Putting Self-Regulation Theory into Practice: A User's Manual

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Cervone, Shadel, Smith, and Fiori (2006) propose that theories of personality architecture may provide an integrative theoretical framework for self-regulation research. Building further on this argument, the present paper considers one comprehensive modern approach to personality architecture, *personality systems interactions* (PSI) theory. The authors provide a brief overview of PSI theory and discuss a simple, three-step "user's manual" that has guided applications of the theory to real-life behavior. Work on PSI theory highlights some of the integrative potential of personality science in the field of self-regulation. The authors conclude that theories of personality architecture may improve the quality and precision of the counselling, coaching, and training that psychologists in many diverse areas provide.

INTRODUCTION

Self-regulation is an immensely adaptive capacity. Indeed, effective self-regulation fosters health-promoting behaviors (Fuhrman & Kuhl, 1998), positive psychological well-being (Baumann, Kaschel, & Kuhl, 2005), and high job performance (Diefendorff, Hall, Lord, & Strean, 2000). It thus stands to reason that scientific insights into self-regulation processes are directly relevant to all disciplines that seek to promote people's physical health, psychological well-being, and job performance. Unfortunately, putting self-regulation theory into practice is not that easy. As Cervone, Shadel, Smith, and Fiori (2006) point out, the modern self-regulation literature is a bewildering jungle of theoretical constructs. This lack of theoretical coherence makes it difficult for other fields to take advantage of the real progress that has been made in understanding self-regulation processes.

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In a bold attempt to bring theoretical order to the study of self-regulation, Cervone et al. (2006) have turned to personality science. This move will undoubtedly be surprising to some readers. After all, mainstream personality research has long focused on *personality structure*. Theories of personality structure focus on between-person taxonomic models and virtually ignore psychological processes within the person. Because self-regulation is by definition an intra-personal process, theories of personality structure have little relevance for understanding self-regulation. However, personality can be approached from a different angle. As Cervone et al. point out, there exists a new breed of theories of *personality architecture*, which analyse the mental systems that shape the individual's enduring, distinctive patterns of experience and action (Cervone, 2004, 2005; Cloninger, 2004; Kuhl & Koole, 2004; Magnusson, 2003; Mischel & Shoda, 1998). Unlike theories of personality structure, theories of personality architecture pay close attention to cognitive and affective dynamics within the person. Consequently, theories of personality architecture are of central relevance to the study of self-regulation. Indeed, as Cervone et al. suggest, theories of personality architecture may very well provide the integrative theoretical framework that is so sorely needed in self-regulation research.

The analysis offered by Cervone et al. (2006) is a landmark development of the integrative potential of theories of personality architecture in self-regulation research. Developing an integrative theory of self-regulation is not only desirable on abstract theoretical grounds. It is also of immensely practical value, because it can guide the development of effective diagnostic instruments and interventions. Our own efforts in this field have led us to formulate *personality systems interactions (PSI) theory*, a functional analysis of the personality architecture that underlies human motivation and self-regulation (Kuhl, 2000, 2001; Kuhl & Koole, 2004). Although PSI theory was formulated largely as a basic theoretical framework, the theory has stimulated numerous forays into more applied areas. In the remaining sections of this paper, we provide a brief overview of PSI theory and discuss a simple, three-step "user's manual" that has guided our applications of the theory to real-life behavior. We offer this discussion as an illustration of the integrative potential of personality science in the field of self-regulation and hope that it will stimulate further applications along these lines.

PSI THEORY

PSI theory is a theoretical approach that integrates insights from cognitive science, motivation science, personality psychology, and neurobiology into a single coherent framework (for more extensive discussions, see Kuhl, 2000, 2001; Kuhl & Koole, 2004). A basic assumption of PSI theory is that human motivation and personality are mediated by a hierarchy of regulatory

TABLE 1
Levels and Systems of PSI Theory

Broad category	Level	Main systems
Complex cognition	(7) Self-government	Self-regulation (EM)
		Self-control (IM)
	(6) High-level cognition	Parallel holistic processing (EM)
		Sequential analytic processing (IM)
Emotions and coping	(5) Motives	Power (EM)
		Achievement (IM)
		Affiliation (IBC)
	(4) Emotional coping	OR ← Hippocampus → EM
	(3) Affect	Positive (IBC) *Inhibition Pos.* (IM)
		Negative (OR) *Inhibition Neg.* (EM)
Elementary sensation and behavior	(2) Temperament	Motor activation (IBC)
		Sensory arousal (OR)
	(1) Simple cognitive operations	Motor programs (IBC)
		Sensory categorisation (OR)

Notes: EM = Extension Memory; IM = Intention Memory; OR = Object Recognition; IBC = Intuitive Behavioral Control; ← → = Interaction between two systems. PSI theory assumes interactions among all systems, especially at higher levels. Only the main systems involved at each level are listed in the table.

systems. Although the theory distinguishes between seven levels of regulation (Kaschel & Kuhl, 2004), these can be summarised into three broad levels (see Table 1).

At the lowest level, behavior is guided by elementary sensations and intuitive behavior programs. PSI theory refers to the system that supports elementary sensation as *object recognition*. Object recognition is specialised in the detection of anomalies, unexpected or discrepant things, including external stimuli and internal "objects" of experience. PSI theory refers to the system that supports intuitive motor programs as *intuitive behavior control*. Intuitive behavior control is specialised in the enactment of automatic behavioral programs.

At the mid-level, behavior is guided by emotion and coping systems. Here, PSI theory distinguishes between *positive* and *negative affect* systems, which regulate approach and avoidance behavior. This level is also responsible for coping, integrating discrepant information into a high-level system (see below), through activation of the hippocampus. Motives are also represented here.

Finally, at the highest level, behavior is regulated by complex cognitive systems. PSI theory distinguishes two high-level systems, specialised in sequential analytic processing and self-control, on the one hand, or in parallel holistic processing and self-regulation, on the other: *Intention memory*, which maintains the activation of difficult goals on a conscious and analytical level

and at the same time inhibits premature enactment of these goals; and *Extension memory*, which integrates information originating in different sensory modalities, needs, bodily states, etc., allowing the formation of extended "cognitive-emotional maps". These maps are considered by PSI theory to be an essential part of the self (cf. also Damasio, 2003).

At times, people's behavior may be regulated simply by the elementary systems, object recognition and intuitive behavior control. Behavior that is guided by these systems, however, will be rather rigid and inflexible. Greater flexibility can be achieved by allowing the high-level systems to participate in behavior regulation. According to PSI theory, the most sophisticated forms of behavior regulation depend on a coordinated interplay between elementary and high-level systems. More specifically, PSI theory distinguishes two main forms of complex self-government, *goal enactment* and *self-development*. Goal enactment involves an interaction between intention memory, which forms and maintains abstract goal representations, and intuitive behavior control, to translate abstract goals into concrete actions. Self-development involves an interaction between object recognition, which takes in new (i.e. unexpected or undesirable) experience, and extension memory, to integrate new experiences into extended networks of the person's prior experiences.

How can different systems become coordinated such that they can achieve goal enactment and self-development? According to PSI theory, this coordination process depends on affect. Positive affect coordinates the interplay of intention memory and intuitive behavior control. When positive affect is low (e.g. when the person experiences heavy demands, frustration, or discouragement), intention memory becomes activated and intuitive behavior control is inhibited. When positive affect is high (e.g. when the person receives a reward or achieves a success), intention memory is inhibited and intuitive behavior control is activated. Negative affect coordinates the interplay of object recognition and extension memory. When negative affect is high (e.g. when the person experiences threat, fear, or pain), object recognition becomes activated and extension memory becomes inhibited. When negative affect is high (e.g. when the person feels calm and relaxed), object recognition becomes inhibited and extension memory becomes activated. In sum, affective changes are vital to goal enactment and self-development. An important implication of PSI theory is therefore that efficient affect regulation skills will greatly facilitate self-regulation in general.

APPLYING PSI THEORY IN THE REAL WORLD

PSI theory offers an abstract theoretical analysis of the basic building blocks of human self-regulation and personality functioning. Nevertheless, we have found the theory to be very useful in developing concrete applications in the

real world. In recent years, applications of PSI theory have found their way to such diverse domains as health (Fuhrmann & Kuhl, 1998; Kazén, 2006), sports (Beckmann & Kellmann, 2004), education (Jaramillo & Spector, 2004; Kuhl, 2000; Menec, Perry, & Struthers, 1995), therapy (Baumann et al., 2005; Kaschel & Kuhl, 2004; Jeger, Znoj, & Grawe, 2003), close relationships (Koole, Kuhl, Jostmann, & Finkenauer, in press), consumer behavior (Bagozzi, Baumgartner, & Yi, 1992), and management (Diefendorff, 2004; Kuhl & Kazén, 2006). Although much of this work remains preliminary, these initial efforts suggest to us that PSI theory can be put to good use in many applied domains.

One of the most distinctive features of PSI theory is its explanatory focus on *functional relationships* among cognitive and affective systems, that is, on the dynamic processes that underlie human action and experience (cf. Kuhl, 2000). Most other theories focus on *cognitive or emotional contents*, for example, on beliefs about the controllability of desired events or the type of implicit theories we have about our own performance (cf. Bandura, 1986; Dweck, 1999). This is not to say that cognitive or emotional contents are not important. In fact, our experience is that the traditional approach of focusing on contents and PSI theory's approach of focusing on functional relationships among systems *complement* each other in explaining the complexities of human experience.

PSI theory distinguishes a complex set of self-regulation processes that can be measured separately. In various applied fields, there is often a tendency to resort to simple formulas that promise quick and easy results. However, we believe that gaining adequate knowledge about a complex system like human self-regulation requires a sophisticated set of measurement tools. Still, the amount of information that is generated by the assessment of dozens of single functions can be overwhelming. To make sense of all of that information, we recommend using a *top-down* analysis, based on principles derived from a coherent personality theory such as PSI theory.

Different domains of application should always be taken on their own terms. Nevertheless, in developing applications of PSI theory, we have followed a general logic across domains. In the following paragraphs, we describe three basic steps that we have found to be useful in working with PSI theory.

Step 1: Diagnosis

The first step in any applied domain consists of a comprehensive assessment of a given person's self-regulatory and motivational characteristics. PSI theory has guided the development of an encompassing assessment system: "Evolvement-Oriented Scanning" (EOS), which measures variables from different levels of personality (see Kaschel & Kuhl, 2004; Kuhl & Henseler, 2004). The short version of EOS, including up to 80 subscales, can

TABLE 2
Main Areas of Assessment of EOS, with a Partial List of the Micro-Functions
Measured (modified after Kaschel & Kuhl, 2004)

Macro-functions	Micro-functions
Self-government (Volitional-Components-Inventory: VCI)	
Self-regulation	Self-motivation; Activation control; Self-determination
Goal enactment	Initiative; Activity; Concentration (under demands)
Self-control	Cognitive self-control; Affective self-control
Self-access under threat	Non-conformity; Coping with failure (under threat)
Life stress	Demands (e.g. difficult or unfinished intentions); Threat (e.g. adaptation to change, fears, pressure)
Action control	AOD: Action Orientation (post-Decisional) AOF: Action Orientation (after Failure or Threat)
Mood Checklist (MCL)	
Affective dispositions	Positive mood; Negative mood; Activation (energy); Tension (arousal); Listlessness; Relaxation; Anger
Well-being (BES-K)	
Affective and physical states	Severity of symptoms; Dissatisfaction; Activation (energy); Relationships (satisfaction); Somatic complaints
Personality Styles (and Disorders) Inventory (PSDI): Affective-cognitive Styles (SEKS)	
Cognitive-emotional styles (primary responses)	Self-assertive (antisocial); Cautious (paranoid); Reserved (schizoid); Apprehensive (avoidant); Conscientious (compulsive); Intuitive (schizotypical); Ambitious (narcissistic); Critical (negativistic); Loyal (dependent); Spontaneous (borderline); Charming (histrionic)
Motivational abilities: Conscious motives (Motive-Enactment-Test: MET)	
Enactment of power (autonomous, assertive impact on others)	Explicit power; Integrative power; Intuitive power; Controlled power; Anxious power; Altruistic power
Enactment of achievement (learning and acquisition of competences)	Explicit achievement; Integrative achievement; Intuitive achievement; Controlled achievement; Anxious achievement; Competitive achievement
Enactment of affiliation (making and maintaining social relationships)	Explicit affiliation; Integrative affiliation; Intuitive affiliation; Controlled affiliation; Anxious affiliation; Extraverted affiliation

be completed in about 30 to 40 min. A schematic overview of EOS is provided in Table 2.

The assessment tools included in EOS were developed using a top-down approach, derived from PSI theory, and permit an in-depth individualised (i.e. *idiographic*) assessment of a person's psychological capacities and processes. For each level of personality integrated by PSI theory, there are specific assessment tools. EOS is not restricted to the assessment of cognitive styles and affective dispositions (such as those measured by the Big Five), but it also includes the assessment of motivational and self-regulatory competences. In

each important personality area, EOS allows the measurement of subfunctions, instead of following the aggregation logic of measurement of global functions. The general functional areas of *self-government (self-regulation and self-control)*, *emotionality, cognitive styles* and *motivation* are each decomposed into a number of concrete single functions (see Table 2). *Self-government*, for example, in its long version is decomposed into 38 different subfunctions (e.g. self-determination, self-motivation, self-relaxation, intrusions, concentration, goal fixation, initiative, etc.).

Compared with the measurement of global traits or functions, the assessment of single functions permits the practitioner a more efficient consulting, coaching, and training. To support such applications, EOS has scales that measure *physical and psychological well-being*, making also a finer differentiation of subjective stress into *demands* (e.g. uncompleted intentions, obligations) and *threats* (e.g. failures, painful experiences). Finally, the EOS measures self-regulatory competences at a more global level, i.e. individual differences in state vs. action orientation (Kuhl & Beckmann, 1994). The demand-related subscale of the action orientation scale relates to self-regulation of positive affect; the threat-related subscale relates to self-regulation of negative affect (Koole & Kuhl, in press).

Because some personality levels are not consciously experienced, it is important to complement the self-report instruments listed in Table 2 with implicit or indirect tests. There are two additional tests in EOS that measure unconscious or implicit processes: (a) the "*Operant Multimotive Test*" (*OMT*), that measures *implicit motives* in the areas of affiliation, achievement, and power, and (b) the *EMOSCAN* ("*Emotional Scan*"), which is a computer-assisted test that records fast response latencies, designed to measure *activation of intention memory* through removal of Stroop interference after exposure to positive achievement primes (Kuhl & Kazén, 1999; Kazén & Kuhl, 2005).

Step 2: Intervention

The second step deals with intervention and consists of the careful examination of the EOS profile of the person, looking at possible stronger or weaker (sub)functions in the areas of cognitive styles, affectivity, motivation, or self-regulation. It is important to consider the subjective level of stress (demands and threats) and whether there are psychological or physical problems. PSI theory assumes that the primary responses given (e.g. cognitive styles, emotionality) can be counteracted by self-regulatory capacities (e.g. self-regulation, self-motivation, action orientation, activation control, etc.), reducing that way the level of stress and the symptoms. The first goal at this stage is to discover a "*leitmotiv*" that helps interpret the complete pattern of results. Once the leitmotiv is established, the next step is to interpret

it in light of the *functional characteristics* of the systems postulated by PSI theory: extension memory, intention memory, object recognition, and intuitive behavior control as well as the levels of positive or negative affect. The coaching or intervention will then focus on strengthening or weakening one or more of those systems or their interaction, through procedures specifically tailored to reestablish the balance among them.

It is our experience that detailed knowledge of personality functioning, aided by a theoretically guided analysis, will at the end *reduce complexity in counseling or coaching*. That is, the thorough assessment of those many personality functions permits the trained practitioner to quickly zoom in on those critical aspects or functions of the individual person that need change, and will permit more precise advice.

Step 3: Evaluation

An advantage of EOS is that practitioners are able to evaluate the efficiency of a particular treatment not only through global changes in psychological dimensions but also through changes in detailed affective, cognitive, motivational, or self-regulatory functions of the person that need improvement (see Table 2). The evaluation of the treatment is carried out in a straightforward manner. Practitioners can examine changes in the person's functions that did not work well before the treatment, in addition to behavioral changes and improvements in psychological and physical well-being. It is important to note that the effects of treatment may not be manifested in actual behavior at the initial stages of the treatment. Nonetheless, through the use of EOS, subtle changes in some of the above functions may be apparent some time before an actual behavioral change is observable.

One example is the case of a client with problems in goal enactment and self-relaxation reported by Kaschel and Kuhl (2004). This client did not manifest any changes in behavior or well-being after 6 months of treatment. Still, some positive changes were observable in some of the EOS scales after 6 months (improvements in primary affective and cognitive responses). Behavioral changes and improvements in well-being only emerged after 12 months. It thus appears that the practical benefits of training specific self-regulatory strategies may take some time to materialise. One example of the application of the three steps of EOS in management was reported by Kuhl and Henseler (2004) under the title "*lean coaching*". A 40-year-old manager looked for advice because of his impatience, authoritarian behavior, strong emotionality, and rigid leadership style. The EOS results indicated low scores in the critical and apprehensive styles and a high score in the charming style. He also had a high score in implicit power motivation, in relationship to seeking status. The explicit "controlled power" scale was also

elevated. Concerning self-regulation, the manager showed a strong tendency towards action orientation, especially in difficult and complex situations.

After examination of the above pattern (*diagnosis*), the *leitmotiv* found in this manager was his deficient sensitivity to discrepancies, fears, and unsatisfied needs, both related to himself and to other persons. This indicated an impaired function of the object recognition system. The coaching (*intervention*) consisted in his learning to focus and accept initial negative feelings and discrepancies produced in interpersonal exchanges with subordinates and to maintain a relaxed attitude in situations in which there were differences in attitudes or interest conflicts. This coaching was successful, and after 5 months the manager's profile in EOS showed changes in the expected scales, together with higher levels of satisfaction and less personal complaints from the manager (*evaluation*).

CONCLUDING REMARKS

Cervone et al. (2006) propose an integration of personality science and self-regulation theory. We believe that this integration is extremely important and useful for the application of self-regulation theory to different settings. Our discussion of PSI theory and the three steps involved in the EOS: Diagnosis, Intervention, and Evaluation, actually complement and extend the proposals made by Cervone et al. (2006). This approach involves a detailed assessment of the capacities of the individual, including not only personality but also motivational and self-regulatory processes, guided by modern approaches to personality architecture. We hope that this work will help to improve the quality and precision of the counseling, coaching, and training that psychologists in many diverse areas provide.

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