Being Someone: The Integrated Self as a Neuropsychological System

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Abstract

Fully functioning persons are characterized by a unity in thought, emotion, and action that amounts to “being someone” or having “an integrated self”. Psychologists have typically treated the integrated self as merely a descriptive term that summarizes significant behavioral achievements. In the present article, the authors seek to place the integrated self on firmer theoretical grounds, by relating the integrated self to a neurobiological system with distinct processing characteristics. Building on personality systems interactions theory (Kuhl, 2000b), the authors suggest that the integrated self is supported by parallel-distributed processing in the right anterior cortex. From this neuropsychological model, the authors derive seven functions of the integrated self: Emotional connectedness, broad vigilance, utilization of felt feedback, unconscious processing, integration of negative experiences, extended resilience, and extended trust. The authors discuss the seven functions and their mutual relations, along with relevant behavioral and neurobiological evidence. Finally, the authors highlight the importance of positive relationships for optimal development of the integrated self, and discuss how the integrated self might be further cultivated to improve self-regulation and health.

Keywords: implicit self, integrated self, self-esteem, self-positivity, Personality Systems Interactions theory, Client-centered therapy, right hemisphere, self-integration, self-regulation, self-determination, health

Being Someone: The Integrated Self as a Neuropsychological System

What does it take to be someone? The basic ingredients that make up a person are easy enough to identify. After all, it is common knowledge that each person is endowed with a body that performs all required life functions; a mind that thinks and remembers, can solve problems and master language; and, finally, motivations and emotions that channel the person's energies towards chosen actions and objectives. However, it takes much more to be a fully functioning person. Personhood only becomes realized when the different facets of the person are mutually coordinated such that the whole represents more than the sum of its parts. For instance, a self-critical person may function completely differently depending on whether or not she is able to calm herself down (Baumann, Kaschel, & Kuhl, 2007). Just how each part of the person is integrated could be said to reflect the person's essence or self. We therefore refer to this crucial aspect of being a person as the integrated self.

The scientific study of the self is nowadays a booming enterprise (for reviews, see Baumeister, 1998; Sedikides & Spencer, 2007, 2011; Morf & Koole, 2014). Nevertheless, the integrated self has remained a neglected topic within psychology. One reason for this neglect is the lack of a well-specified theoretical model of the cognitive and neurobiological mechanisms that underlie the integrated self. In this article, we seek to fill this theoretical gap. Building on a comprehensive personality theory (Kuhl, 2000b), we propose that the integrated self is grounded in parallel-distributed processing networks in the right anterior cortex. This neuropsychological model accounts for key characteristics of the integrated self, such as its connectedness with emotion and its extended integrative functions. Moreover, as we explain later on, the model has important social implications, by highlighting the significance of positive interpersonal relationships for the integrated self.

In what follows, we begin by discussing traditional conceptions of the integrated self. Next, we introduce our neuropsychological approach to the integrated self, which was derived

from a more comprehensive personality theory (Kuhl, 2000b). We then examine the neurological foundations of the integrated self, and discuss seven psychological functions of the integrated self, along with relevant behavioral and neurological evidence. Finally, we reflect on the broader implications of our model for understanding and promoting optimal self-regulation.

Prior Conceptions of the Integrated Self

Ideas related to the integrated self can be found throughout diverse cultural traditions and historical periods, particularly in religious and philosophical works. All major world religions, including Hinduism, Buddhism, Judaism, Christianity, and Islam, have cultivated inner peace and harmony, values that facilitate the development of the integrated self. Indeed, Spranger (1974) has suggested that religious development can be understood as a process of ongoing self-realization, in which the person strives for a unified wholeness (see also Koole, McCullough, Kuhl, & Roelofsma, 2010). In a similar vein, philosophers since at least the ancient Greeks have recognized the importance of achieving inner balance. For instance, Plato (4-5th century BCE) suggested in his *Republic* that the soul of an ethical person is orderly and harmonious, whereas the soul of an unethical person is chaotic and at war with itself.

Given this venerable heritage, it is not surprising that notions of the integrated self have found their way to modern psychology. Some of the earliest psychological work on the integrated self can be traced to the psychoanalytic tradition. This seems somewhat ironic given that founder of psychoanalysis, Sigmund Freud (1856-1939), saw no role for the integrated self in his theories. Instead, Freud theorized extensively about the ego, which he regarded as a primarily rational, logically thinking entity that was in constant battle with the primitive impulses of the id. This conflicted portrait of the human psyche is still discernible in modern approaches to the self (e.g., Baumeister, 1991; Leary, 2004; Metcalfe & Mischel, 1999).

Although Freud himself only theorized about the ego, two of his former associates went on to champion notions of the integrated self. One of these was the Swiss psychiatrist Carl Gustav Jung (1875-1961), who wrote at length about individuation, a process that takes place over the lifespan in which people may integrate opposing sides of the psyche into the self. According to Jung, the ego is an element of the self, but nonetheless, the consciousness of the ego is too narrow to ever fully grasp the self. Similar to Spranger (1974), Jung regarded religious symbols of the divine as expressions of the integrated self, which Jung once described as the "God within us" (Jung, 1967, p. 399).

Another one-time associate of Freud who theorized about the integrated self was Otto Rank (1884-1939). Rank saw the strengthening the will as the primary goal of psychotherapy, where he defined the will as "a positive guiding organization and integration of the self, which utilizes creativity as well as inhibits and controls the instinctual drives." (Rank, 1945, p. 112). Rank thus sought to harness the integrative forces of the self in his will therapy. To achieve this goal, Rank advised psychotherapists to abandon their emotionally distant stance towards their clients, which was proscribed by classic psychoanalysis. Instead, Rank encouraged therapists to become emotionally involved with their clients, communicating empathy and acceptance. Although Rank was shunned by the traditional psychoanalysts of his day, his ideas found a receptive audience among several influential American psychologists, including the pioneering existential psychotherapist Rollo May, Heinz Kohut, the founder of "self psychology", and Paul Goodman, co-founder of Gestalt therapy.

In 1936, Otto Rank was invited to give a series of lectures in New York by Carl Rogers. Rogers was apparently deeply impressed by these lectures, professing years later that he had had two teachers: "Otto Rank and my clients" (Rogers, 1983). Rogers became widely known as one of the founders of humanistic or client-centered approach to psychotherapy. The foundation of Rogers' approach is formed by his personality theory (Rogers, 1961). This

theory regards the self as the basis for many achievements typically associated with a mature, responsible, and decisive individual - a "fully functioning person" in Rogers' terminology. According to Rogers, fully functioning persons overstrain neither themselves nor other people, are able to unite their own with others' needs and values, do not categorize people or experiences in an either-or fashion, rarely have exaggerated doubts about their decisions, allow emotions while not becoming absorbed by them, and are mindful of their mistakes while not becoming paralyzed by them.

Rogers' (1961) eloquent portrait of the integrated self has had a tremendous influence on the psychology of the self, an influence that can still be observed, for instance, in current theories of authenticity (Kernis & Goldman, 2006), self-esteem (Crocker & Wolfe, 2001), self-determination (Deci & Ryan, 2000, 2010), and self-concordance (Sheldon & Kasser, 19956; Sheldon, 2014). In this sense, the integrated self has become part of mainstream psychology. Nevertheless, as a scientific construct, the integrated self has retained an elusive quality. Rogers successfully identified the behavioral achievements of the integrated self, but he did not explain whether the notion of the integrated self merely summarizes a set of admirable behaviors, or whether the integrated self is a causal force that generates these behaviors. We seek to resolve this ambiguity by examining the neuropsychological foundations of the integrated self.

The Conceptual Self versus the Integrated Self:

Insights from Personality Systems Interactions Theory

If the integrated self is indeed an explanatory construct, we should be able to relate its functioning to a distinct set of neuropsychological mechanisms. Scholars of the integrated self have been understandably wary of this notion, given that mechanistic approaches have been historically associated with the specter of scientific reductionism. A particularly painful episode of reductionism took place during the first half of the 20th century, when

mechanistically oriented psychologists deemed it prudent to deny the existence of all mental constructs, including people's inner thoughts and feelings (a movement known as behaviorism). Reductionism has never completely vanished from the scientific scene, and, indeed, the tendency keeps cropping up every now and then. A recent example is the work of neurophilosopher Metzinger, who in his book *Being No One* (2003) has argued on the basis of neuroscientific research that the self does not exist.

Fortunately, a focus on neuropsychological mechanisms by no means obliges researchers to commit to reductionism. Instead of reducing the integrated self to lower-level phenomena such as the firing of individual neurons, a neuropsychological analysis can invoke separate mechanisms to account for the integrated self. This fundamentally non-reductionistic stance is also known as the organismic paradigm, because it studies how an organism operates as a self-directed unit, coordinating its parts towards certain ends (Ryan, Kuhl, & Deci, 1997). Our theoretical work on the integrated self is based on this general approach, which we have also applied in other domains of psychology, including volition (Kuhl & Koole, 2004), motivation (Kuhl & Koole, 2008), and emotion regulation (Koole, 2009; Koole & Kuhl, 2007; Kuhl & Quirin, 2011).

In theorizing about the integrated self, we have drawn from a comprehensive framework for personality functioning known as personality systems interactions (PSI) theory (Kuhl, 2000b, 2001). PSI theory is a systematic attempt to explain personality functioning in terms of dynamic interactions between cognitive-behavioral-affective systems. A full exposition of the theory would take us far beyond the present context. We therefore restrict our present discussion to those aspects of PSI theory that relate directly to the self, particularly the integrated self.

PSI theory assumes that the self has evolved from the more primitive biological machinery that enabled our pre-human ancestors to perceive and move around in its

environment. This basic sensory-motor apparatus, which still functions in modern humans, makes use of elementary, nonverbal representations of the organism's own body, for instance, to coordinate the movements of its limbs. These elementary representations could be regarded as a proto-self (which is part of the "intuitive behavior system" in PSI theory's terminology). In time, however, our pre-human ancestors evolved more sophisticated cognitive abilities. According to PSI theory, these cognitive abilities developed along separate lines for the processes involved in the on-line control of motor behavior and the processes involved in developing stable perceptions of the world. As a result, modern humans are capable of forming two qualitatively different sets of high-level mental representations of the self.

On the behavioral side, human beings developed a conscious mind, which allows them to construct explicit, linguistically represented action plans that heed possibilities in the distant future (Baumeister & Masicampo, 2010). These mental abilities allow for the construction of a conscious self-concept. The conceptual self roughly corresponds to the psychoanalytic concept of the ego. According to PSI theory, the conceptual self is mediated by analytic thought and reasoning processes that are explicitly encoded in language and can be assessed by explicit self-evaluation of attitudes and beliefs about one's own values, self-efficacy, locus of control, etcetera (e.g., Judge, Erez, Bono, & Thoresen, 2003). The conceptual self has no direct access to the person's emotional functioning and somatic states. Instead, people base their conceptual self on more indirect inferences about their own behavior (e.g., "If I eat bread every day, then I must like it", see Bem, 1972), and on observable physiological states. Because the conceptual self can be easily communicated to others, the conceptual self is also prone to incorporate the expectations that others impose upon the person, which may be experienced as obligations or the "ought self" (Higgins, 1996).

On the perceptual side, human beings developed extended capacities to store their life experiences in longterm memory (Conway & Pleydell-Pearce, 2000). This autobiographical memory base allows people to access their prior experiences in relevant situations. The memory base grows each time that people encounter new (unexpected or undesired) experiences that are incorporated into the memory base. It is this extended memory system that forms the basis for the integrated self. According to PSI theory, the integrated self is mediated by a high-level form of parallel-distributed processing that integrates a large number of the person's self-aspects simultaneously. Because parallel-distributed processing does not adhere to logical steps, the integrated self is never fully conscious. Nevertheless, the integrated self may still guide people's behavior or preferences, in a tacit or implicit manner.

Parallel-distributed processing is traditionally invoked to explain elementary perception and automatic behavior (Rumelhart et al., 1986) and it may also support low-level forms of intuition (e.g., stereotyping) that sometimes may appear irrational . However, we suggest that parallel processing also plays a role in higher forms of cognition such as the integrated self (Kuhl, 2000b; Engel & Kuhl, 2014). A key distinction between low-level and high-level intuition is whether the input elements of processing are separable. In low-level intuition, the input elements inextricably merge into a sub-symbolic network representation (Rumelhart et al., 1986). By contrast, in high-level intuition, the various input elements (e.g., arguments, values, considerations) that have been taken into account can be accessed separately, even after the person has formed a decision. Because of this, decisions based on high-level intuition can be retrospectively reconstructed by conscious reasoning. Moreover, people may extract parts of their integrated self in a propositional format, so that these parts become accessible to the conceptual self. The synchronization between the integrated self and the conceptual self is also known as "self-concordance" (cf. Kuhl & Beckmann, 1994b; Sheldon, 2014).

Through high-level parallel processing, the integrated self brings all personal experiences relevant to a decision or in a concrete situation to the center of attention simultaneously and tacitly integrates experience relevant to a decision over time (cf. the "incubation period" in creative problem-solving, Sio & Ormerod, 2009). Due to their integrated nature, these personal experiences are manifested to the person as holistic feelings. These holistic feelings may be contrasted with the analytical thinking which is associated with the conceptual self. Analytic thinking tries to reduce ambiguous information to one aspect important in a particular moment (monosemantic processing: Rotenberg, 2004). Furthermore, analytic thinking abstracts from the emotional and personal meaning of a message or an experience. This abstraction has advantages for solving logical problems and coming up with plans (see next section). However, abstraction can put one at a disadvantage if the solution to the problem requires the consideration of many boundary conditions, including one's own and others emotional and motivational states (e.g., solving a conflict, making peace or solving a complex problem that is caused by many factors at the same time like complex illnesses or when dealing with environmental issues).

High-level parallel processing enables simultaneous processing of an enormous amount of information, and facilitates the ability to consider all important aspects without the need to think of all these aspects explicitly, and bolsters against the risk of becoming a slave of thinking in black-and-white categories on the basis of an either-or principle (e.g., a person either has to have positive or negative attributes). The perhaps most complex accomplishment of integrative competence is the self's ability to generate a feeling of temporal connectedness providing reasons for living and existential meaning (Frankl, 2011; Yalom, 1980). Temporal connectedness integrates the presence ("being someone" in the here and now, e.g., one's current needs, concerns, activities) with the past (e.g., feeling connected with one's ancestors and one's personal past in a meaning-providing way) and with the future (e.g., feeling

connected with one's future goals, choices, and developmental potentials). Temporal connectedness was, besides circumspect care for one's existence, the central feature of Martin Heidegger's (1927/1996) existential philosophy that had a great impact on existential psychology (Frankl, 2011; Greenberg, Koole, & Pyszczynski, 2004; Yalom, 1980).

In sum, PSI theory distinguishes between conceptual self, as a propositional system that is based on analytical thinking, and the integrated self that is based on parallel processing that integrates cognitive, emotional, motivational, and volitional processes within the person. Within healthy functioning persons, the conceptual self and the integrated self are continually interacting. Nevertheless, for analytic purposes, it is useful to differentiate the two types of selves.

The Integrative Self as a Neurological System

What might be the neurological foundations of the integrated self? Because of the complexity of the system, it seems unlikely that the integrated self would be located at one specific part of the human brain. Rather, it seems more likely that the integrated self forms a network of several interacting brain areas. This network is presumably formed throughout personal development on the basis of a simple neuroanatomical characteristic: The closer two processes or functions operate in the brain, the easier and faster their interaction becomes, and thus the more likely these processes and their underlying neural structures will compose a functional network system such as the "self" (Sporns, Chialvo, Kaiser, & Hilgetag, 2004).

When we were looking for a functional network that could support the various tasks attributed to the self-system, one design feature of the brain that stood out was its hemispheric lateralization of functions, which has been consistently reported in studies that carefully controlled the implicit (vs. explicit) status of self-representations (Ivanitzky, 1994; Kircher, Brammer, Bullmore, Simmons, Bartels, & David, 2002; Molnar-Szakacs, Uddin & Iacoboni, 2005). This type of experimental control is crucial for distinguishing between self-concept

and the integrative self. According to the neuroanatomical proximity hypothesis (cf. Sporns et al., 2004), ipsilateral networks, i.e., those operating within the same hemisphere of the brain, can more efficiently form a functional system than contralateral networks. Thus, it seems likely that the brain circuits that support the integrated self are located predominantly within one hemisphere of the brain. Notably, our emphasis on hemispheric lateralization does not preclude the relevance of other neuroanatomical distinctions, e.g., anterior versus posterior or dorsal versus ventral systems (Borst, Thompson, & Kosslyn, 2011; Tucker & Luu, 2012).

The right hemisphere is more than the left hemisphere associated with parallel processing (Bowden, Jung-Beeman, Fleck, & Kounios, 2005; Mihov, Denzler, & Förster, 2010; Rotenberg, 1998; Shamay-Tsoory, Adlera, Aharon-Peretzb, Perrya, & Mayselessa, 2011). On these grounds, we may formulate the tentative hypothesis that the integrative self is likely to be supported by right-hemispheric networks more than by the left hemisphere. Although the right hemisphere is inferior to the left hemisphere in recognizing means-end relationships ("Why do we need a scissor?") or logical deductions (Deglin & Kinsbourne, 1996), it is superior in detecting remote or multiple semantic associations (Beeman, Friedman, Grafman, Perez, Diamond, & Lindsay, 1994; Bowden et al., 2005; Rotenberg, 2004), making intuitive-holistic judgments, concerning, for example, the appearance or aesthetic appeal of an object, concerning similarities between different objects or individuals or about experiential knowledge (Deglin & Kinsbourne, 1996; Levy & Trevarthen, 1976). This high-level holistic processing feature may be a possible basis of the self's capacity to support "self-congruent" decisions that satisfy multiple constraints related to one's own (and even relevant others') needs, emotions, beliefs and abilities (Hecht, 2014; Koole & Kuhl, 2003; Kuhl, 2000b).

Of course, the relevance of the right hemisphere for the integrative self requires more direct evidence. To date, however, neuropsychological research featured a large number of imaging studies focusing on rather simple self-related states of mind (for a review, see

Gillihan & Farah, 2005; Northoff, Heinzel, de Greck, Bermpohl, Dobrowolny, & Panksepp, 2006; Raichle, MacLeod, Snyder, Powers, Gusnard, & Shulman, 2001). Such research is of limited validity in addressing the more complex integrative functions of the self. We have therefore developed a task that is more suitable to this end (Kuhl & Kazén, 1994). In the so-called self-discrimination task, participants are asked to select a certain number of tasks from a list that are to be performed out later on in the experiment. In addition, participants are also assigned by the experimenter to perform certain tasks from the list. Finally, some tasks on the list are neither self-selected nor assigned. In an unexpected memory test, participants are later asked about the initial source of each task. The rate of tasks that are self-ascribed but originally assigned by the experimenter indicates a lack of access to the integrated self. The validity of the self-discrimination task is supported by a number of behavioral studies (e.g., Kazén, Baumann, & Kuhl, 2003; Quirin, Koole, Baumann, Kazén, & Kuhl, 2009).

Participants with a chronic tendency to ruminate (i.e., who make use of the analytical ego rather than the integrated self) tend to display lower self-discrimination, especially when they are in a negative mood (Baumann & Kuhl, 2003; Kuhl & Kazén, 1994). Self-discrimination among this group was enhanced when we helped chronic ruminators to activate their right hemisphere by squeezing a soft ball for about 30 seconds with their left hand (Baumann, Kuhl & Kazén, 2005). The same ball-squeezing procedure was found to remove the adverse effects of explicit self-focus on skilled task performance among well-trained athletes (Beckmann, Gröpel, & Ehrlenspiel, 2013). In a more recent neural imaging study, we found that the improved self-access due to ball-squeezing could be attributed to an activation of the right prefrontal cortex, especially the ventromedial region (Quirin, Kerber, Küstermann, Koole, Conrad, Kazén, Baumann, & Kuhl, 2014).

In sum, there is growing evidence that the integrated self is supported by the right hemisphere more than by the left cortical hemisphere. Particularly the right prefrontal cortex

seems important for the integrated self. Because these functions are supported by ipsilateral (mostly prefrontal) brain regions, they constitute an efficient functional network provided that developmental conditions for acquiring an integrated, autonomous self are present (a point to which we return toward the end of this article).

Seven Functional Characteristics of the Integrated Self

Because human behavior is multiply determined, it is often hard to say whether a particular behavior was self-determined or guided by a system other than the self. To resolve this problem, it is useful to specify the functional profile of the integrated self. Such a profile provides guidelines for deciding whether a given behavior is likely to be attributable to the self or some other personality system. Here, we describe seven functional features of the integrated self, which are outlined in Table 1. The seven functions are each derived from the high-level parallel processing that gives rise to the integrated self. Notably, our functional profile of the integrated self is selective rather than exhaustive.

We assume that a fully functioning person has the various functions of the integrated self at her or his disposal whenever any of them are needed and the personal level of decision-making and action control is activated. Consequently, trait measures of those functions should be highly correlated as an indication of healthy self-development. On the other hand, state measures may dissociate because a fully functioning person may selectively activate only those functions that are needed in a given situation (see Schwartz, Stoessel, Baxter, Martin, & Phelps, 1996, for an early demonstration of this principle).

1. Extended connectivity with emotional and somatosensory signals

The first function of the integrated self is formed by its "extensive" connections with emotion and body perception. Whereas the narrow focus of analytical thinking may be confined to one emotion, the holistic feelings of the integrated self are full of emotional and somatic overtones ("emotional landscapes"). Much evidence suggests that it is the right rather

than the left hemisphere that is linked more directly and more extensively to the experience of emotions (e.g., Devinsky, 2000; Gainotti, 2005), both negative (Dawson & Schell, 1982) and positive (Schweiger, Stemmler, Burgdorf, & Wacker, 2013; Winston, Strange, O'Doherty, & Dolan, 2002; Wittling, 1990). These effects are partly mediated by the right insula and the right inferior frontal gyrus, which play a strong role in interoceptive awareness, emotional experiencing, and sympathetic regulation (for a recent review and theoretical integration, see Tops, Boksem, Quirin, IJzerman, & Koole, 2014).

An example for the role of the right prefrontal cortex in personal emotional involvement is a study showing right prefrontal activity when young mothers have to distinguish between the different emotions of their newborn baby, for instance, if the baby is, at the moment, looking sad, happy, angry or surprised (Nishitani, Doi, Koyama & Shinohara, 2011). By contrast, women who did not have a personal relation to the child ("non-mothers") did not show this right prefrontal activation even when responding positively to the infant (see also Van Lancker, 1991). Right prefrontal activity has also been demonstrated in babies showing emotional distress when their mothers left the room (Fox & Davidson, 1987) and in adults when they were successfully suppressing their sad emotion induced via film clips (Levesque et al., 2003).

2. Extended attentional scope: Vigilance

The second function of the integrated self relates to broadening the scope of information processing. Presumably, the extended scope of high-level parallel processing facilitates a special form of attentional vigilance. Note that our meaning of "vigilance" is closer to its classical philosophical meaning (perhaps starting with Plato's concept of guardianship) than to a more recent use of this term to denote threat-related narrowing of attention (Terburg, Aarts, & Van Honk, 2012), that was (perhaps more appropriately) called "sensitization" in earlier research (Brosschot, 2002). Instead, in cognitive science, "vigilance"

describes a broad, non-focused form of sustained attention characterized by simultaneously paying attention to a lot of information or to one rarely occurring target. This form of attention seems to be supported by a right prefrontal network (Cohen et al., 1988; Posner & Peterson, 1990) that is inversely correlated with brain structures supporting a narrow attentional focus (e.g., target detection). In line with this, recent work demonstrated that inferences about possible courses of action are processed by the right (ventrolateral) prefrontal cortex, whereas inferences about necessary courses of action are processed by the left (dorsolateral) prefrontal cortex (Barbey, Krueger, & Grafman, 2009).

Within personality functioning, vigilance operates from the background of one's consciousness and draws attention to anything that has strong personal relevance such as opportunities to accomplish one's needs or enact one's intentions (Kazén, Kaschel, & Kuhl, 2008) or anything that is associated with some threat to one's interests. Vigilance is thus selective in a way that differs markedly from common conceptions of mindfulness. For example, in contrast to vigilance, mindfulness is associated with openness (i.e., non-selectivity) for everything passing one's mind without evaluation of the personal meaning of mental contents (cf. the concept of equanimity: Desbordes et al., 2014). Vigilance shares with this form of mindfulness a broad scope of attention, which contrasts with the narrowly focused mode of attention associated with target detection. However, in contrast to mindfulness, the broad attentional scope of vigilance is more selective: It does not attend to anything (nor being "open for anything") by ignoring personal evaluation of mental contents, but is selective for mental contents that are of personal interest.

Vigilance serves a personal surveillance function that becomes apparent in everyday life, for instance, when somebody increases the "inner distance" from another person or, conversely, when somebody is "crossing the lines", for example, when someone intrudes into one's business. Vigilance can thus be seen as the "border patrol of the self". Here, the close

conceptual relationship between vigilance to parallel processing becomes apparent: To instantly notice when someone is crossing one's line, one needs a great deal of information simultaneously ready in the background of one's consciousness that indicate what fits to one's self and what does not, in order to immediately notice a line crossing. In clinical practice, teaching a patient to be aware of others intruding into personal space is a typical target of therapy toward protecting the self and its autonomy. Enhanced vigilance may also warrant the stability and coherence of personality: By continuously monitoring the self-compatibility of decisions and actions from the background of consciousness, vigilance prevents the person from becoming overly dependent on situational changes.

3. Extended Outcome Processing: Felt Feedback

The third function of the integrated self relates to the parallel (i.e. simultaneous and extended) consideration of feedback that enables a broad array of consequences of one's actions to be integrated into the self. How can one distinguish this extended type of feedback utilization from other more narrowly focused types? Presumably, the likelihood that feedback touches the integrated self should increase when feedback is given in an implicit rather than in an explicit (verbal) format and when it has emotional overtones rather than when it is merely presented as a fact. Findings reported by Derryberry (1990) confirm this expectation: Both positively and negatively valenced feedback affected subsequent behavior when task-relevant information was projected into the right hemisphere (i.e., presented in the left visual field) and when it was conveyed by the shape of a symbol or its spatial location rather than by a verbal cue (see Kaplan & Zaidel, 2001, for similar findings).

Whereas analytical processing merely takes explicit note of the consequences of action, feeding perceived consequences into the integrated self does not only yield mere (verbal) knowledge of the response but also renders a holistic feeling about these consequences. This includes the kinesthetic responses that come from the entire body when an

action is performed and the act of feeling the consequences of one's actions (e.g., letting the impact of one's behavior on others "get close to one's self"). Thus feeling the consequences of one's own actions (including its personal meaning) endows the person with "response-ability", that is, allows her to find an appropriate response to every challenge a particular task might be associated with. This type of commitment requires a broad scope of processing that is not provided by focused analytical processing of outcomes.

Within a counseling or clinical context, "felt sense" of consequences, feedback, and other personal information is often considered to be a prerequisite of healthy personality functioning (Gendlin, 1978; Gilligan, 2013). If the somatosensory response of doing or the consequences of one's action do not come into contact with one's self, a person might repeat the same mistaken behavior over and over again (e.g.., compulsive and "mindless" perseveration of mistakes; see also the notion of "ego fixation: Koole, Tops, Strübin, Bouw, Schneider, & Jostmann, 2014). Likewise, the person may never be happy even with successful work and in the end overexert herself, leading to workaholism, burnout, or obsessive-compulsive disorder (Wojdylo, Baumann, Buzny, Owens & Kuhl, 2013). When failure sets in, the person may run out of ideas very fast. If however, a failure sets in while one has contact with the integrated self, one can see many new paths of action afterwards because one has, with the help of high-level parallel processing, one's collected life experience online.

4. Extended Unconscious

The fourth function of the integrated self relates to its unconscious processing. To make wise and circumspect decisions, numerous inputs such as needs, values, goals, and action possibilities as well as other individuals' needs and intentions have to be taken into consideration at once (Kuhl, 1994, 2000a). This wealth of information cannot be simultaneously processed at a conscious level because conscious working memory processing can only focus on a few chunks of information. The parallel-processing of the integrated self

does have the required information processing capacity. Although parts of the integrated self can be made conscious, we use the term “unconscious” (rather than the Freudian term "pre-conscious") because the integrated self in its entirety can never be fully explicated.

The unconscious nature of the integrated self implies that self-access may be facilitated when people relinquish conscious control and give the self’s unconscious intelligence more room. This increase in self-access may be facilitated in a quiet and relaxed atmosphere (Kuhl, 2000b, 2001). Methods for activating the “intelligent unconscious” have been developed in the ancient tradition of hypnosis and in more modern methods of consulting, training, and in therapy, starting with the pioneering work of the American psychotherapist Milton Erickson (1980). Paradoxical interventions are one way of overcoming the experience of not being able to intentionally control one's self (including one's emotions): Once you notice that you cannot intentionally control feeling happy, you may then intentionally pursue unhappiness (Frankl, 2011; Watzlawick, 1983). Such paradoxical intentions may increase accessibility for self-congruent action because they put the undesired state under explicit intentional control leaving the integrated self free for spontaneous, self-congruent action.

There is preliminary evidence that the right hemisphere, more than the left hemisphere, contributes to the unconscious, automatic generation of emotions (see Gainotti, 2005, for review and theoretical integration). In addition, recent studies suggest that the right hemisphere even contributes to the unconscious regulation of emotions. For example, Quirin, Bode, Fröhlich, and Kuhl (2014) found that activating the right hemisphere by squeezing a stress ball with the contralateral hand led to increases of implicit self-esteem and implicit positive affect, but had no effects on explicit self-esteem or explicit positive affect.

5. Extended Self-Development: Integrative Competence

The fifth feature of the integrated self relates to its ability to merge seemingly contradictory needs and emotions (one's own and others'), as well as the positive and negative sides of an experience. A lack of cognitive and emotional integration lies at the core of many psychological disturbances, such as borderline personality disorder, which is characterized by instability of affects, self-image, and interpersonal relationships (Linehan, 1993). From the present perspective, such disorders may stem from impaired functioning of the integrated self.

As previously mentioned, close communication between psychological systems is a prerequisite for adaptive personality functioning. This is particularly applicable to the integrative competencies of the self. Expressing emotional contents through language may be one way in which communication between psychological systems may be facilitated (e.g., Kircanski, Lieberman, & Craske, 2012, Lieberman, Eisenberger, Crockett, Tom, Pfeifer, & Way, 2007; see also Samur, Tops, Schlinkert, Quirin, Cuijpers, & Koole, 2013). From the present perspective, such verbalizations may facilitate a transfer of the right hemisphere's implicit information into the analytical left hemisphere. This transfer may be crucial for nurturing integrative competences (Kuhl, 2011), especially when verbalizations are accompanied by emotional and self-related feelings, which completes the two-way interaction between analytical "focusing" and emotionally "felt sense" thereby rendering the verbalized problem amenable to sustainable emotional coping (cf. Gendlin, 1978).

Sustainable coping with negative emotions is presumably only possible when individuals confront themselves with those emotions, that is, when people maintain right hemispheric self structures active, in order to be able to integrate those negative experiences. By contrast, mere verbalization of unpleasant circumstances without experiencing concomitant emotions constitutes defensive rather than integrative coping. In fact, there is much evidence that right prefrontal structures, the ventrolateral prefrontal cortex in particular, are involved in emotion regulation (Eisenberger & Lieberman, 2004; Levesque et al., 2003;

Lieberman et al., 2007; Torrisi, Lieberman, Bookheimer, & Altshuler, 2013). There is also evidence that the type of emotion regulation supported by the right prefrontal cortex is integrative rather than defensive (Kalisch, Wiech, Herrmann, & Dolan, 2006) and unconscious rather than conscious (Yanagisawa et al., 2013).

Some of the sparse experimental evidence on the integrative competence of the self derives from a study by Showers and Kling (1996). These authors reported that participants who were able to integrate positive and negative self-attributes within a coherent self-image more efficiently coped with induced negative affect when exposed to an experimental condition intended to activate the self (i.e., completion of sentences beginning with "I am ...") and were less able to cope with negative affect than participants having fragmented self-representations when exposed to a distractor condition (e.g., count backwards in steps of 3 starting from 1000). This self-confrontational coping can be called "extended" self-development because it is based on some dialectic interaction between focusing on a single experience (e.g., failing a test) and bringing it in contact with one's extended experiential knowledge base (i.e., the self). This form of extended processing results in accommodation of rather than assimilation: It does not simply impose familiar self-representations on a painful experience (assimilating it into existing representations), but results in a qualitative modification of familiar self-representations.

6. Extended resilience: Turning vulnerabilities into strengths

The sixth feature of the integrated self relates to its capacity to turn emotional vulnerability into emotional strength. According to PSI theory, emotional vulnerability relates to sensitivity for negative affect. Negative affect leads people to focus more on experiences that are discrepant from wishes and expectancies (Kazén, Kuhl, & Quirin, 2014). These discrepant experiences can become a resource for learning and self-development, provided that they can be related back to the existing knowledge structures of the integrated self. This

access can be achieved by down-regulating negative affect after the discrepant experience has been identified. Consequently, the extra opportunities for learning among emotionally vulnerable people can only be utilized when they can successfully overcome negative affect (Kuhl, 2000b). Sensitivity for negative affect can thus be turned into an advantage when it is paired with affect-regulatory skills.

Preliminary findings suggest that emotion-regulatory competencies can indeed bring out psychological benefits of emotional vulnerability. For example, participants scoring high on a measure of sensitivity for negative evaluation, which is typically associated with an increased risk to develop psychosomatic symptoms, are at an even lower risk compared to low sensitivity controls when they have developed an efficient non-defensive (self-based) form of emotion regulation (Baumann et al., 2007). In the same study, a personality trait associated with reduced positive affect (i.e., avoidant adult attachment) turned from an inhibitory to an enhancing condition for well-being when it was accompanied by an intact capacity to upregulate positive affect as needed (self-motivation). Another set of studies (Baumann & Scheffer, 2010) showed that avoidant attachment style, a disposition that promotes inhibited positive affect, can lead to enhanced achievement motivation when it is accompanied by a high degree of self-motivation (assessed by a scale assessing “mastery orientation”).

Similar findings have been reported for child development. According to a recent meta-analysis (Bakermans-Kranenburg & Van Ijzendoorn, 2011), children having an increased genetic risk to develop psychological symptoms (presence of dopamine receptor D4 7-repeat allele) were even better protected against those symptoms than children without that genetic vulnerability when they were exposed to "positive rearing environments" (e.g., maternal sensitivity, security of attachment). Longitudinal studies showed that those positive rearing environments and their effects on child behavior (e.g., positive social responsivity),

assessed during the first year of life, predict efficient self-regulation and moral behavior assessed several years later (Kochanska & Kim, 2014).

7. Extended trust: Self-positivity

The seventh and final feature of the integrated self is a deeply rooted tendency toward positive feelings about one's existence (feeling accepted in the world and having an inner security that even difficult or painful experiences cannot upset). This notion of self-positivity is reminiscent of Erik Erikson's (1950) concept of basic trust developing during the first months of life in interaction with the primary caretaker (also known as secure attachment: e.g., Bowlby, 1969). Presumably, trust forms the basis for later development of self-positivity and self-esteem (Brown, 2014), which foster inner security and self-development including self-regulatory skills (Diamond & Aspinwall, 2003; Kochanska, Philibert & Barry, 2009) such as the ability to efficiently cope with negative experiences by intuitively recruiting positive affect (Quirin, Bode, & Kuhl, 2011; Koole & Jostmann, 2004; see also Koole, 2009). Notably, activating the right hemisphere by squeezing a stress ball with the left hand leads to increases in implicit positive affect and implicit self-esteem (Quirin et al., 2014). Moreover, the right hemisphere supports perspective taking and the inclination to deem others trustworthy (Winston et al., 2002) and right prefrontal cortex development supporting affect regulation and self-development (Schore, 2001, 2012).

Self-positivity as conceptualized here does not imply global positivity, unrealistic optimism, unlimited self-efficacy beliefs, or defensive embellishment of negative experience. Rather, basic trust and concomitant inner security make it possible to accept and learn from, rather than to ignore or repress, painful experiences. According to PSI theory (Kuhl, 2000b), the ability to alternate between non-defensive self-exposure to painful experience and subsequent contact with the integrated self (which presumably requires some downregulation of negative affect) has been described as the basis for *accommodative self-development*, that

is changes in self-development based on self-confrontational revision of self-schemas rather than mere assimilation of new experiences by existing schemas (Kuhl, 2000b). Compared to defensive coping, self-confrontational coping entails the chance to find constructive solutions to an emotional problem (Epstein, 1992).

Despite the obvious risks associated with emotional self-exposure, self-confrontational coping is better suited for sustainable adjustment to adverse experience, at least for individuals who have developed a mature integrative self (Showers & Kling, 1996; Stanton, Kirk, Cameron, & Danoff-Burg, 2000). Specifically, the motivation to confront negative experiences rather than defensively evading them is based on the ability to keep the faith in the recoverability of positive feelings, even if one is confronted with negative experiences. People who lack this faith or basic trust may have difficulties growing with their painful experiences because they cannot afford to open up to them. Inner security thus enables the confrontation with one's own flaws or painful experiences rather than blocking them out in order to find a positive balance of personal experience (cf. the concept of *self-positivity*, Koole & DeHart, 2007; Koole & Jostmann, 2004).

Although not identical with self-efficacy and optimism, self-positivity and inner security can nonetheless be a reliable source of optimistic beliefs in one's self-efficacy, that is, a general anticipation that one accomplishes a goal by the actions taken. This competence to anticipate positive affect associated with goal attainment is especially important once a decision has been made and individuals need positive affect to pursue their goal even when difficult or unpleasant steps have to be taken (Beckmann & Kuhl, 1984, Harmon-Jones & Harmon-Jones, 2002; Puca, 2001) or even to maintain their positive assessment of things that belong to them. A positivity bias in evaluating the degree to which the goal was obtained or not, for example by focusing on congruent rather than discrepant aspects, may motivate the person to go on pursuing further goals (Beckmann & Kuhl, 1984; Koole & Jostmann, 2004).

Conclusion and Outlook: Individual Differences and Development

What does it take to be someone? In the present article, we have discussed how the distinctive unity in thought, emotion, and action that characterizes a fully functioning person derives from the integrated self. Notions regarding the integrated self have been around in humanistic and existential approaches to psychology from the 20th century onwards. Nevertheless, it has remained unclear whether the integrated self is merely a descriptive term, or whether the integrated self is a causal mechanism than can explain some part of human behavior. We sought to clarify this issue by relating the integrated self to parallel-processing networks in the right anterior cortex, which are intimately connected with emotions, foster broad attentional vigilance, utilize felt feedback, process unconsciously, integrate negative experiences, foster resilient coping, and promote an extended sense of trust.

The capacities of the integrated self are potentially available to each human being. Nevertheless, people differ in the degree to which their integrated self is developed. In accord with the "use it or lose it" principle, the integrated self may develop better the more often its functions are successfully used. Also, the functions of the integrative self may be blocked, for example, by negative affect or stress (see below) and individuals may have more access to their analytical ego than to their holistic self. In today's ego-driven media society, the conceptual self is often celebrated more than the integrated self. It therefore seems increasingly important to offer possibilities for developing the integrated self. To this end, it would be important to think about how to effectively support self-development in educational institutions (kindergarten, school, university) and at home (cf. the concept of "autonomy support" by Deci & Ryan, 2000).

The link between the integrated self and the right hemisphere may be exploited in future applications. In general, activation of the right hemisphere, in everyday life as well as in experimental or therapeutic settings, should increase the availability of integrated self-

functions such as high-level parallel and poly-semantic processing, emotionality, vigilance, nonverbal feedback processing, implicit self-access, integration of contradictions, and extended trust. These beneficial effects could be harnessed as a function of healthy self-development, autonomy support (Deci & Ryan, 2000), and integrative competence (Showers & Kling, 1996). In this context, one simple method that might be useful for developing self-functions refers to the unilateral kinesthetic activity (stress ball squeezing) mentioned earlier (see Beckmann et al., 2013, for a recent application in sports).

An issue that warrants more research is the development of self-positivity and inner security during childhood Presumably, this development is influenced strongly by past experiences in close relationships but can also be influenced later on by positive relational experiences, especially if they coincide with an improvement of self-awareness of one's own needs (Schore, 2012). Specifically, children learn to regulate their feelings themselves when they experience that caregivers regulate their children's feelings (Kuhl, 2000b). An effective way of facilitating this internalization process is to console when the child is upset or distressed and to encourage the child. The latter interventions must be carefully dosed, however, by helping not more than necessary and allowing children to continue on their own as much as possible. Merely encouraging or soothing is not enough for cultivating the integrated self. This is because the experience of being encouraged (or becalmed) only becomes integrated if the integrated self is active during this interaction. This may be accomplished in positive and affectionate relationships where individuals feel personally addressed and understood.

In this article, we limited our analysis to the functional features of the integrative self as a neuropsychological system. Many important issues could be dealt with only in passing, such as the developmental conditions of the integrative self (e.g., intimate, personal relationships characterized by personal acceptance, mutual understanding, autonomy support,

responsive consolation and encouragement), and issues relating to interactions with mental systems other than the integrated self that seem necessary for optimal self-development. Because a discussion of these complex personality dynamics is beyond the scope of this article, we refer to relevant literature (Bakermans-Kranenburg & van Ijzendoorn, 2011; Kochanska et al., 2009; Kuhl, 2000a, 2000b, 2001, 2011; Kuhl & Keller, 2008; Kuhl & Quirin, 2011; Schore, 2001, 2012). In spite of these limitations, we hope that the present article places the integrated self on firmer scientific grounds, and, by so doing, complements and extends existing approaches in fostering the healthy functioning of the integrated self.

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Table 1: Functional Characteristics of the Integrated Self

Overarching Principle: Extended high-level parallel processing (polysemantic processing, remote associations, multiple constraint satisfaction similarity matching, robustness: "graceful degradation")

(1) Extended emotional and somatosensory connectedness (including needs and body)

(2) Vigilance (broad attention for personally relevant aspects)

(3) Extended outcome processing: Felt feedback (failure recognition, assumption of responsibility)

(4) Extended unconscious processing

(5) Extended self-development: Integrative competencies (integration of negative with positive experiences; efficient, sustainable affect regulation)

(6) Extended resilience: Turning vulnerabilities into strengths

(7) Extended trust: Self-positivity and inner security.