



Self-Regulation in a Cognitive–Affective Personality System: Attentional Control in the Service of the Self

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The highly valued goals of the self too often turn into failed good intentions. Even when the goals are important and motivation is high, they easily become difficult to achieve in the face of temptations, frustrations and obstacles. The model and research discussed here address how people can exert willpower even when the situational pull to give up is strong. Research on the basic mechanisms and dynamics that enable delay of gratification show that exertion of willpower requires one to “cool” or self-distance from the negative arousal of difficult and frustrating situations. Such attention control helps prevent “hot,” impulsive responses that undermine long-term goal attainment. The attentional control mechanisms assessed in the preschool delay of gratification paradigm are visible in toddlerhood and continue to affect important life outcomes—academic, social, and interpersonal, through adolescence to adulthood. Most importantly, they seem to serve as protective factors against the negative long-term consequences of dispositional vulnerabilities. These self-regulatory and protective processes are conceptualized within a cognitive–affective processing system model of personality.

Social cognitive theorists provide extensive evidence that—with all due respect to cognition and cognitive processes—it is the situational factors in the environment that account for, and automatically drive, many, most, or virtually all of the complex psychological phenomena of everyday life, through mechanisms such as priming, accessibility, preconscious activation and so on. Nowhere does this claim become more credible than in the failed good intentions of the obese cardiac patient’s resolution to diet or the emphysemic smoker’s desire to give up tobacco. Even when motivation is high to exert self-control and the goals are important, the dieter can’t resist the chocolate pastry flashing by on the tray and the smoker lights up again while coughing helplessly.

These findings on the power of the situation or “stimulus control” co-exist with the common belief that human beings have the capacity to take control and exert “willpower” with high-level brain centers, overcoming obstacles and temptations along the way to achieving their valued goals. The challenge for a model of self-regulation is to unpack the concept of “willpower” and to clarify how people can exert volitional control even in powerful “hot” situations that

Received 15 September 2001; accepted 10 October 2001.

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are likely to elicit automatic impulsive reactions that defeat the long-term goals of the self. The research discussed here tries to clarify the principles that underlie self-regulation and willpower within a cognitive-affective personality systems model or CAPS (Mischel & Shoda, 1995). We specifically focus and elaborate on the attentional mechanisms of the regulatory system, and discuss both their developmental precursors and long-term implications for human vulnerability and resilience.

Self-Regulation in a Cognitive–Affective Personality System (CAPS) Model

In the CAPS model, personality is a dynamic system—an organized network of interconnected cognitions and affects that are activated in response to particular situations in stable patterns that characterize the individual. The fundamental mediators of the personality structure are the *cognitive–affective units* (CAUs). These consist of such mental representations as encodings—including of the self, goals, expectations and beliefs, and affects, as well as self-regulatory standards, competencies, plans and strategies. These CAUs and their intra-individual organization in the CAPS system reflect both the biological and the social learning history of the individual (Mischel & Shoda, 1995).

Individual differences in such a system arise both from differences in the chronic accessibility of CAUs and in the distinctive organization of interrelationships among them within each person. The self-regulatory strategies and related attention control mechanisms within the CAPS network are intrinsic aspects of this personality system. They enable impulse control, planning and “cooling operations” that are basic for effective coping when frustrations, fears and impulsive behavioral tendencies are activated.

Within the CAPS model, self-regulatory behavior should depend both on *regulatory motivation* and *regulatory competencies*. Regulatory motivation is the outcome of how the individual construes/encodes the situation as well as the values, beliefs, standards, goals, and emotional states that become activated by it. The motivation to refuse a slice of double-chocolate fudge cake for example, may depend on whether the individual encodes it as “unhealthy and fattening,” believes that regulating high-fat food intake has considerable health benefits (as opposed to believing that high cholesterol is genetic), and values the long-term goal of being fit. But even when motivation is high, self-control in the face of temptations and frustrations requires more than good intentions. As William James noted more than a hundred years ago, the gap from “desiring and wanting” to “willing” cannot be bridged unless “certain preliminaries” are met (1890/1981): Even in the presence of high regulatory motivation, goal-attainment depends critically on the availability and accessibility of effective self-regulatory competencies. By regulatory competencies, we mean the cognitive and attentional mechanisms that help execute goal-directed behavior. In the remainder of this chapter, we will concentrate on examining the processes that underlie these competencies assuming that regulatory motivation is high.

Dynamics of Willpower: Attentional Mechanisms in Delay of Gratification

Regulatory competencies become increasingly important as the temptations, frustrations, obstacles, and distressing affective arousal en route to achieving regulatory goals increase. It is in these contexts that “willpower”—or the processes that enable

it—become most crucial. A prototype for the study of willpower in such difficult “hot” situations has proved to be the preschool delay of gratification paradigm, currently popularized in the media as the “marshmallow test.” It has been used extensively to study self-control processes at early periods in development when these processes emerge and become particularly visible (Mischel, Shoda, & Rodriguez, 1989). In this paradigm a young child is shown some desired treats, for example, marshmallows or pretzel sticks. Then a dilemma is presented: wait until the experimenter returns and get two of the desired treats or, alternatively, ring a bell, and the experimenter will come back immediately—but then only one treat will be obtained. After the child chooses to wait for the larger outcome, the delay soon becomes very difficult. Seconds become minutes not knowing when exactly the experimenter will come back, and the child feels growing frustration and temptation to ring the bell and take the immediately available treat.

Taken collectively, findings from three decades of experimental and longitudinal studies within this paradigm indicated that attention to motivational, consummatory, “hot” cues about a stimulus object activate arousal and create action readiness, driving individuals to the immediate goal response (e.g., ringing the bell and eating the pretzels). Informational, “cool” cognitive cues about the stimulus or self-distraction, on the other hand, serve to suppress action-readiness by directing attention to non-consummatory aspects of the situation. To illustrate briefly, these studies have shown that priming children to think about the actual rewards in terms of their cool, abstract qualities (i.e., think about the marshmallows as puffy round clouds) or to think about pleasant, distracting thoughts while waiting (i.e., “if you want to, while you’re waiting, you can think about Mommy pushing you on a swing”) increased delay ability greatly. In contrast, cuing children to think about the rewards (“if you want to, while you’re waiting, you can think about the cookies”), or to explicitly focus on the hot, appetizing qualities of the rewards (i.e., to think about how sweet and chewy the marshmallows would be in their mouth) made it almost impossible for most preschoolers to wait (Mischel et al., 1989). Studies of the spontaneous use of attention deployment strategies yielded parallel findings, underscoring the facilitative role of cool attention deployment (i.e., time spent looking away from the rewards and the bell as opposed to time spent looking at the rewards) in successful delay (Rodriguez, Mischel, & Shoda, 1989).

These findings have led to a formal two system (Hot/Cool) model of willpower in which self-regulation is a function of a balance between two processing systems within the larger CAPS system: an emotional, hot system and a cognitive, cool system (Metcalf & Mischel, 1999). The amygdala-based emotional, hot processing system generates automatic approach-avoidance or fight-or-flight responses. In contrast, a hippocampus-based cognitive cool processing system is the locus of cognitive mediational processes, generating thoughtful reflective reactions. Although at relatively low levels of stress, the two systems work in concert, hot-system processing begins to dominate the cool system as stress levels and negative arousal increase. Thus, effective self-regulation hinges on being able to access cooling mechanisms to attenuate negative arousal and suppress hot system activation when needed.

Individual differences in attentional processes such as eye-gaze aversion, flexible attention shifting and focusing, have been documented as early as in infancy and shown to be related to lower impulsivity and negative affect both in children and in adults (Derryberry & Rothbart, 1997). Thus, considerable research suggests that attentional control may form part of a generalized self-regulatory competency that

enables effective cooling of arousal and controlling associated impulsive behaviors in many hot, affect-laden contexts. Thus, theoretically it should have significant implications for diverse key aspects of the self over the course of development, including adaptive social-cognitive functioning, self-concepts and interpersonal relationships.

Long-Term Consequences of Delay Ability

In line with these expectations, evidence for the breadth, stability, and significance of self-regulatory competence as assessed in the delay of gratification paradigm is becoming increasingly clear. With regard to long-term consequences for resilience versus vulnerability, longitudinal follow-up studies show that the number of seconds preschoolers were able to delay gratification significantly predicted diverse adaptive social-cognitive outcomes and efficacy years later. To illustrate, those who waited longer in this paradigm were described by their parents as more socially and cognitively competent teenagers who were more able to manage stress and exert effective self-control in diverse frustrating situations in adolescence (Mischel et al., 1989). Likewise they obtained substantially higher SAT scores (Shoda, Mischel, & Peake, 1990). In a further follow-up conducted when these individuals reached their early thirties, links remained significant between their preschool delay behavior and adult-relevant measures of social-cognitive competence, goal-setting, planning, and self-regulatory abilities.

Developmental Precursors of Attention Control: Toddler Strategies in Attachment Contexts

Recent work also addresses the early developmental precursors of the attention deployment competencies assessed in the delay paradigm. Such precursors of delay ability are being found in extremely different situations as in the mother-toddler interactions observed as they unfold at 18 months of age (Sethi, Mischel, Aber, Shoda, & Rodriguez, 2000). Specifically, the use of effective attention deployment strategies to cope with aversive and distressing situations in the attachment context in toddlerhood predicted the use of effective delay of gratification strategies in preschool. For example, toddlers who used distraction strategies to reduce distress as they coped with a brief maternal separation were able to delay gratification longer 3-and-one-half years later.

Most interesting, preschoolers who delayed for longer periods of time at age 5 were those who had shown a significant increase in their use of cooling strategies from the first to the last 30 seconds of the maternal separation in toddlerhood. In other words, they had been able to direct their attention to the toys or the research assistant who was present during maternal separation, when distraction was most needed as the separation continued overtime and the level of stress increased. These toddlers appeared to actively direct attention away from the mother's absence. Those who did not successfully delay gratification in preschool, on the other hand, were unable to activate such cooling strategies as toddlers and instead stayed focus on the absence of the mother (e.g., clinging to the door), showing signs of higher distress. Likewise, toddlers of overcontrolling mothers who engaged themselves in distant exploration (i.e., moving away from the mother to play with toys farther away) when the mothers bid for attention, showed less hot and more cool attentional focus in the delay paradigm and delayed longer.

Protective Effects of Strategic Attention Control: Implications for Long-Term Vulnerability

In sum, there are impressive longitudinal continuities in the attentional control strategies that children use in early childhood, and these in turn have long-term implications for consequential life outcomes in adolescence and adulthood. The stability and robustness of these attention control competencies across the life span and across different regulatory domains suggest that attention control could serve as a protective mechanism that can cool people's chronic impulsive hot reaction tendencies, that is, their dispositional vulnerabilities. This idea is consistent with research in developmental research suggesting that reactive processes (e.g., fears and impulsive desires) of the CAPS system and self-regulatory control, in particular attention management, may have independent effects on adaptive functioning. This work indicates that attentional control serves regulatory functions (e.g., Derryberry & Rothbart, 1997) in constraining and modulating the reactivity of motivational systems related to fear (as it is in the dynamics of rejection sensitivity, described below). Likewise, attention control enables regulation of appetitive-approach behaviors (as in the delay of gratification paradigm). Thus, vulnerability and resilience may coexist with the same individual and determine in interaction, behavioral responses generated by the CAPS system and the psychological outcomes ultimately experienced by the person.

We have been exploring the possibility that attentional mechanisms that are assessed in the delay of gratification paradigm serve as protective factors, focusing on two vulnerabilities as exemplars: chronic tendencies to high aggressiveness, and over-sensitivity to rejection in interpersonal relationships. With regard to aggression, a cross-sectional study of preadolescents boys with behavioral problems—particularly in the management of aggression—assessed their use of cooling attentional strategies during the delay task (i.e., looking elsewhere and not at the rewards). Use of such a cooling strategy predicted substantially lower levels of verbal and physical aggression, observed in vivo over multiple occasions, and this held even after controlling for verbal intelligence (Rodriguez, Shoda, Mischel, & Wright, 1989).

To further assess the potential protective value of delay ability as a buffer against hot over-reactions we sampled individuals who were vulnerable with regard to sensitivity to interpersonal rejection. Rejection sensitivity or RS is a dynamic pattern of inter-connected expectations, encodings, and affects within the CAPS system—a pattern that is triggered by specific psychological features of interpersonal situations and which, in turn, elicits intense reactions to rejection (e.g., hostility, withdrawal). People high in RS anxiously expect rejection in interpersonal situations which make them readily perceive rejection in minimally ambiguous cues, leading them to impulsively and often destructively react to rejection (see Levy, Ayduk, Downey, 2001). RS is typically associated with aggression in close relationships as well as low self-esteem, depression, substance abuse and low academic achievement and hence tends to undermine life quality. The CAPS model suggests however that whether people high in RS will experience these outcomes should depend critically on whether they can access and utilize effective regulatory strategies to prevent themselves from reacting impulsively and maladaptively to rejection.

In an adult a follow-up of the preschoolers who had participated in the original delay of gratification studies 20 years earlier, preschool delay ability predicted adult resiliency against the potentially destructive effects of RS (Ayduk et al., 2000, Study 1). Specifically, high RS people who were able to delay gratification longer in

preschool were buffered in adulthood against low self-esteem and self-worth, were better able to cope with stress, and had greater ego-resiliency, and had higher educational levels. A parallel study, conducted among low income, urban, minority middle-school children replicated these findings with population-appropriate measures for aggression and low self-worth (Ayduk et al., 2000, Study 2). The overall findings indicate that attentional mechanisms that underlie delay of gratification ability serve as protective factors that can shield individuals against the negative interpersonal and intra-psychic consequences of their chronic personal vulnerabilities. Experimental studies further lent support to the causal role attentional control plays in attenuating maladaptive reactivity to rejection (Ayduk, Mischel, & Downey, 2002).

Flexible Attention Deployment and Discriminativeness

For the sake of simplicity in the presentation we have focussed on the adaptive value of cooling strategies in the service of the self and in the effective pursuit of the individual's long-term goals that require self-control. But adaptive self-regulation involves more than automatic application of cooling strategies without any other consideration. Even within the delay paradigm, successful delay and goal pursuit often involve shifting attention flexibly rather than unconditional use of cooling strategies. Some of the children who delay best seem to focus briefly on the hot features in the situation to sustain motivation but then quickly switch back to the cool features and self-distraction to avoid excessive arousal and frustration (Peake, Hebl, & Mischel, 2002).

Effective self-regulation also requires sensitivity to the demands, constraints and affordances of the particular situation. Such *discriminative facility*—taking into account characteristics of each situation and responding accordingly—may play a central role in coping and social-emotional competence in general (see Chiu, Hong, Mischel, & Shoda, 1995). Distraction, or cooling then, is likely to be adaptive when applied to coping in aversive or frustrating situations that must be tolerated for goal attainment, but not in many other types of situations. In the mother–toddler interactional context, for example, distancing oneself from an overcontrolling mother and her bids for attention seems to be an effective way of coping with the frustration that her intrusions may elicit in the toddler during a developmental period that is marked by pursuit of independence. Distancing oneself from a non-controlling nonaversive mother, on the other hand might result in not getting one's needs met even when the means to do so exist and the consequences would be positive. Not using cooling, then, but rather approaching, seems to be the appropriate adaptive strategy in such situations and predicts effective delay behavior 3 years later (Sethi et al., 2000).

The Down-Side of Self-Regulation?

On the one hand, cooling seems to be an effective attentional control strategy. On the other hand, there may be long-term costs associated with its use to regulate affect and behavior in coping with negative interpersonal relationships. Take for example, the group of children who move away in response to their controlling mothers' bids. Although avoidance of an over-controlling mother is related to greater delay ability and attentional focus in toddlerhood, we do not know the emotional compromises that may be made by these children. We do know that those children who are successful in the delay paradigm are more likely to exhibit academic and social

competence in adolescence (Ayduk et al., 2000; Shoda et al., 1990). These competencies, however, may come with a cost, making these individuals susceptible to other kinds of difficulties such as avoidance or internalizing problems (Eisenberg, this volume). A careful examination of such possible trade-offs is needed to further understand the complex relationship between diverse protective mechanisms and subsequent risks across multiple domains of coping.

In a related vein, whether or not one *should* or should *not* delay gratification or “exercise the will” in any particular choice is often everything but self-evident. Lionel Trilling, a distinguished humanist with much to say about psychology, captured the risks of too much self-control in a few words. After reminding us, of the place of passion and “the strange paradoxes of being human,” he said “the will is not everything,” and spoke of the “panic and emptiness which make their onset when the will is tired from its own excess” (Trilling, 1943, p.139). An excess of will can certainly be as self-defeating as its absence. Postponing gratification can be an unwise—and even stifling—joyless choice, but unless people develop the competencies to sustain delay and continue to exercise their will when they want and need to do so, the choice itself is lost.

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