Workings of the Will:

A Functional Approach

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RUNNING HEAD: Workings of the Will

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It is often said that people like being in control of things (Alloy & Abramson, 1979; Vohs & Baumeister, this volume; Langer, 1975). Viewed from this perspective, having willful control over one's own actions is highly desirable. However, willfulness also has some deeply unsettling existential implications. When someone has the power to willfully decide what he or she does, this person is fully responsible for his or her own actions. Willfulness thus eliminates any excuses or mitigating circumstances that might explain one's personal weaknesses and wrongdoings. As existential thinkers like Heidegger and Sartre have pointed out, the mere realization of this responsibility can be terrifying. Indeed, many modern individuals seem eager to flee from what has been called the "tyranny of choice" (Schwartz, 2000), avoiding or even outright denying their ability to take charge of events. Unfortunately, the denial of personal responsibility ultimately keeps people from living their lives as they truly want. One of the major goals of existential psychotherapy has thus been to liberate people from their responsibility defenses, allowing them to regain volitional control over their own actions (Yalom, 1980).

Much like modern individuals have struggled with the existential burdens of the will, experimental psychologists have struggled with the conceptual role of the will in human functioning. At the beginning of the twentieth century, the experimental study of the will made a promising start (Ach, 1910; Lewin, 1926; Lindworsky, 1923). However, this period was followed by the rise of behaviorism, which emphatically refused to accord a scientific status to the will (Skinner, 1971; Watson, 1913). After the cognitive revolution, experimental psychologists were once again at liberty to theorize about volitional processes such as self-regulation (Carver & Scheier, 1981), executive functioning (Vohs & Baumeister, this

volume; Norman & Shallice, 1986), autonomy (Deci & Ryan, 2000), delay of gratification (Metcalfe & Mischel, 1999) and action control (Kuhl & Beckmann, 1985). Yet, in spite of the substantial progress that has been made in these areas, the will continues to be a highly controversial topic, and attempts to deny the will its independent conceptual status have not ceased (Bargh, this volume; Libet, 1985; Wegner & Wheatley, 1999).

In the present chapter, we focus on the will as a central theme in experimental existential psychology. More specifically, we argue that the will represents an independent psychological concept that lends itself to rigorous scientific analysis. In the following section, we begin by considering some of the most important theoretical objections that previously have been raised against the scientific status of the will. As we will show, none of these objections constitutes a compelling argument against a scientific analysis of the will. Next, we discuss a functional approach to the will, an approach that may be useful in guiding the experimental analysis of the will. Finally, we consider some of the existential-psychological implications of our perspective on the workings of the will.

In Defense of the Will

One of the most fundamental objections against the scientific status of the will has been concerned with the absolute freedom from causality that the notion of willfulness seems to imply. If willful behavior would be completely free from objective determination, then any scientific attempt to analyze the workings of the will would indeed be pointless. However, upon closer consideration, this argument of indeterminism is based on a confounding between subjective and objective determination. When we perceive a person's behavior as "willed" we typically mean that this behavior is self-determined, in the sense of being free from control by forces that are external to the self. Such "external" forces can be truly external such as a mugger forcing me to give him my wallet, but they can also be "internal"

as long as they are external to the self system. For example, when I stick to a good paying job even though I hate it, my behavior is controlled by the monetary incentive, an internal motivational factor that is not integrated in the self. Subjectively speaking, self-congruent willful behavior tends to be experienced as free by the person him- or herself (Deci & Ryan, 2000). However, this does not mean that the self-system that controls the behavior is itself free from objective determination. Subjective freedom thus does not imply freedom of objective determination (nor does the former exclude the latter).

The distinction between subjective and objective determination can also be approached from a neuropsychological perspective. Neuropsychological research has identified several parts of the brain that mediate volitional processes, such as the frontal lobes (Fuster, 1989; Lezak, 1983; Luria, 1978) and the anterior cingulate cortex (Pardo et al., 1990; Posner & Petersen, 1990). These brain structures greatly increase the flexibility of behavior, for instance, by facilitating shifting between cognitive sets and overriding habitual responses. For example, Luria (1978) described how a patient suffering from a lesion of the prefrontal cortex became distracted from his intention to leave the ward and buy cigarettes by external cues eliciting some routine behavior (e. g., he automatically followed a group of people walking down the hallway although he could still remember his intention to buy cigarettes). In this sense, the brain structures involved in volitional control of behavior can be said to "liberate" the person from the rigid type of behavior control that is characteristic of routine behavior. At the same time, the very brain structures that give rise to volitional behavior are themselves subject to a host of causal influences, including electrochemical inputs from other brain areas, changes in blood sugar levels, hormonal changes, and so on (LeDoux, 2002). Thus, at the level of brain processes, we again see how actions that are free and willful from a personal perspective can be objectively determined at the same time.

If the causal status of neurobiological influences on willful action is undebatable, then one might argue that psychologists could suffice with studying these objective causal influences instead of the more slippery volitional processes that can only be studied on a psychological level. After all, it could be argued that objective causal influences such as electrochemical events operate on a more basic level of analysis. However, this kind of reductionism is unlikely to shed much light on the workings of the will. Even if one would assume that all events in the universe, even mental events, are, in the final analysis, determined by the law of physics, predictability is very limited. The dissociation between determinism and predictability has even been shown for simple systems involving just two variables. To the extent that these variables affect each other in a reciprocal and non-linear fashion, that is, when the non-linear effect of one variable on the other is fed back to the first variable, the system can behave according to an unpredictable ("chaotic"), but fully deterministic way (Gleick, 1990; Haken, 1981; Kuhl, 1986). Indeed, recent developments in dynamical systems theory have shown that fully determined complex systems have emergent properties, so that the behavior of the whole system cannot be reduced in a straightforward manner to the behavior of its constituent elements (Vallacher, Read, & Nowak, 2002). Accordingly, higher-order, system-level constructs such as willfulness and self-regulation provide the most parsimonious way to describe and explain the behavior of complex systems. Notably, the concept of will as we use it in this chapter cannot be reduced to the emergent properties of nonlinear interactions among systems determining behavior. Rather, the will is conceived as a superordinate system that coordinates many processes much like an executive board of a large company or the government of a country.

Whereas the foregoing arguments were strictly theoretical, some recent work has proposed empirical arguments against the causal role of the will. For instance, research by

Libet (1985) has shown that people's awareness of their intention to move one of their fingers is preceded by brain readiness potentials that presumably initiate the finger movement. These findings have been interpreted as evidence that behavior was not caused by a conscious intention because the intention to move one's behavior seemed to occur after the brain had initiated activities that typically precede motor behavior. In a related vein, a series of clever experiments by Wegner, Wheatley and associates demonstrated that people can be tricked into believing that they voluntarily chose to perform certain actions (e.g., moving a mouse across a computer screen), even when these actions were objectively caused by an external event (Wegner & Wheatley, 1999). From the present perspective, these lines of research offer intriguing insights into the relation between conscious experience and volitional action. However, we do not think that this research provides any compelling argument against the causal role of the will in action control.

First, even if one would accept the previous findings as instances of volitional illusions, they do not prove that volition can never be a cause of behavior. Indeed, the particular actions that were investigated in these studies (i.e., simple motor movements) were hardly representative of the entire universe of actions that are generally considered volitional. Second, experimental research has shown that many actions that on the surface appear to be volitional are in reality performed because individuals feel pressured to do so (Deci & Ryan, 2000; Kuhl & Kazén, 1994). Similar pressures may well have been operating in the experiments by Libet (1985) and Wegner and Wheatley (1999). For instance, participants in Libet's (1985) experiments were explicitly instructed to move their finger at a self-chosen time. These explicit instructions could have undermined participants' sense of personal freedom, thereby inhibiting the operation of volitional processes. Indeed, recent experiments have shown that some individuals (so-called "state-oriented" individuals) are likely to

mistake external assignments for self-chosen commitments (Baumann & Kuhl, 2003; Kuhl & Kazén, 1994; Kazén, Baumann, & Kuhl, 2003). This judgmental error appears to indicate impaired volitional functioning, given that state-oriented individuals frequently experience difficulties when it comes to executing intended actions (Kuhl & Helle, 1986). These and related findings suggest that the suppression of willful processes through explicit instructions is a common phenomenon which may even occur outside of awareness (Baumann & Kuhl, 2003; Kuhl & Kazén, 1994; Kazén et al., 2003).

Finally, the research by Libet (1985) and Wegner and Wheatley (1999) only speaks to the validity of people's conscious experience of the will. It thus remains an open question to which extent unconscious volitional processes are a causal force in human behavior. Libet (1999), who briefly entertained the notion of unconscious will, eventually considered it "unacceptable". In contrast, we believe that unconscious volition is a viable theoretical possibility. As we will explain, this position follows naturally from a functional approach to the workings of the will.

A Functional Approach to the Will

When psychologists are theorizing about the nature of the will, it is important to keep in mind that the will is more than just an abstract psychological construct. As Wegner and Wheatley (1999) noted, "We all have the sense that we do things, that we cause our acts, that we are agents". Indeed, for most people, willfulness constitutes a very compelling subjective experience. Consequently, it becomes tempting to equate the experience of willing with the actual functioning of the will. Though this confounding is understandable, we believe that it stands in the way of a genuine understanding of how the will operates. Notably, we do not dispute that the actual functioning of the will has important phenomenal correlates. Indeed, numerous studies have documented that many important aspects of willful behavior can be

assessed through self-reporting (e.g., Deci & Ryan, 2000). Moreover, our own work on individual differences in action orientation suggests that even unconscious volitional functions may be tapped by self-report instruments, presumably because people can learn about unconscious volitional functions indirectly, by observing the consequences of these functions in their own actions (Kuhl & Fuhrman, 1998).

Although some aspects of willing may become consciously represented, conscious experience cannot fully reveal how the will operates. First of all, there are important limitations to people's ability to accurately report on their own mental processes (Nisbett & Wilson, 1977). Indeed, the aforementioned experiments by Wegner and Wheatley (1999) and Kuhl and Kazén (1994) highlight just how easily the conscious mind can be misled about the workings of the will. Second, people's self-reports are contaminated by a variety of factors, such as social desirability and cultural preconceptions about the will (Morris & Young, this volume). Third, many volitional processes may be in principle inaccessible to conscious experience. Although the notion of unconscious volition has been scarcely considered by experimental psychologists, some existential psychologists have recognized that some acts of will appear to operate on "subterranean", unconscious levels (Farber, 1966; Jung, 1964; Yalom, 1980). For instance, Farber (1966) suggested that the important choices one makes in life are not consciously experienced as choices, but can only be inferred after the fact. We believe that a similar conclusion can be derived from the commonly held conception of the will as a central executive system. According to this conception, willful processes are responsible for filtering, organizing, and integrating the vast array of different feelings, thoughts, needs, motivations, goals, norms, expectations, and so on, that collectively make up the person. Because the conscious mind has only a very limited processing capacity, it is unlikely that all these different self-aspects can be simultaneously represented in conscious

awareness. As such, the will can only perform its central executive functions if it operates at least in part (most likely, in large part) on unconscious levels.

If conscious experience cannot reveal the whole story about the will, then how can psychologists obtain a deeper understanding of the workings of the will? We think this can be achieved by adopting a functional approach to the will. The functional approach tries to uncover the various subsystems that underlie volitional functioning. Whereas everyday, subjective accounts attribute all forms of willfulness to the whole person, the functional approach breaks down willful phenomena into the sub-personal mechanisms that mediate these phenomena (see also Greve, 2001). This kind of approach is commonplace in cognitive psychology, which has successfully analyzed the functional components of psychological phenomena with low levels of internal organization, such as the perception of isolated objects or simple motor actions. We believe that a similar approach can be fruitful in studying more complex psychological phenomena, such as motivation (Kuhl, 1984; 2000), authenticity (Koole & Kuhl, 2003) and the will. It should be noted that our functional approach to the will is not reductionistic because it treats volitional phenomena at a separate level of functioning. Thus, volitional mechanisms are considered as functionally independent, and hence irreducible to lower-level mechanisms, such as stimulus-response associations, arousal, or affect.

Within personality psychology, a functional approach to high-level phenomena is not new. Indeed, Freud's classic model of Id, Ego, and Super-Ego can be seen as initial attempt towards a functional analysis of motivational and volitional behavior. One familiar objection against these kinds of models has been that they were often very difficult to test empirically, and hence may degenerate into overly abstract, metaphorical accounts. However, this objection only applies to implementations of the functional approach that are too vague to

permit empirical testing. The risk of creating merely metaphorical accounts can be overcome by explicating functional mechanisms in such a way that these mechanisms can be rigorously tested. The functional approach therefore is useful only when the relevant functional mechanisms are formulated with maximal explicitness and precision. At times, however, the functional approach may postulate mechanisms for which no empirical instruments are available, even though such instruments could be designed in principle. In such cases, the functional approach challenges researchers to develop measures that can reliably discriminate between the theorized functional mechanisms. Our own efforts to establish a functional account of the will have been guided by Personality Systems Interactions (PSI) theory (Kuhl, 2000 a,b, 2001), which we present in the following section.

PSI Theory

PSI theory is an integrative framework that seeks to explain human personality functioning in terms of its underlying functional mechanisms (Kuhl, 2000 a, b, 2001). As a broad theoretical perspective, PSI theory addresses a wide range of personality phenomena, including creativity (Biebrich & Kuhl, 2002; Koole & Coenen, 2003), intuition (Baumann & Kuhl, 2002), the self (Koole & Kuhl, 2003), and depression (Kuhl & Helle, 1986). Originally, however, PSI theory was developed out of a conceptual analysis of volitional action control (Kuhl, 1984; Kuhl & Beckmann, 1994). As such, the will continues to occupy a central place within PSI theory.

In agreement with other approaches (e.g., Vohs & Baumeister, this volume; Metcalfe & Mischel, 1999), PSI theory conceives of the will as a set of central executive processes, which regulate the person's thoughts, feelings, and actions in a top-down manner. PSI theory further distinguishes between two fundamental forms of willing or volitional modes. The first form of willing is responsible for inhibiting impulsive actions and maintaining a single-

minded focus on goals that are activated in memory. This volitional mode is referred to as self-control. By contrast, the second form of willing directs the person's functioning towards activities that are either intrinsically appealing or congruent with a multitude of the person's inner values and autobiographical experiences. This second volitional mode is referred to as self-maintenance[1]. Self-control and self-maintenance represent functionally opposite ways of volitional action control. Indeed, the brain systems that presumably underlie self-control and self-maintenance are assumed to be mutually inhibitory. Accordingly, the person cannot engage both volitional functions simultaneously. However, by switching between modes, it is possible to coordinate two volitional modes with each other (Fuhrmann & Kuhl, 1998). Indeed, the functional dissociation between self-maintenance and self-control is often hard to notice in well-balanced, effectively functioning individuals. Even so, it remains important to distinguish between self-control and self-maintenance on a conceptual level, because the two volitional modes are responsible for qualitatively different forms of action control.

Self-Control

Self-control is an immensely useful form of action control. Among other things, it enables people to acquire healthy eating habits (Fuhrman & Kuhl, 1998; Verplanken & Faes, 1999), meet important deadlines (Gollwitzer & Brandstätter, 1997; Koole & van 't Spijker, 2000), inhibit prejudiced reactions (Devine, 1989; Fiske, 1989), and engage in prosocial, self-sacrificial actions (Koole, Jager, Hofstee, & van den Berg, 2001; Van Lange et al., 1997). Self-control tends to be conscious and effortful, and is thus in line with traditional psychological conceptions of the will as an explicit, conscious phenomenon. Metaphorically, self-control may be likened to an “inner dictatorship” (Fuhrman & Kuhl, 1998), during which a “narrow-minded” central executive imposes one dominant goal or perception on the system and suppresses opposing needs, feelings, and other self-aspects. A prototypical example of

self-control is a student who attempts to enact her intention to study by inhibiting all thoughts related to attractive alternatives such as talking with friends or going to the movies (Metcalfe & Mischel, 1999; Wegner, 1994).

According to PSI theory, self-control can be further broken down into two separate functional systems. The first system that supports self-control is intention memory. Intention memory becomes activated when immediate enactment is not possible or undesirable. For instance, intention memory may become activated when people are undecided about where and how to act (Gollwitzer, 1999), when an action plan contains multiple steps (Goschke & Kuhl, 1993), or when immediate responding needs to be delayed (Metcalfe & Mischel, 1999). In these kinds of situations, it is useful to maintain an explicit memory representation of an intended action until the action can be performed. Intention memory is thus responsible for (1) maintaining abstract-symbolic representations of intended actions in working memory (Goschke & Kuhl, 1993; Kuhl & Helle, 1986), and (2) inhibiting the pathway between such intentions and intuitive behavior control systems, to prevent premature action (Kuhl & Kazén, 1999). According to PSI theory, intention memory is connected to a larger network of subsystems that support analytical thinking, verbal processing and other functions that support planning (Shallice, 1988). Neuro-anatomically, the operation of intention memory may be attributed to left-hemisheric (prefrontal) processing (Knight & Grabowecky, 1995). The organization of the left hemisphere consists of a large number of small neuronal networks that function like an ensemble of highly specialized "experts" (Scheibel et al., 1985). This combination of high specialization and low integration is highly conducive to analytical thinking, which is characterized by high competition between alternatives: Things are either true or false, good or bad, useful or useless.

More specifically, PSI theory assumes that self-control is also supported by lower-order cognitive processes, in the form of an object recognition system. Object recognition is a primarily perceptual system that focuses on explicit identification and recognition of elementary sensations (e.g., a visual object, a sequence of tones, an emotion, a semantic category). Characteristic for object recognition (especially in connection with negative mood) is a focus on discrepancies. The system is especially focused on sensations that diverge from previously held expectations, standards, or wishes. Object recognition thus performs the discrepancy-detecting monitoring function that is part of cybernetic models of self-regulation (Carver & Scheier, 1981; Miller, Galanter, & Pibram, 1960). Object recognition can also act as a warning system, which alerts the person to potentially dangerous situations by highlighting unexpected or undesirable events.

Several lines of research have shown that it is possible to obtain separate measures of the self-control functions. For instance, Goschke and Kuhl (1993) investigated the operation of intention memory in a prospective memory paradigm. In this paradigm, participants were asked to memorize pairs of behavioral scripts (e.g., cleaning up one's desk), some of which were to be executed later on. The results indicated that recognition memory for the to-be-executed script was especially efficient, an effect that was termed the intention-superiority effect (ISE). The ISE can be regarded as a marker of intention memory activation, because it indicates the degree to which intentional structures are activated in working memory (for alternative measures of intention memory, see Förster & Liberman, 2002; Koole, Smeets, van Knippenberg, & Dijksterhuis, 1999; Shah, Friedman, & Kruglanski, 2002). In a related vein, Kuhl and Kazén (1999) used the classic Stroop color-naming task to study the inhibitory link between intention memory and intuitive behavior control. In this research, even brief exposures (< 1 s) to positively charged words were able to remove the inhibition between

intention memory and intuitive behavior control, such that the classic Stroop interference effect was effectively eliminated. Object recognition can similarly be studied in various ways. Beckmann (1989) used a perceptually based indicator of object recognition, that is recognition accuracy of tachistoscopically presented words. Notably, object recognition may also facilitate the perception of internal “objects” (i.e., thoughts or sensations). Indeed, Kuhl and Baumann (2000) have argued that uncontrollable ruminations can indicate excessive operation of object recognition, especially when these take the form of negative intrusions. Ruminations become uncontrollable when super-ordinate systems are inhibited (e. g., through negative affect) to the extent that they cannot filter out unwanted productions of the object recognition system.

Self-Maintenance

Even a casual glance at human behavior reveals that the conscious, self-controlled conception of the will cannot account for the full spectrum of willful phenomena. Indeed, some of the most powerful forms of willing are accompanied by experiences of "flow" (Csikszentmihalyi, 1990), "self-congruence" (Kasser & Sheldon, this volume), or "self-determination" (Deci & Ryan, 2000). Apparently, some forms of willing are enjoyable, congruent with multiple needs and self-aspects, and autonomous. This self-determined willing is closely related to Rank's (1945) "creative will", willing that does not involve suppression and has access to the individual's deepest emotions and desires. In line with these notions, PSI theory assumes that there exists a form of willing that is fundamentally different from self-control. This second mode of volition is called self-maintenance. Metaphorically, self-maintenance resembles an inner democracy, during which the central executive "listens to many voices", that is, pursues goals that simultaneously satisfy multiple self-aspects. Applied to the student who wants to study and hang out with her friends, this means that she

would be sensitive to all of her needs, emotions, and thoughts, and find a way to take care of them simultaneously (e.g., by studying together with friends) or successively (e.g., study for a while, then go out with friends)), or find even more creative ways to integrate her diverse inclinations..

Like the self-control mode, the self-maintenance mode can be further broken down into two functional systems. The first functional system that supports self-maintenance is extension memory. Extension memory is a central executive system that consists of extended cognitive-affective networks. Extension memory supports an intelligent, high-inferential form of intuition (Baumann & Kuhl, 2002), which is capable of integrating multiple inputs from both cognitive and affective subsystems through parallel-processing mechanisms (Rumelhart & McClelland, 1986). Extension memory is typically invoked when the person confronts seemingly contradictory aspects of an object, person, or situation. In these situations, it is highly adaptive to engage in holistic processing, which integrates vast amounts of information at speeds that are much greater than can be handled by logical-analytical thinking (i.e., intention memory). Extension memory also forms the basis for implicit self-representations, integrated representations of internal states such as needs, motives, emotions, somatic feelings (e.g., muscle tensions), motives, values, and autobiographical experiences that involve the self (Koole & Pelham, 2002; McClelland, Koestner, & Weinberger, 1989; Wheeler, Stuss, & Tulving, 1997). On a neuro-anatomical level, the operation of extension memory is attributed to right-hemispheric (prefrontal) processing. The organization of the right hemisphere is much like a global network that integrates information from a vast variety of input systems. As such, the right hemisphere is ideally suited for integrative information processing (Beeman et al., 1994; Rotenberg, 1993).

Self-maintenance is further supported by a lower-order behavior control system, intuitive behavior control. Intuitive behavior control consists of a multitude of highly contextualized behavioral programs that guide the automatic execution of concrete actions, and intuitive responses to objects or events. Intuitive behavior control refers to behavior-regulating mechanisms that are purposeful but are lacking in explicit intentionality. One of the earliest forms of intuitive behavior control can be observed in newborn children, who already display emotional contagion and imitation of the emotional expressions of their caretakers (Meltzoff & Moore, 1994). Some of these intuitive behaviors persist into adulthood (Chartrand & Bargh, 1999; Van Baaren, Maddux, Chartrand, de Bouter, & van Knippenberg, in press), whereas additional intuitive behaviors may be acquired later in life. Intuitive behavior programs are especially important for conducting positively toned, spontaneous social interactions (Papousek & Papousek, 1982). Finally, intuitive behavior control is promotion-oriented (cf. Higgins, 1998), being geared towards maximization of positive affect, rewards, or need satisfactions.

A number of methodologies have been found useful in assessing the self-maintenance functions. Extension memory activation is often accompanied by experiential correlates, which include feelings of freedom (Yalom, 1980), mastery (Dweck, 1986), and self-determination (Deci & Ryan, 2000). According to PSI theory, it is possible to interpret these subjective experiences in functional terms. Behavior that is controlled by extension memory has much more flexibility than rigid S-R behavior control, because the parallel processing networks of extension memory can process vast numbers of behavioral options, including even options that are highly unusual or removed from the immediate action context. The subjective experience of freedom that often accompanies this kind of behavior control may thus be based on an intuitive sense of the vast number of behavioral options that individuals

have at their disposal. In a related vein, feelings of mastery may be based on an intuitive computation of the vast networks of experiences that the individual can tap in order to solve a particular problem. Finally, the experience of self-determination may arise through an intuitive sense that one's activities are congruent with all the extended networks of personal needs, motives, self-aspects, and autobiographical experiences that have been recruited through extension memory.

The cognitive structures of extension memory are too extended to be completely accessible to conscious experience. As such, it remains crucial to develop measures of extension memory that do not rely on introspection. The information-processing functions of extension memory can be assessed using various indicators of integrative processing, such as summation priming (Beeman et al., 1994, cf. Bolte, 1999), coherence judgments (Baumann & Kuhl, 2002), and measures of creative thinking (Biebrich & Kuhl, 2001; Koole & Coenen, 2003). The activation of implicit self-representations in extension memory may be tapped through measures of self-accessibility (Koole & Jostmann, 2003) or other measures of implicit self-concept (Greenwald & Banaji, 1995; Koole, in press; Koole & Pelham, 2002). Finally, access to the self's choices may be assessed through the self-discrimination paradigm (Kuhl & Kazén, 1994). In the latter paradigm, participants and the experimenter select an equal number of activities from a list, which are to be executed by the participants later on. After a distracter task, participants are again presented with the entire list, and indicate for each activity whether it was self-chosen. A self-discrimination index can be constructed by taking the number of assigned activities that participants erroneously designate as self-chosen. Various experiments have supported the validity of the self-discrimination measure. For instance, research has established that state-oriented individuals are much more likely to display self-discrimination errors (Kuhl & Kazén, 1994), especially when it comes to

unattractive activities (Kazén et al., 2003) and when negative affect is high (Baumann & Kuhl, 2003). Accordingly, self-discrimination errors occur especially under conditions that theoretically are characterized by reduced access to extension memory (i.e., the combination of state orientation and negative affect).

Activation of intuitive behavior control is best assessed through implicit measures because intuitive behavior control operates primarily at the level of sub-symbolic motor movements. Kuhl (2001, p. 330) has listed various information processing characteristics that may be used to develop objective measures of intuitive behavior control. These characteristics include: multi-modal sensations, orientation towards the immediate present, ego-centric perception, context-specificity, reciprocity between sensation and motor movements, implicit knowledge, impressionistic processing, and a focus on concrete instances (prototypes). Useful experimental methods for the assessment of intuitive behavior control include the performance of well-practiced motor skills (Heckhausen & Strang, 1988; Kuhl & Koch, 1984), signal detection methods (i.e., the maximization of hits; see Higgins, 1998), seating distance (Wisman & Koole, 2003), and social mimicry (Chartrand & Bargh, 1999).

Interactions between Volitional Systems: The Mediating Role of Affect

Self-control and self-maintenance are mutually exclusive forms of volitional action control. Thus, at any given point in time, it is impossible for the person to be at once self-controlling and self-maintaining. Given that both self-control and self-maintenance are highly adaptive forms of executive control, this creates a vexing self-regulatory dilemma. If the person emphasizes self-control, he or she runs the risk of becoming overly analytical and inhibited (due to chronic activation of intention memory) and may suffer from uncontrollable negative ruminations and periods of alienation (due to chronic activation of object

recognition and suppression of the self and other parts of extension memory). Conversely, if the person chooses to emphasize self-maintenance, he or she runs the risk of becoming overly impulsive (due to chronic activation of intuitive behavior control) and insensitive to genuine threats to well-being (due to chronic activation of extension memory suppressing unexpected or unwanted perceptions). Clearly, neither of these alternatives qualifies as adaptive self-regulation. How can people resolve this problem?

According to PSI theory, the solution lies in switching between self-control and self-maintenance in a flexible and dynamic manner. Even though self-control and self-maintenance cannot be performed simultaneously, the person may alternate between self-control and self-maintenance from moment to moment. For instance, a person may first construct a complex action plan (using intention memory) and then proceed by putting this plan into action (using intuitive behavior control; cf. Kuhl & Kazén, 1999). Thus alternating between intention memory and intuitive behavior control is highly beneficial for forming and subsequently enacting intentions (or volitional efficiency; Kuhl, 2000b). In a related vein, alternating between object recognition and extension memory is vital for personal growth (Kuhl, 2000a). More specifically, the person may first notice a new, self-alien experience (using object recognition) and then integrate this experience into the larger scheme of his or her personal motives, needs, and autobiographical experiences (using extension memory). In short, to function optimally (i.e., to attain high volitional efficiency and personal growth), dynamic alternations between self-control and self-maintenance functions are necessary.

The ability to alternate between different volitional functions requires additional coordination. According to PSI theory, this coordination mechanism is provided by the affective systems (Kuhl, 1983a). More specifically, affect acts as an internal signal that modulates the dynamic energy flow between volitional systems (see Martin, 1999, for a

related view). Notably, this modulating function of affect is assumed to occur over and above the hedonic functions of affect (i.e., motivating the person to maximize pleasure and to minimize pain). The underlying idea here is that affective changes inform the self-regulatory system that a different approach to the situation is needed (see also Clore, Schwarz, & Conway, 1994, for related mood-as-information models). Our perspective is also consistent with the view that affect may be aroused from both cognitive (e.g., appraisal) or purely affective (e.g., visceral) sources, and that changes in affect may or not be consciously perceived by the person (LeDoux, 1995). PSI theory further argues that positive and negative affect (though often negatively correlated) have distinct functional roles, in addition to the ones illustrated by previous research, such as facilitation of behavior and creative performance (Ashby, Isen, & Turken, 1999; Isen, 1984). Positive affect modulates the information flow between intention memory and intuitive behavior control. Decreases in positive affect signal that important needs are not being met because some obstacle has to be overcome, and hence lead to activation of intention memory. Conversely, increases in positive affect signal that need satisfaction is no longer problematic, and hence lead to activation of intuitive behavior control. Negative affect modulates the energy flow between object recognition and extension memory. Increases in negative affect signal the possible presence of an immediate, unpredictable danger, and hence cause an increase in the activation of object recognition. Conversely, decreases in negative affect indicate that the situation is relatively safe and predictable, and hence cause extension memory to become activated. On the basis of its extended experiential networks, extension memory is highly suited for sensing the underlying predictability of large numbers of complex events.

Because of the modulatory role of affect, circumstances that influence the person's affective states have profound implications for volitional behavior. For instance, being in a

friendly emotional climate and a predictable environment will lead most individuals to adopt the self-maintenance mode. Conversely, a hostile emotional climate in a highly unpredictable environment will cause most individuals to revert to the self-control mode. In addition to these external factors, enduring personality dispositions may exert an important influence on the person's affective states, and hence, on volitional functioning. For instance, a predisposition towards neuroticism may lead individuals to have frequently elevated levels of negative affect, which leads to frequent activation of object recognition accompanied by suppression of extension memory. Likewise, a predisposition towards extraversion may lead individuals to have frequently elevated levels of positive affect, which leads to frequent activation of intuitive behavior control accompanied by suppression of intention memory. The dispositional factors that influence sensitivity for positive and negative affect may be innate or learned.

Volitional Affect Regulation

People are not just passive observers of their own feelings. Indeed, the emotion literature indicates that people continually monitor and regulate their own affective states (Gross, 1999). PSI theory provides a theoretical explanation for these intense affect regulation efforts. Because affective change has important consequences for volitional functioning, the ability to maintain certain affective states is vital to effective action control. Some affect regulation mechanisms occur on early, relatively primitive levels of information processing. Examples are the perceptual blocking (“repression”) of negative affect (Bruner & Postman, 1948; Dawson & Schell, 1982; Greenwald, 1988; Hock, Krohne & Kaiser, 1996; Langens & Mörth, 2002), or the instinctive urge to affiliate with others in times of distress (Schachter, 1959; Wisman & Koole, 2003). However, affect regulation may also occur on higher, more sophisticated levels of information processing of the kind that is supported by

prefrontal brain regions. When such high-level processes are involved in affect regulation, PSI theory speaks of volitional affect regulation. Volitional affect regulation is possible when the volitional functions (i.e., intention memory and extension memory) have developed links with the affective systems. Accordingly, volitional affect regulation skills are fostered by an environment that encourages individuals to use volitional processes to down-regulate unwanted affect (see Kuhl, 2000a, for a more formal model).

PSI theory further distinguishes between volitional affect regulation by means of intention memory and volitional affect regulation by means of extension memory. Affect regulation by means of intention memory operates through conscious, deliberative processing. Recent work by Gross (2002) and associates has studied two kinds of deliberative affect regulation. First, individuals may use emotional suppression to inhibit the expression of their aversive affective states. Suppression strategies tend to be ineffective (Gross, 2002), and may even add to the unwanted affect (Wegner, 1994). Second, individuals may down-regulate negative affect by changing one's conscious reappraisals of events (for instance, people may adopt a neutral perspective when they are experiencing something negative). Although reappraisal is more effective than suppression, it can only be implemented before the unwanted affect has been triggered. Once an affect has become fully processed, reappraisal is no longer viable. According to PSI theory, a considerably more flexible and efficient control over one's affective states can be achieved through extension memory. Extension memory is closely connected with the affective systems (Dawson & Schell, 1982; Wittling, 1990). As such, extension memory seems especially suited to regulate the person's affective states. Moreover, due to its parallel processing characteristics, extension memory is capable of responding much more quickly and efficiently to affective change than the sequential operators of intention memory.

Kuhl (1981, 1994b) has developed a measure to assess individual differences in affect regulation through extension memory. Because this kind of affect regulation is a central component of effective action control, individuals who are highly skilled at coping through extension memory are referred to as "action-oriented" individuals. Theoretically, action-oriented individuals are presumed to be capable of highly efficient and context-sensitive affect regulation, leading to smooth execution of intended actions, even in the face of stressful circumstances. By contrast, individuals low on action orientation are presumably lacking in such powerful affect regulation skills, causing them to be more vulnerable to aversive affect and unwanted ruminations. Because the latter individuals are easily preoccupied by their own aversive states, they are referred to as "state-oriented" individuals. Converging lines of research have supported the validity of the distinction between action- and state-oriented coping styles in terms of self-regulation of affect on explicit affect (Brunstein & Olbrich, 1985; Kuhl, 1981, 1983b; Rholes, Michas, & Schroff, 1985) and implicit affective processes (Heckhausen & Strang, 1988; Koole & Jostmann, 2003; Rosahl, Tennigkeit, Kuhl, & Haschke, 1993). For instance, Koole (2003) found evidence that stress inductions cause action-oriented individuals to display reversed affective priming for negative affect, a pattern indicative of volitional inhibition of negative affect. No such findings emerged among state-oriented individuals. Moreover, and consistent with the notion that action orientation is an acquired skill, clinical studies indicate that action orientation can be boosted through psychotherapy (Kaschel & Kuhl, in press; Schulte, Hartung, & Wilke, 1997).

According to PSI theory, self-regulation of affect is not confined to the maintenance or restoration of pleasant mood and its implications for subjective well-being and health. Instead, self-regulation of affect also modulates the interaction among the four mental

systems that is needed for switching among mental systems according to situational requirements, for putting the will into effect, and for developing a creative and wise self-system (Figure 1). Accordingly, PSI theory predicts that action orientation should be a key moderator of the entire range of volitional functions. Consistent with this prediction, research has found reliable effects of action orientation on various indicators of intention memory, object recognition, extension memory, and intuitive behavior control (Kuhl, 2000, 2001). In line with the generality of the action orientation construct, the effects of action orientation have been obtained across a broad range of content domains, ranging from cognitive performance (Goschke & Kuhl, 1993) to physiological functioning (Walschburger, 1994), social perception (Baumann & Kuhl, 2002) and work performance (Diefendorff, Hall, Lord, & Strean, 2000). Across these diverse domains, action-oriented individuals consistently display optimal volitional performance, whereas state-oriented individuals have displayed a variety of volitional deficits. However, this asymmetry between action- and state-oriented individuals only emerges under stressful conditions. Under relaxing conditions, when self-regulation of affect is not needed, state-oriented individuals may even outperform action-oriented individuals[2] (Kuhl & Beckmann, 1994a; Menec, 1995). From a functional perspective, however, the volitional deficits observed among state-oriented individuals under stressful conditions are often most informative, because such deficits may reveal dissociations between volitional functions that are smoothly coordinated in action-oriented individuals. As such, the study of individual differences in action orientation has contributed valuable insights to the functional analysis of the will.

Conclusions and Future Directions

In the present chapter, we have argued that the will deserves to be taken seriously as a scientific construct. The will has had a highly controversial history in psychology.

Accordingly, we began the present chapter by addressing some of the most frequently heard objections against the will. As it turned out, none of these objections constitutes a compelling argument against the independent conceptual status of the will. We then discussed PSI theory, a functional account that explains the workings of the will in terms of dynamical interactions between cognitive and affective systems. The analysis that PSI theory offers is not reductionistic, because it assumes separate mechanisms to account for willful functioning instead of reducing the will to lower-level phenomena such as S-R associations. At the same time, PSI theory is undeniably deterministic, by specifying volitional systems and processes that can be empirically assessed and tested. The tension that has existed between deterministic and reductionistic approaches to the will has thus been resolved by PSI theory.

Doubtless, future scientific developments will continue to contribute to the functional analysis of the will. New knowledge about brain functioning, dynamical systems theory, behavioral genetics, and personality and social psychology will almost certainly enrich our thinking about the will. Consequently, we anticipate that the field's knowledge of volitional processes will expand dramatically over the next few decades. One of the main challenges for researchers will be to keep up with all the new discoveries that are made on the workings of the will. The development of broad, integrative theories will be needed to organize this ever-growing body of findings and to keep its major findings accessible. In this regard, PSI theory may serve a useful function, as a theoretical framework that spans a broad range of volitional phenomena.

But what about the deeper existential issues that are connected with the will? Can a functional analysis such as PSI theory speak to persistent problems of the will such as responsibility avoidance, alienation, and existential guilt? Although this challenge is daunting, we believe that the functional approach has at least the potential to help individuals

who are struggling with these existential concerns. First, the functional approach offers a precise scientific language for existential concepts such as the will, self, and intuition. As Jung (1957) noted, "...scientific knowledge (...), in the eyes of modern man, counts as the only intellectual and spiritual authority". Thus, a rigorous scientific approach to existential issues is increasingly needed to overcome modern individuals' discomfort with the metaphorical models that have traditionally been espoused by existential approaches. Second, the measures that are developed within the functional approach may be useful in uncovering the functional causes of people's existential concerns. A major advantage of the objective measures of the functional approach is that they can provide information on implicit volitional processes. As noted by Yalom (1980), implicit volitional processes often provide the key to the deeper existential problems with which individuals are struggling. At the University of Osnabrück, we have been collaborating with psychotherapists in order to capitalize on the applied significance of the functional approach. In so doing, we have found that our experimental techniques can be turned into sensitive diagnostic instruments for assessing specific volitional malfunctions (Kaschel & Kuhl, in press). Finally, by offering a wealth of new conceptual and empirical tools, the functional approach may contribute to the development of particular methods of helping individuals to overcome volitional and existential problems in everyday life as well as in organizational contexts (Kuhl & Henseler, 2003).

We are not arguing, however, that the functional approach provides a simple formula to rid people once and for all from all their existential concerns about responsibility, willing, and decision-making. Rather, the functional approach acknowledges the complexity that is inherent in the workings of the will, and thus highlights the many ways in which healthy forms of willing can be frustrated. Instead of helping people to avoid existential problems

altogether, the functional approach is designed to help people to confront their existential concerns without getting stuck. Indeed, when people manage to overcome these existential concerns, even the most troubling feelings of guilt, anxiety, or alienation may be transformed into opportunities for psychological growth.

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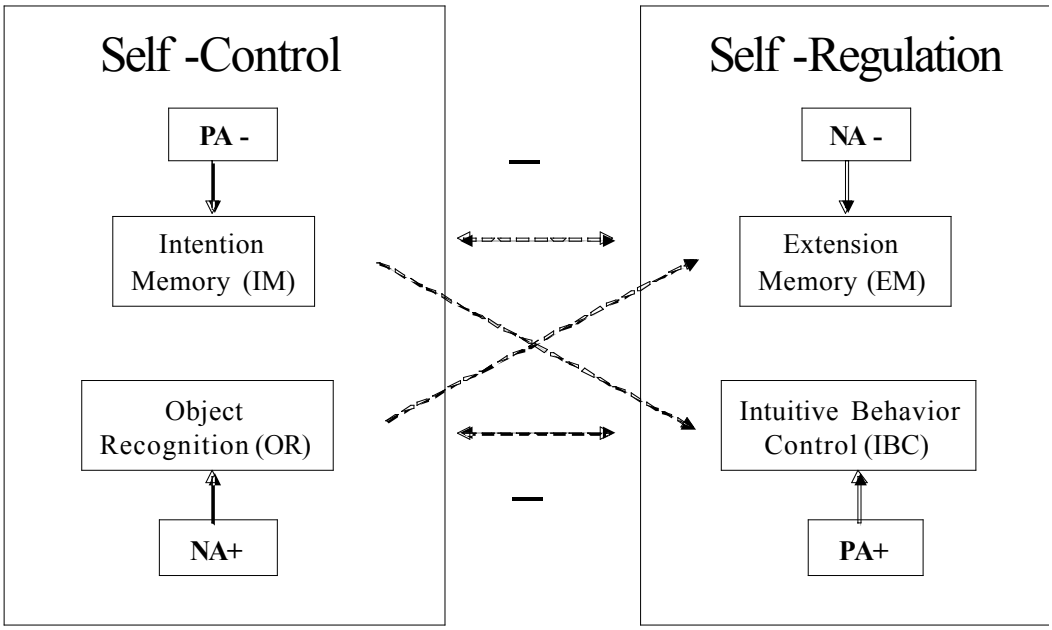
Figure Caption:

Figure 1: Cognitive systems of PSI Theory and their modulation by high (+) vs. low (-) positive (PA) or negative (NA) affect. Note: Dashed arrows indicate antagonisms between cooperating systems that can only be overcome through an affective change.


Self -Control
PA -
Intention Memory (IM)
Object Recognition (OR)
NA+
Self -Regulation
NA -
Extension Memory (EM)
Intuitive Behavior Control (IBC)
PA+

Footnotes

1. In earlier publications, we also referred to self-maintenance by the term self-regulation (e.g., Kuhl, 2000). We now prefer to use the latter term in a more general sense, as encompassing the two modes of volition.

2. The performance advantage for state-oriented individuals under relaxing conditions might seem counter-intuitive and hence require some further explanation. PSI theory has related this pattern to the workings of the hippocampus (Kuhl, 2001). The hippocampus is most efficient at moderate levels of stress. Thus, very low levels of stress and very high levels of stress lead to inferior performance. Now, state-oriented people may reach this optimum much quicker than action-oriented people, so that the optimal performance for both groups is reached at different levels of stress. If this reasoning is correct, the performance advantage for state-oriented individuals under relaxing conditions should emerge primarily for tasks that involve the hippocampal system (e.g., spatial orienting tasks). This implication could be tested in future research.

AUTHOR'S NOTE

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