-reported grades, depression, and involvement in delinquent behavioral and substance use.

All of the nondemographic measures and some of the demographic variables (e.g., sex, race/ethnicity, and age) used in this article come from the student questionnaire. Information related to SES, that is, household income and maternal education, come from the parent questionnaire. The measures used in the present investigation are described below.

SES. Both maternal education and family income were used as the indicators of family SES. At each wave, parents were asked to provide information about family SES, including household income and the biological mother's highest level of education (maternal education). The autocorrelation for household income between the four waves of data collection was highly significant (rs ranged from .80 to .94, ps $<$ .01). Therefore, the average household income was computed for each participant on the basis of available data. The mean of this composite variable was \$60,508 (SD = \$36,006).

Maternal education ranged from 8 years (eighth grade or less) to 20 years (doctoral degree). As the reports of mother's education from different points of assessment were highly correlated (rs ranged from .92 to .98, ps $<$ .01), overall maternal education score was calculated for each adolescent by computing the mean of scores reported at different time points. The mean of this composite variable was 13.93 years (SD = 2.43 years).

Behavioral school engagement. Behavioral school engagement was assessed by four items. All of the items were from the Profiles of Student Life: Attitudes and Behaviors, created by the Search Institute (Leffert et al., 1998). With these items, youth were asked about behaviors that pertained to academic functioning. For example, youth were asked whether they attended school regularly, whether they went to school without homework completed, and whether they brought books and other materials to school everyday. The response formats of these items were from 1 = *usually* to 3 = *seldom*. The scores were then rescaled so that 1 = *usually* and 5 = *seldom*. Higher scores indicate higher levels of behavioral school engagement. In the present study, Cronbach's alphas for Grades 5–8 were .63, .67, .69, and .79, respectively.

Emotional school engagement. Emotional school engagement was assessed by three items in which youth were asked how much they cared about school and how much they thought their teachers and classmates cared about them. The response formats of these three items were from 1 = *completely disagree* to 5 = *completely agree*. Higher scores indicate higher levels of emotional school engagement. The Cronbach's alphas for emotional school engagement were .65, .68, .63, and .66 for Grades 5–8, respectively, in the present sample.

The measures of behavioral and emotional school engagement have adequate internal consistency validity: The correlations among the items that make up the behavioral and emotional measures were at least moderate (R^2 above 0.35). Results of confirmatory factor analysis also provided evidence for adequate discriminant validity.

Grades. Grades were measured by a single item in which participants reported their grades in school on an 8-point scale. A score of 1 indicates that a participant gets mostly As in school and a score of 8 indicates that a participant gets mostly below Ds in school. This variable was recoded from 0.5 to 4.0 and was then reverse coded so that higher scores corresponded to better grades.

Depression. Depressive symptoms were assessed using the 20-item Center for Epidemiologic Studies Depression Scale (Radloff, 1977). Using a forced-choice response format ranging from 1 = *rarely or none of the time* to 4 = *most or all of the time*, adolescents reported how often they felt a particular way during the past week. Examples of items included "I was bothered by things that usually don't bother me" and "I felt sad." Items were summed for a total score, with higher scores indicative of greater depressive symptomatology. Potential scores range from 0 to 60. The Center for Epidemiologic Studies Depression Scale has an internal consistency of .85 for the general population and of .90 for psychiatric patients (Radloff, 1991). The measure has been used extensively with adolescents, and validity and reliability with populations in high school and junior high school have been established (Bachman, Johnston, & O'Malley, 2000). In the 4-H study, scale reliability was high at all four times of testing. The Cronbach's alphas for Grades 5–8 are .81, .84, .87, and .87, respectively.

Delinquency. Indicators of delinquency were measured with questions derived from items in the Monitoring the Future (Bachman et al., 2000) questionnaire. Four items assessed the frequency of delinquent behaviors, such as stealing, hitting or beating up someone, getting in trouble with police, and vandalism, during a particular time period. The response format ranged from 1 = *never* to 5 = *5 or more times*. A sample item is "During the last 12 months, how many times have you hit or beat up someone?" In the present study, the Cronbach's alphas for Grades 5–8 are .65, .65, .72, and .73, respectively.

Substance abuse. Five items in each wave assessed the frequency of substance use (e.g., smoked cigarettes, drank alcohol, used marijuana or hashish, or chewed tobacco) in the past year. The response format ranged from 1 = *never* to 4 = *regularly*. A sample item is "During the last 12 months, how many times have you used marijuana?" In the present study, the Cronbach's alphas for Grades 5–8 are .66, .66, .87, and .84, respectively.

Analyses

To index possible trajectories of behavioral and emotional engagement, we used methodologies permitting analysis of patterns of intraindividual change. That is, we applied a semiparametric mixture model approach to repeated measures of behavioral and emotional school engagement to identify a relatively small number of distinct patterns of adolescent school engagement. SAS Proc Traj was used to fit models identifying the optimal number and shapes of latent trajectory classes to data collected in 4 years (Jones, Nagin, & Roeder, 2001).

Analyses proceeded in three stages. In the first stage, we conducted confirmatory factor analysis to assess the degree to which a two-component model of school engagement fits the Grade 5 data. In the second stage, the optimal number of trajectory groups of emotional and behavioral school engagement was first identified and models with specifications for constant, linear, quadratic, or cubic shapes of the engagement trajectory groups were estimated. Each participant was assigned membership in one of the identified groups on the basis of his or her engagement scores in each grade.

The last stage involves several steps of data analysis. First, we used the multiple imputation method of handling missing data to produce 20 imputed data sets, each of which contained imputed values that were randomly drawn from a distribution of plausible missing values (Schafer, 1997). Data analysis was conducted on each imputed data set. In particular, how variations in demographic variables were related to the probability of membership in a particular trajectory group and how trajectories of school engagement and developmental outcomes at Grade 8 were associated were then examined. Finally, the resulting 20 sets of parameters were then combined by an iteration procedure for multiple imputation inference (Rubin, 1987). The combined results based on the analyses of the multiply imputed data are presented below.

Results

The purpose of the current investigation was threefold. First, longitudinal trajectory analysis was used to identify developmental trends in behavioral and emotional school engagement. Second, multinomial logit analyses tests were used to determine whether the membership of trajectory groups differed by sex, race/ethnicity, household income, and maternal education. Third, ANOVAs were conducted to examine how different trajectories of these two types of school engagement predicted grades, depression, delinquency, and substance use.

Accordingly, after presenting descriptive statistics and correlations among variables, we report Bayesian information criterion (BIC) scores and Akaike information criterion (AIC) scores for six alternative models of behavioral and emotional school engagement and present the trajectories identified by the optimal model. Next, we present the results of multinomial logit analyses and describe the relations between trajectory group membership and developmental outcomes.

Preliminary Analyses

Means, standard deviations, and number of participants for all the study variables are presented in Table 1. Table 2 presents the bivariate correlations among these variables.

A Two-Component Model of School Engagement: Confirmatory Factor Analyses

We recognize that it is important to establish acceptable internal consistency and validity for all of our outcome variables, behavioral and emotional school engagement in particular. Thus, after conducting descriptive analyses, we tested the degree to which the two-component model of school engagement fits the data, using confirmatory factor analysis with the Grade 5 cross-sectional data. LISREL 8.80 (Jöreskog & Sörbom, 1996) was used for the analyses.

We first examined the adequacy of fit of a two-component model of school engagement where the seven items loaded on two correlated latent school engagement constructs: behavioral and emotional engagement. Generally, the fit indexes suggested that this two-component model was adequate, $\chi^2(13) = 60.56$, $p < .01$, $\chi^2/df = 4.65$, nonnormed fit index (NNFI) = 0.94, comparative fit index (CFI) = 0.96, goodness of fit index (GFI) = 0.98, root mean square error of approximation (RMSEA) = 0.062, CI [0.047, 0.078]. The standardized factor loadings were all significant and ranged from .45 to .74. The correlation among the two latent variables was moderate (.40), suggesting that these scales were correlated yet distinct from each other.

However, as there is some theoretical support for the existence of a global, unidimensional construct of engagement and that it is a common practice to use a general index that mixes both components, we also assessed a simplified one-factor model, where all seven items load on one global school engagement construct. For this model, $\chi^2(14) = 428.96$, $p < .01$, $\chi^2/df = 30.64$, CFI = 0.77, NNFI = 0.65, GFI = 0.89, RMSEA = 0.176, which shows a poor fit between the model and the data. Thus, we decided to choose the two-component model.

Treatment of Missing Data

As with most longitudinal studies, we experienced two types of missing data, across-wave attrition and within-wave item nonresponse. The attrition analysis described earlier suggested few significant differences between the longitudinal sample and the one-wave participants. With regard to item nonresponse, it was assumed that values were missing at random, that is, we assumed that the outcome variables were not related to these variables themselves but may have been caused by other variables (e.g., sex, household income, and maternal education) that were measured in the present study (Jeličić, Phelps, & Lerner, 2009). Accordingly, we assumed that missing data may only be related to demographic variables or other variables included in the analysis but were not related to the underlying values of the four outcome variables themselves.

With regard to missing data on school engagement variables, the SAS Proc Traj procedure estimates parameters with a maximum likelihood approach (Dodge, Shen, & Ganguli, 2008). Missing data thus were estimated through the use of full information maximum likelihood (FIML) estimation, which allows cases with only two time points for a measure to be accommodated in the models (Zimmerman et al., 2008). FIML has been recognized as an appropriate method of estimation for longitudinal incomplete data because of its advantages (Allison, 2002; Little & Rubin, 1987). For instance, one does not have to deal with missing data prior to running the planned analyses of the data. However, a potential drawback of the FIML estimation is that it is not easy to include auxiliary variables (Jeličić et al., 2009): in this case, including variables of interest other than school engagement variables. The

Table 1
Means, Standard Deviations, and Number of Participants for School Engagement, Grades, Depression, Drug Use, and Delinquency for the Longitudinal Sample of the 4-H Study of Positive Youth Development

	Grade 5 (n = 1,115)			Grade 6 (n = 1,598)			Grade 7 (n = 1,545)			Grade 8 (n = 1,136)		
Variable	M	SD	n	M	SD	n	M	SD	n	M	SD	n
Behavioral school engagement	4.03	0.87	969	3.97	0.88	1,385	4.08	0.82	1,369	3.95	0.93	1,074
Emotional school engagement	4.09	0.73	851	3.83	0.80	1,382	3.64	0.76	1,360	3.58	0.81	1,074
Grades	3.37	0.68	871	3.33	0.69	1,387	3.28	0.77	1,373	3.25	0.80	1,058
Delinquency	0.83	1.76	1,016	0.98	2.13	1,508	1.31	2.71	1,258	1.66	3.15	1,046
Depression	13.64	8.94	950	12.69	9.28	1,454	13.31	9.64	1,427	13.78	9.68	1,062
Drug use	0.21	0.78	1,029	0.52	1.20	1,525	0.83	2.27	1,281	1.23	2.94	1,050

Table 2
Interitem Correlations and Possible Ranges of Variables Included in Model Testing

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Grade 5 behavioral engagement	—											
2. Grade 6 behavioral engagement	$.46^{**}$	—										
3. Grade 7 behavioral engagement	$.28^{**}$	$.42^{**}$	—									
4. Grade 8 behavioral engagement	$.20^{**}$	$.26^{**}$	$.41^{*}$	—								
5. Grade 5 emotional engagement	$.21^{**}$	$.20^{**}$	$.15^{**}$	.08	—							
6. Grade 6 emotional engagement	$.21^{**}$	$.28^{**}$	$.27^{**}$	$.12^{**}$	$.37^{**}$	—						
7. Grade 7 emotional engagement	$.25^{**}$	.24	$.37^{**}$	$.23^{**}$	$.41^{**}$	$.23^{**}$	—					
8. Grade 8 emotional engagement	$.16^{**}$	$.16^{**}$	$.32^{**}$	$.34^{**}$	$.32^{**}$	$.55^{**}$	$.34^{**}$	—				
9. Grade 8 grade	$.27^{**}$	$.29^{**}$	$.41^{**}$	$.39^{**}$	.09	$.19^{**}$	$.27^{**}$	$.38^{**}$	—			
10. Grade 8 delinquency	$-.13^{*}$	$-.12^{**}$	$-.29^{**}$	$-.33^{**}$	$-.07$	$-.23^{**}$	$-.25^{**}$	$-.37^{**}$	$-.34^{**}$	—		
11. Grade 8 substance use	$-.07$	$-.08^{*}$	$-.20^{**}$	$-.26^{**}$	$-.06$	$-.17^{**}$	$-.19^{**}$	$-.33^{**}$	$-.29^{**}$	$.60^{**}$	—	
12. Grade 8 depression	$-.16^{**}$	$-.12^{*}$	$-.14^{**}$	$-.25^{**}$	$-.13^{**}$	$-.16^{**}$	$-.20^{**}$	$-.29^{**}$	$-.29^{**}$	$-.18^{**}$	$.18^{**}$	—
Possible range	1–5	1–5	1–5	1–5	1–5	1–5	1–5	1–5	0–4	1–5	1–5	1–60

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

problem of not being able to easily include auxiliary variables in the FIML model motivated us to seek other approaches of handling missing data on family SES and youth outcome variables.

With regard to missing data on the outcomes variables (e.g., grades and depression), we decided to perform multiple imputations to handle missing data. Multinomial logit regression and multivariate analysis of variance (MANOVA) were then conducted with these imputed data sets. Parameter estimates and corresponding covariate matrices from each of these data sets were then combined to generate statistical inferences. Multiple imputations were conducted using the PROC MI and PROC MIANALYZE components of SAS 9.1. Twenty imputed data sets were created. To facilitate the imputation process of the MI method, we added a few auxiliary variables, for example, scores of depression and problematic behaviors (delinquency and substance use) measured at previous time points (i.e., Grades 5, 6 and 7). After the 20 complete data sets were generated, we conducted multinomial logit regression and MANOVA using the PROC LOGIST and PROC GLM components of SAS 9.1. Results from individual data sets were then combined.

Identification of the Developmental Models of School Engagement

Here, we identify the distinctive clusters of individual trajectories of behavioral and emotional school engagement within our sample. The censored normal distribution was used to account for censoring at the lower and the upper bounds of the school engagement scales. Determination of the number of groups that best describes the data was made on the basis of BIC, as recommended by Nagin (2005). AICs were also taken into account when making decisions. However, Phelps et al. (2007) emphasized that decisions about the number of trajectories within a longitudinal data set need to be adequately rationalized. Ideally, theory should provide this rationale (Lerner, Schwartz, & Phelps, 2009). In the absence of theory, however, empirical generalizations derived from well-replicated findings can be used. Unfortunately, for the study of school engagement trajectories neither adequate theory nor adequately replicated findings exist. As such, decisions need to be rationalized through alternative means, for example, by inspection of the characteristics of the data set being assessed. Of course, such a procedure has the limitation of being potentially sample dependent, a problem that cannot be assessed without attempts to cross-validate findings with an independent data set. Nevertheless, in the present research, this last approach to rationalization was the only one available.

Accordingly, the size of the smallest trajectory group was taken into consideration to choose the best model. To determine the optimal number of trajectories for behavioral and emotional school engagement from Grades 5–8, we estimated models with up to six groups for both types of engagement. Table 3 presents the BIC and AIC scores for each model of school engagement, along with the changes in BIC and the estimated percentage of participants in the smallest group.

Trajectories of behavioral school engagement. As shown in Table 3, although the change in the BIC score that occurred by adding a fifth trajectory to the four-group model for behavioral school engagement is significant ($p < .01$), the smallest group size in the five-group model is smaller than 1% of the sample. Further comparisons between the BIC of a four-group model with all nonsignificant functions being fixed and the BIC score of a three-group model with all functions being significant suggest that the four-group solution was the most appropriate. As a consequence, a four-group trajectory model was selected. This model is defined by two constant trajectories at different levels of engagement, one trajectory following a decreasing linear function and one trajectory reflecting a slight cubic trend.

Figure 1 presents four developmental trajectories for behavioral school engagement in early adolescence and the actual percentages assigned to each trajectory group. A small group of adolescents (4.4%), identified as *the decreasing group*, started with initially high levels of engagement, followed by a significant and steady decline from Grade 6 to Grade 8. A second group distinguished itself from other trajectories in that it contains increments from Grades 6 to 7. This group started with a lowest level of engagement, followed an initial downward trend, with some increase toward the seventh grade, and then started to decrease again; thus, it was labeled *the transitory decreasing group*. It represented 15.1% of the sample. The third trajectory appeared stable and moderate and was labeled *the moderate stable trajectory group*

Table 3
Bayesian Information Criterion (BIC) and Akaike Information Criterion (AIC) Scores, Changes in BIC, and Percentages of Participants in the Smallest Group for Three-Order Trajectory Models of Behavioral and Emotional School Engagement (N = 1,977)

Model	BIC	ΔBIC	AIC	Size of smallest group (%)
Behavioral school engagement				
One group	−6,687.62			100.00%
Two group	−6,475.23	212.39*	−6,442.85*	29.11%
Three group	−6,432.40	42.83*	−6,383.83*	15.70%
Four group	−6,444.46	−12.06*	−6,379.70*	7.06%
Five group	−6,392.23	52.23*	−6,311.28*	0.86%
Six group	−6,394.70	−2.53	−6,297.56	0.89%
Emotional school engagement				
One group	−5,916.51	—		100.00%
Two group	−5,715.01	201.50*	−5,682.77*	45.36%
Three group	−5,588.35	126.66*	−5,539.98*	8.63%
Four group	−5,569.36	18.99*	−5,504.87*	5.16%
Five group	−5,566.82	2.54	−5,486.21	2.75%
Six group	−5,570.22	−3.40	−5,473.49	2.47%

* $p < .01$.

because it represented the majority of students (62.2%). The fourth trajectory showed a similarly shaped profile as seen in the moderate stable group, except that it included students with the highest levels of behavioral engagement. It was named *the high stable group*. This group included 18.4% of the adolescents.

Trajectories of emotional school engagement. Similar procedures were made in our choice of a best trajectory model for emotional school engagement. On the basis of the statistical indices we used, we decided on a four-trajectory model. Figure 2 presents these four trajectories and the actual percentages assigned to each group.

Overall, all of the four trajectories followed downward trends. Three out of the four trajectories were mostly differentiated by their levels of emotional engagement. Only a small percentage (5.7%) of youth showed the highest levels of engagement at any point, and even here there was a slight decrease over time (*the highest group*). Slightly less than half of the total sample (47.9%) reported somewhat high levels of emotional engagement, which appeared fairly stable, showing only a slight decrease over time; this group was labeled *the high with decrease trajectory group*. The third group showed a similar profile to the high with decrease trajectory group but with moderate levels of engagement. This group comprised the second largest group of students (41.1%) and was named *the moderate group*. The trajectory of the fourth group differed from the three previous trajectories by its shape. This

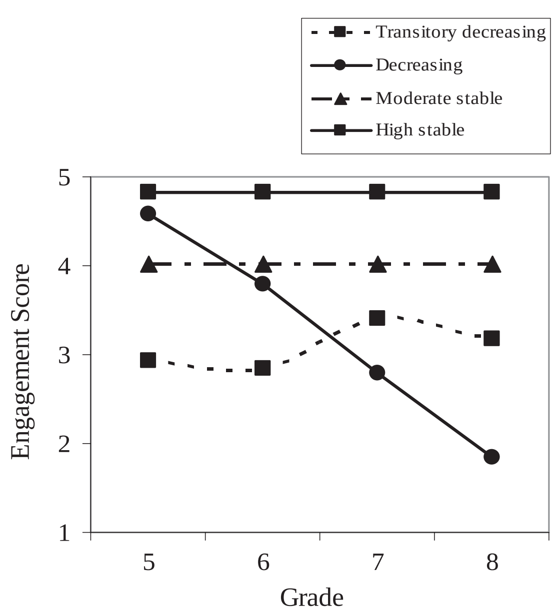

Figure 1. The developmental trajectories of behavioral school engagement during adolescence.

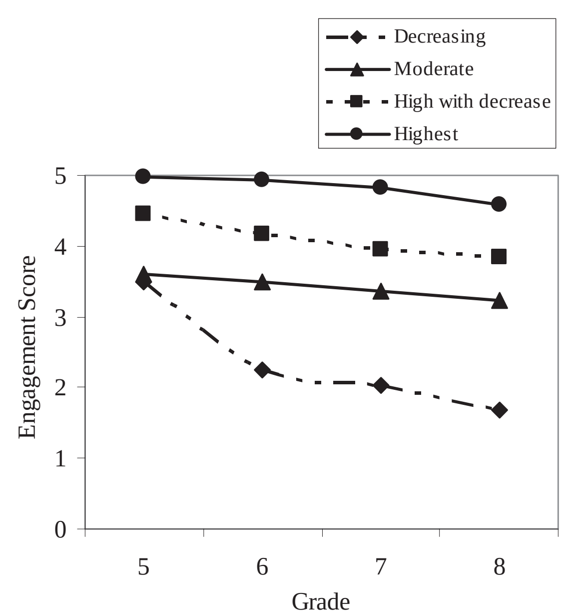

Figure 2. The developmental trajectories of emotional school engagement across adolescence.

group showed the least stable pattern, starting with moderate levels that were followed by marked decrements to the lowest level's engagement. It was thus named *the decreasing group*.

Table 4 presents the resulting percentages of the sample assigned to each group and the average posterior probability for members of the groups. The average posterior probabilities for members of each group are all above 0.7, a criterion suggested by Nagin (2005). In short, although most of the students in the current sample exhibited relatively stable trajectories of behavioral and emotional school engagement, there were nevertheless many students who experienced unstable trajectories involving either significant loss or nonlinear change.

Demographic variables as predictors of school engagement trajectory membership. Multinomial logit analyses were conducted separately for behavioral and emotional engagement to examine the nature of relations between trajectory groups and demographic variables such as sex, race/ethnicity, and SES (indexed by mother's education and income), with each of the 20 imputed data sets. Three racial/ethnic dummy variables (Latino American, African American, and other) were created. The Asian, Native American, multiethnic, and other categories were merged into a combined "other" group because of the small sizes of these groups in our sample.

The multinomial logit analyses were conducted with sex, household income, maternal education, and three dummy variables of race/ethnicity as joint predictors of engagement group membership. For both behavioral and emotional engagement, the reference category was the highest group. Table 5 shows the significant predictors for each trajectory group of engagement when compared against the reference group in regard to sex, race/ethnicity, income, and mother's education. The significant average odds ratios for these comparisons are also included in Table 5.[2]

The combined results of the 20 imputed data sets indicated that membership in the behavioral engagement trajectories was significantly related to sex, average $\chi^2(3, N = 1{,}977) = 49.32$ (range = 47.54–51.25); family income, average $\chi^2(3, N = 1{,}977) = 16.53$ (range = 8.86–24.28); and at least one of the dummy variables of race, average $\chi^2(3, N = 1{,}977) = 11.49$ (range = 9.91–12.72); all $ps < .05$. However, membership in the behavioral engagement trajectories was not related to levels of mothers' education, average $\chi^2(3, N = 1{,}977) = 5.41$ (range = 4.94–6.10), *ns*. As shown in Table 5, the proportion of girls in any of the three groups of behavioral engagement was significantly lower than the proportion of girls in the high stable group (odds ratios are presented in Table 5). Wald test results showed that girls were also more likely to belong to the moderate stable group than to be in the transitory decreasing and the decreasing groups. There was no significant difference in terms of the proportion of girls in the transitory decreasing group and the decreasing group. Youth from wealthier families were more likely to be in the high stable group than in the three other trajectory groups. However, youth from wealthier families were more likely to be in the decreasing group than in the transitory decreasing group. There was no significant difference between any of the trajectory groups in terms of levels of maternal education. The only racial/ethnic difference found was that African American youth were more likely to be in the transitory decreasing group and moderate group than in the high stable group of behavioral engagement.

According to the combined results, membership in the emotional engagement trajectory groups was also significantly related to sex, the average $\chi^2(3, N = 1{,}977) = 34.46$ (range = 31.98–48.94); household income, average $\chi^2(3, N = 1{,}977) = 19.20$ (range = 12.28–26.71); and at least one of the dummy variables of race, average $\chi^2(3, N = 1{,}977) = 8.14$ (range = 6.92–11.44); all $ps < .01$. However, maternal education was not associated with membership in emotional engagement trajectories, average $\chi^2(3, N = 1{,}977) = 4.39$, *ns*. Girls were more likely to be in the highest group than in the three other groups. The likelihood for girls to be in the high with decrease group was higher than the likelihood for them to be in the moderate and the decreasing groups. The Wald test results also indicated that girls were more likely to be in the moderate than to be in the decreasing group of emotional engagement. Youth whose families had higher income were more likely to be in the highest or the high with decrease group than to be in the decreasing or the modest group. Latino youth were less likely to be in the highest group of emotional engagement than in the high with decrease or the moderate group of emotional engagement. No other significant ethnic/racial differences were found. The Wald test results revealed no difference in the levels of family income between the decreasing and the modest groups of emotional engagement.

In short, there were significant demographic differences in trajectory groupings of behavioral and emotional engagement. The results indicated that boys and youth from lower income families were more likely than other participants to be members of less favorable trajectory groups: They were more likely to experience rapid decreases in their levels of behavioral and emotional engagement and were more likely to experience unstable trajectories of engagement. African American youth were more likely to experience lower and unstable trajectories of behavioral engagement,

Table 4
Actual Percentages of the Sample Assigned to Each Trajectory Group and Average Posterior Probability for Trajectory Assignment

Trajectory group	% participants	Average posterior probability for trajectory assignment
Behavioral school engagement		
Transitory decreasing	15.1	0.717
Decreasing	4.4	0.756
Moderate stable	62.2	0.812
High stable	18.4	0.777
Emotional school engagement		
Highest	5.7	0.858
High with decrease	47.9	0.751
Moderate	41.1	0.753
Decreasing	5.3	0.818

[2] Significant differences were detected between European American youth and youth who were classified as the "other" group. The percentage of "other" youth in each behavioral or emotional engagement is presented in Table 5. However, estimated coefficients for this group were not reported in the table or discussed in the text, because the "other" group consisted of several quite diverse racial/ethnic groups, such as Asian, Native American, and multiracial/multiethnic.

Table 5
Gender, Ethnic Backgrounds, and Family Socioeconomic Status (SES) for Each Trajectory Group of School Engagement and Significance of Effects of Covariates as Predictors of Trajectory Group Membership

Group	% girls	Racial/ethnic background				Family SES	
		% European American	% African American	% Latino	% other	Household income	Maternal education
Behavioral engagement							
High stable[a]	69.7	51.2	9.2	15.2	24.4	67,337.42	14.28
Moderate stable	57.1 (0.56**)	69.6	6.5 (1.72*)	4.3	19.6	60,118.67 (0.95*)	13.90
Decreasing	39.1 (0.27**)	62.6	8.2	14.5	14.7	62,470.95	13.55
Transitory decreasing	42.4 (0.30**)	69.9	5.0 (2.21*)	11.0	14.1	51,759.30 (0.88**)	13.56
Emotional engagement							
Highest[a]	71.1	55.3	9.4	10.6	24.7	74,517.59	14.51
High with decrease	61.3 (0.61*)	58.3	9.0	15.0 (6.24*)	17.7	63,348.94 (0.91*)	14.08
Moderate	52.7 (0.42**)	65.8	6.5	14.0 (6.63*)	13.7	56,174.91 (0.87**)	13.70
Decreasing	38.8 (0.24**)	75.6	7.8	2.2	15.8	53,743.29 (0.83**)	13.53

Note. Odds ratios are presented in parentheses. Only significant odds ratios are shown. Odds ratios for the "other" group are not presented. Confidence intervals of odds ratios for the 20 imputed data sets are available on request.
[a] Reference category for multinomial logit analyses.
* $p < .05$. ** $p < .01$.

whereas Latino youth were more likely to experience relatively low and decreasing emotional engagement.

Linking trajectories of school engagement to developmental outcomes. To test the linkage between trajectories of behavioral and emotional school engagement and the four developmental outcomes (i.e., grades, depression, delinquency, and substance use), we conducted a MANOVA, with the 20 multiply imputed data sets and with sex, household income, and maternal education as covariates, using the PROC GLM procedure of SAS 9.1. Results indicated that the dependent variables were significantly related to the main effects of sex, average Pillai's trace = .126 (range = .124–.131), average $F(4, 1022) = 37.00$ (range = 36.10–38.42), $p < .01$; maternal education, average Pillai's trace = .023 (range = .017–.030), average $F(4, 1022) = 6.25$ (range = 4.40–8.00), $p < .01$; household income, average Pillai's trace = .021 (range = .010–.033), average $F(4, 1022) = 5.52$ (range = 2.66–8.76), $p < .01$; membership in behavioral engagement trajectory groups, average Pillai's trace = .160 (range = .154–.164), average $F(12, 3072) = 14.44$ (range = 13.81–14.78), $p < .01$; and membership in emotional engagement groups, average Pillai's trace = .180 (range = .175–.185), $F(12, 3072) = 16.35$ (range = 15.85–16.79), $p < .01$.

After determining that the overall multivariate test is significant, we conducted follow-up tests. In particular, separate follow-up ANOVAs were conducted on each of the four outcome variables, to determine the locus of the statistically significant multivariate main effects of membership in behavioral and emotional engagement trajectory groups. Maternal education was found to be associated with youth self-reported grades, $F(1, 1967) = 38.78$ (range = 19.70–54.41), $p < .01$, and depression $F(1, 1967) = 6.71$ (range = 1.38–17.03), $p < .05$. Results identified significant effects of household income only on grades, $F(1, 1967) = 27.01$ (range = 9.16–46.82), $p < .01$, not on the three other variables. Sex differences were found on three out of the four dependent variables: For grades, average $F(1, 1967) = 8.21$ (range = 2.88–23.09), $p < .05$; for youth levels of depression, average $F(1, 1967) = 102.35$ (range = 66.89–119.81), $p < .01$; for rates of delinquency, average $F(1, 1967) = 45.44$ (range = 44.23–47.12), $p < .01$; but not for substance use, average $F(1, 1967) = 2.30$ (range = 2.08–2.53), *ns*. On average, girls reported higher grades, lower rates of delinquent behavior, but higher levels of depression. Their involvement in substance use was not significantly different from that of boys.

The combined results from the 20 data sets also indicated that when controlling for the effects of demographics, there were significant main effects of membership in behavioral engagement trajectory groups and membership in emotional engagement groups on all of the three outcomes. That is, belonging to a particular behavioral engagement trajectory group was associated with one's grades, $F(3, 1967) = 52.52$ (range = 39.52–63.24), $p < .01$; delinquency, $F(3, 1967) = 24.92$ (range = 24.18–25.41), $p < .01$; substance use, $F(3, 1967) = 18.13$ (range = 17.82–18.34), $p < .01$; and depression, $F(3, 1967) = 19.71$ (range = 11.97–27.84), $p < .01$. Belonging to different emotional engagement groups was also associated with one's grades, $F(3, 1967) = 21.41$ (range = 15.84–32.17), $p < .01$; depression, $F(3, 1967) = 27.79$ (range = 22.23–38.66), $p < .01$; substance use, $F(3, 1967) = 36.87$ (range = 36.41–37.42), $p < .01$; and delinquency, $F(3, 1967) = 37.03$ (range = 36.40–37.49), $p < .01$. These results and the means and standard deviations for each of the groups are reported in Table 6.

Post hoc tests were then conducted using a Tukey test to determine pairwise mean differences. On average, youth who were members of the transitory decreasing and the decreasing groups of behavioral engagement reported lower grades relative to students in the other two groups. Members of the high stable group of behavioral engagement reported the highest grades among all of the four groups. With regard to emotional engagement, youth who were members of the decreasing group had the lowest self-reported grades among all youth, whereas youth who were members of the highest group reported the best grades. Members of the high with decrease group reported lower grades than did members of the highest group, but their grades were better than those of the members of the moderate and decreasing groups.

Table 6
Means and Univariate Analysis of Variance Results, With Grades, Depression, Delinquency, and Substance Use as Outcomes and Behavioral and Emotional Engagement Groups as the Predictor Variables

	Grades			Depression			Delinquency			Substance use		
Trajectory membership	*M*	*SD*	*F* (*df*)	*M*	*SD*	*F* (*df*)	*M*	*SD*	*F* (*df*)	*M*	*SD*	*F* (*df*)
Behavioral engagement												
Transitory decreasing	$2.58_{a,b}$	0.82		$18.84_{a,b}$	10.34		$3.54_{a,b,c}$	5.00		$2.42_{a,b,c}$	3.36	
Decreasing	$2.44_{c,d}$	1.09		$18.15_{c,d}$	11.88		$5.91_{a,d,e}$	6.57		$5.11_{a,d,e}$	6.89	
Moderate stable	$3.08_{a,c,e}$	0.72		$14.81_{a,c,e}$	8.86		$1.52_{b,d,f}$	2.56		$1.05_{b,d}$	2.52	
High stable	$3.50_{b,d,e}$	0.59		$12.15_{b,d,e}$	8.55		$0.61_{c,e,f}$	1.94		$0.62_{c,e}$	2.26	
Average *F* statistic			52.52^{**} (3)			19.71^{**} (3)			24.92^{**} (3)			18.13^{**} (3)
Emotional engagement												
Decreasing	$2.48_{a,b,c}$	1.02		$21.05_{a,b,c}$	10.11		$7.14_{a,b,c}$	6.40		$5.99_{a,b,c}$	6.83	
Moderate	$2.92_{a,d,e}$	0.77		$16.45_{a,d,e}$	9.50		$2.01_{a,d,e}$	3.13		$1.46_{a,d,e}$	3.02	
High with decrease	$3.23_{b,d,f}$	0.69		$13.44_{b,d,f}$	8.60		$1.15_{b,d}$	2.46		$0.79_{b,d}$	2.03	
Highest	$3.48_{c,e,f}$	0.57		$10.67_{c,e,f}$	7.42		$0.46_{c,e}$	1.20		$0.27_{c,e}$	0.81	
Average *F* statistic			21.41^{**} (3)			27.79^{**} (3)			37.03^{**} (3)			36.87^{**} (3)

Note. Within a column, means with the same subscript are significantly different according to Tukey post hoc tests, $p < .05$.

In regard to delinquency, members of the decreasing cluster of behavioral engagement reported the most frequent involvement, whereas those who belonged to the high stable group reported the least frequent involvement. Youth who exhibited moderate and stable behavioral engagement over the years showed lower levels of delinquency than did members of the high stable cluster and exhibited higher levels of delinquency than did members of the other two groups. Youth who belonged to the highest and the high with decrease groups of emotional engagement reported the lowest rates of delinquency, whereas those who belonged to the decreasing group of emotional engagement reported the highest rates of delinquency. The results of post hoc tests for substance use yielded the same patterns of group differences among behavioral and emotional engagement clusters as to delinquency with one exception: Youth who were members of the highest and the high with decrease groups were not different in terms of their substance use.

In regard to depression, among the four behavioral engagement groups, members of the transitory decreasing and the decreasing groups were most depressed. They were significantly more depressed than youth who were not in these two groups. Youth who belonged to the high stable group were least depressed among all the youth. Among the four emotional engagement groups, members of the decreasing group of emotional engagement reported the highest levels of depression among all, whereas youth in the highest group were least depressed. In addition, students who experienced high but decreasing emotional engagement were more depressed than youth in the highest group.

Summary of Results

Developmental trajectory analyses permitted us to take a nuanced view of the development of behavioral and emotional school engagement. The results demonstrated that discrete and theoretically meaningful trajectories of school engagement could be identified. Specifically, we found four different pathways for both behavioral and emotional engagement. These trajectories were distinct regarding the initial mean level of engagement at Grade 5, speed of change, and the shape of the trajectories. Most of these trajectories followed downward trends, but they differed in several respects. For both behavioral and emotional engagement, there existed a small portion of youth who experienced the most problematic pathways of engagement. Furthermore, we found that these trajectories were differentiated by sex and SES. Boys and youth from low SES families were more likely to experience problematic pathways of behavioral and emotional engagement. Being a Latino American was associated with a higher likelihood of experiencing problematic pathways of emotional engagement, whereas being an African American was associated with being more likely to experience problematic pathways of behavioral engagement.

Finally, we found that membership in different trajectories of behavioral and emotional engagement was significantly linked to grades, depression, delinquency, and substance use. Overall, youth who were in the highest trajectory of behavioral or emotional engagement were the best performers for all of the developmental domains. Conversely, youth who were members of the decreasing group of emotional engagement or the transitory decreasing group of behavioral engagement reported the lowest grades and the highest rates of delinquency and substance use, and they were the most depressed. Experiencing problematic pathways not only was associated significantly with worse academic outcomes but also was associated with more frequent involvement in substance use and delinquency. Youth who experienced problematic pathways of school engagement were also less happy.

Discussion

The present study began with three overarching questions: (a) Are there multiple developmental patterns for behavioral and emotional school engagement? (b) If so, do these patterns of change vary in relation to sex, race/ethnicity, and socioeconomic characteristics? (c) To what extent do pathways of engagement predict academic and nonacademic outcomes? Generally, the results attested to the presence of significant variation in pathways of school engagement. These findings suggest the importance of investigating interindividual differences in the intraindividual development of school engagement. The findings also point to the use of behavioral and emotional engagement as predictors of developmental outcomes for adolescents. Given these findings, the present study contributes to the school engagement literature in three ways.

First, applying a finite mixture model approach to test whether there are diverse patterns of development for behavioral and emotional school engagement provided a richer depiction than was offered by prior research of the development of engagement over the period of adolescence. Overall, the findings indicate that diversity exists in regard to behavioral as well as emotional school engagement. The results thus contradict a prevailing belief about a general pattern of continuous decline in children's engagement across the years they spend in school (see Fredricks et al., 2004). Although a majority of the participants were moderately engaged in school-based activities or experienced declining pathways of behavioral engagement, about one fifth of the students experienced a high and stable trajectory of behavioral engagement, and a smaller group of young people was consistently highly emotionally engaged. However, small proportions of adolescents also followed problematic pathways, ones with a rapid decline and/or low levels of engagement across measurement points. These results confirmed that small yet significant proportions of students may not fully engage in academic and social activities within school, behaviorally or emotionally. In addition, the findings revealed important similarities as well as differences in the development of behavioral and emotional engagement and their associations with the demographic characteristics. For instance, although four trajectory groups were identified for both behavioral and emotional engagement, the shape of each behavioral engagement trajectory differed from those of emotional engagement. Although two groups of adolescents experienced no changes in behavioral engagement, all of the four emotional engagement trajectories were downward. In other words, the fact that each of the four emotional engagement trajectories had a downward trend suggests that, as predicted, although some students experience stability in behavioral engagement, most students in the current sample experienced loss in the extent to which they felt connected in school.

The presence of diversity in developmental trajectories for behavioral and emotional school engagement has important implications for both theory and practice. For instance, students who show a rapid decline in or a consistent low level of behavioral engagement may need to be targeted as a priority. However, it might be worthwhile to design interventions to help form bonding, positive affects, and a sense of belonging and connectedness among all students, instead of narrowing the target audience to at-risk students. Conceptually, the diversity of developmental pathways underscores the importance of a pattern-centered approach, such as the one applied in this study, for enhancing understanding of the complexity of the educational experiences during adolescence. In turn, the fact that, with a few exceptions, youth either reported moderate levels of engagement that remain stable or manifested problematic trajectories suggests that promoting school engagement may require individualized needs assessment, careful program design and implementation, and integrated in- and out-of-school collaboration between educators and practitioners.

A second contribution of this research arises because, consistent with previous findings (e.g., Whitlock, 2006), we were able to identify several instances of sex, race/ethnicity, and family SES differences with regard to membership in both behavioral and emotional engagement trajectory groups. In general, we found that boys, youth of color, and youth from less advantaged families tend to be in less favorable trajectory groups for both behavioral and emotional engagement. These results converge with other findings that youth from lower income families do worse on several indicators of school engagement (e.g., Janosz et al., 2008; Whitlock, 2006). This finding might be due to low-wage, unstable, or psychologically stressful parental employment (Kalil & Ziol-Guest, 2005). However, we are not certain about the reason why household income, instead of maternal education, was significantly associated with membership in school engagement trajectories. One possibility is that these two indicators of SES were highly correlated. Future research should address factors that may contribute to these differences. Whereas the findings about gender differences are consistent with the previous literature, this study extends the results of prior research in that we found that there were differences in the development of engagement, instead of only in the average level of engagement at a given point in time. Future research should seek to identify why boys seem to be more likely to be members of the less favorable school engagement trajectory groups; for example, it may be useful to consider whether boys' peer groups may influence engagement more so than is the case with girls (Li et al., 2009).

In addition, we found that although Latino students were more likely than other students to belong to the less favorable trajectories of emotional engagement, African American students were more likely than other students to be members of the less favorable trajectories of behavioral engagement. There may be several reasons why Latino and African American youth are more likely to be members of less favorable trajectory groups of behavioral and emotional school engagement. First, previous studies (e.g., Hudley, 1993; Hughes & Kwok, 2007) have found that African American youth exhibit more problematic behaviors than do their European American counterparts in early school grades. These early differences in African American youth's behaviors in the classroom may trigger and reinforce racial stereotypes among teachers, which in turn may influence teacher–student interactions within and outside of the classroom. Negative teacher–student interactions may lead to lower involvement in school, lower grades, and other youth adjustment outcomes. Language and cultural mismatch between the mainstream school system and Latino students (Morrison, Cosden, O'Farrell, & Campos, 2003) may be an important reason why Latino students tend to experience low or decreasing pathways of emotional engagement. Indeed, school may be particularly important for minority students and students from disadvantaged families, because there may be fewer resources afforded by the family or available in the community. Unfortunately, minority students and youth from low SES families disproportionately attend schools that are crowded, understaffed, dysfunctional, and inadequately funded. Thus, regardless of the exact reasons for the racial/ethnic and SES discrepancies in behavioral and emotional engagement, these findings are of great concern.

A third contribution of this study is the finding that the trajectories of behavioral and emotional engagement predict academic as well as behavioral and emotional outcomes for youth. Despite repeated observations about the links between behavioral school engagement and a variety of forms of academic outcomes (Fredricks et al., 2004), important information about the relations between behavioral engagement and other facets of development remains largely unknown. Studies such as the present one can expand psychologists' understanding of the impact of behavioral school engagement on youth development. Furthermore, the findings of the present study also confirmed a positive link between emotional engagement and academic outcomes. The fact that both behavioral and emotional school engagement trajectories were associated with a variety of adolescent outcomes suggests that it is not enough to only ensure that students are fully involved in school-based instructional and social activities. It is at least equally important to make sure that students feel connected to school. To increase the likelihood of academic success and decrease the chance of problematic outcomes, efforts to promote school engagement should strive to increase involvement and attendance as well as positive affects about school among all students.

Consistent with expectations, youth who experienced more positive pathways of behavioral or emotional engagement tended to have better grades, were less depressed, and were less likely to be involved in delinquency and drug abuse than were those youth who followed less favorable trajectories. These findings thus suggest that associations between behavioral engagement and nonacademic outcomes exist. In addition, pathways of emotional engagement were also associated with academic outcomes. One possible reason for the significant associations between behavioral engagement and nonacademic outcomes is that high levels of psychological distress or frequent involvement in delinquency and substance use may make it difficult to be fully involved in academic activities. The reverse is also plausible: Youth who are behaviorally engaged with school may be too busy to explore problematic or risky behaviors. In addition, a possible explanation of the significant link between emotional engagement and deviant behaviors, such as delinquency or substance use and depression, is that the emotional connection youth feel toward the important figures in their lives (e.g., peers and teachers) provides strong bonding that prevents them from seeking comfort from unconventional groups or activities. Similarly, such a positive social connection also could be a resource countering potential psychological distress. In this regard, it is not surprising to find that those youth who experienced the greatest decrease in emotional engagement were the ones who were most depressed.

However, we hasten to point out that although it is tempting to emphasize the theoretical effect of engagement on achievement and other outcomes, we cannot confidently draw conclusions about the causality or directionality of these relations. It is likely that good academic standing engenders higher levels of behavioral engagement. It is also likely that one's depression keeps one from being connected in school. Indeed, some scholars have posited that adolescent behavioral and emotional adjustment (e.g., delinquency and depression) are as likely to contribute to school engagement as school engagement is to contribute to adolescent development (Loukas et al., 2009; Roeser, Eccles, & Sameroff, 2000). The extent to which this position holds true requires simultaneous examinations of the contribution of preexisting developmental conditions to subsequent school engagement as well as the opposite direction of influence among such associations.[3]

As noted, the methodology of this study had several limitations. First, the current findings are, of course, dependent on the nature of our sample. For instance, the majority of the youth in our sample identified themselves as European American, posing a challenge to the generalizability of the identified engagement trajectories. Only by comparing the two largest ethnic minority groups with European American students did we provide preliminary findings about racial/ethnic differences in the membership of different behavioral and emotional school engagement. The low percentage of other ethnic minority groups, such as Native American, Asian, and multiethnic youth in the current sample, made it difficult to make meaningful racial/ethnic comparisons among those groups. The distribution of students among these trajectories remains to be cross-validated with research on more heterogeneous samples in varied school contexts and across different points in adolescence. Second, the assessments of school engagement used in the present study may introduce some measurement challenges. For example, some of the items indexing behavioral school engagement reflect deficit thinking. In addition, we assessed youth perceptions of their status as members of the school as an approximation of emotional engagement. These approaches may limit our ability to accurately measure these two constructs. Furthermore, the measures of behavioral and emotional school engagement had relatively low reliability on some occasions. The relatively low reliability on both measures may be due to the young age of the participants. In addition, the fact that our measure of behavioral engagement asked questions about related but distinct behaviors may be another reason for low reliability. It is possible that a student who always brings needed materials to class does so because his or her parents pack the bag for him or her. The same student may not be able to complete homework. With regard to emotional engagement, a student's feelings toward the school, teachers, and schoolmates might be well different. It is important to note that the well-known sensitivity of Cronbach's alphas to the number of items could be a reason for the low values of some of the coefficient alphas reported in the current study (Streiner, 2003). Other methods, such as split-half reliability and test–retest reliability, are needed to provide additional information on the reliability of these two measures. Third, all of our nondemographic measures were self-reported. Having all of the information coming from one source may cause the potential problems of socially desirable responding and common method variance due to single-source bias. The fourth limitation of this study is the failure to account for the clustering of students within schools. Given that the intraclass correlations for behavioral and emotional school engagement ranged from being quite low (.015) to the borderline of being substantial (.089), future research would need to take steps to assess possible clustering effects. Fifth, the present data did not span into the high school years, during which young people's educational experiences may diverge even more greatly. Future research is needed to assess the development of school engagement with a longitudinal cohort of high school students.

[3] To examine if and how these adjustment variables influence the possibility for youth to gain membership in a particular trajectory group, we conducted some additional analyses. We added grades, depression, delinquency, and substance use as time-varying covariates to the trajectory specification in SAS Traj. The results indicated that problematic adjustment variables were associated with lower engagement for members of most of the trajectory groups. By contrast, grades were associated with increases in behavioral and emotional engagement for the majority of these groups. The findings of the additional analyses suggest that preexisting adjustment problems may also have enduring impacts on school engagement.

Future research also needs to clarify the mechanisms by which behavioral and emotional engagement either benefit or compromise healthy development. In addition, longitudinal studies that permit us to understand the individual and contextual mechanisms that produce different pathways of school engagement would be of great value. Moreover, it is likely that reciprocal causal processes between engagement, achievement, depression, and problematic behaviors are at play in youth's educational experience. Models and methods that more thoroughly examine the causal directions of these relations are needed. Finally, it is important to study predictors of behavioral and emotional engagement, the contextual predictors in particular. Information about such predictors is needed to advise policy makers and practitioners about how to create school settings that can best foster school engagement.

Notwithstanding these limitations, the current study has two important implications. First, because there are diverse patterns of the development of school engagement and they differ for youth from different backgrounds, educators and practitioners cannot use a one-size-fits-all approach to designing and implementing interventions. Second, the existence of diverse trajectories calls for the use of a person ←→ context, developmental systems model to fully understand and effectively respond to the developmental heterogeneity that policies and programs are designed to impact.

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