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Unpacking Self-Control

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Abstract

Self-controlled behavior refers to actions aligned with valued, longer-term goals in the face of conflicting impulses to seek immediate gratification. In this article, we argue that the psychological processes that contribute to self-controlled behavior can be grouped into two functionally distinct categories: Volitional processes facilitate self-controlled behavior and include executive functions as well as learned metacognitive strategies like planning, attention deployment, and psychological distancing. In contrast, impulsogenic processes undermine self-controlled behavior and include reward sensitivity, sensation seeking, and domain-specific cravings. A disproportionate amount of research has addressed the former at the expense of understanding individual and developmental differences in the latter. This imbalance is now being rectified. Distinguishing between self-controlled behavior and its antecedent psychological processes helps illuminate normative developmental changes in self-control and points to directions for measurement and intervention.

Understanding and Cultivating Self-Control in Children

“The Cookies” is a popular children’s story in which two characters named Frog and Toad face a familiar dilemma (1). Both want to keep eating cookie after delicious cookie, but at the same time, they want to stop before getting sick. “We need will power!” cries Frog, as he reaches for another cookie. “What is will power?” asks Toad. Frog’s answer: “Will power is trying hard *not* to do something that you really want to do” (1, p. 35).

The will power that so concerns Frog and Toad has interested psychologists since James (2) and Freud (3). Self-control has become one of the most prolifically researched topics in developmental psychology (4). In this article, we argue that making sense of this growing body of empirical findings requires distinguishing the overt expression of self-control from its underlying psychological processes. Furthermore, we suggest organizing these psychological processes into two functionally distinct categories: *volitional processes* that facilitate self-controlled behavior and, conversely, *impulsogenic processes* that incline individuals to enact immediately rewarding but ultimately regrettable actions. We show that

these distinctions are essential for understanding the maturation of self-control during childhood and adolescence, and for informing the design of interventions. We conclude by suggesting ideas for continued investigation.

What Is Self-Controlled Behavior?

The nomenclature of controlled behavior varies by theoretical tradition (5), with many developmental psychologists embracing the terms *effortful control* (6–8), *willpower* (9), or *ego-resiliency* (10), and most personality and social psychologists preferring the term *self-control* (11, 12). Whatever the moniker, self-controlled behavior refers to voluntary actions in which individuals engage to advance personally valued longer-term goals despite conflicting urges that are more potent in the moment. Sometimes, self-control entails inhibiting an undesired impulse (e.g., suppressing the urge to interrupt another student in class) and at other times, self-control entails strengthening a desired action (e.g., practicing piano rather than watching television; 12). Individuals can regulate their own emotions, thoughts, or physical actions. In every case, the alternative to self-controlled behavior—impulsivity—typically brings about short-term gratification at the expense of longer-term goals.

To conclude that a child is exercising self-control, one must be confident that his or her personally valued long-term goals are in conflict with competing, short-term desires. This ambivalence features an essential asymmetry: The child acutely wants the short-term desires (e.g., to check my Instagram feed), but upon reflection, the long-term goals (e.g., to do well on tomorrow's algebra test) are more valuable. As the philosopher Harry Frankfurt (13) might put it, what the child *wants* in the moment may not be what the child *wants to want* beforehand or afterwards. Therefore, self-controlled behavior is distinct from compliant behavior, which a child enacts in response to an external authority figure. Self-controlled behavior also differs from actions taken in the absence of internal conflict between mutually exclusive actions.

Developmental research often overlooks these distinctions. Instead, behaviors that may represent compliance with authority or just the absence of competing inclinations are interpreted as exemplifying self-control. For example, to assess whether a studious child has prodigious self-control, one would need to determine how important academic goals are for that child as well as how comparatively enjoyable he or she finds nonacademic pastimes like playing video games or texting friends. While not a substitute for such ancillary measurement, studies tell us that most school-age children and adolescents consider schoolwork the most important thing they do for the sake of their own futures, but experience studying and homework as less pleasurable than almost any other waking activity (14).

Relatedly, when implemented correctly, the preschool delay of gratification task (colloquially referred to as the marshmallow test) begins with a child choosing from a selection of treats the one he or she likes best, then confirming that he or she prefers waiting for more of this treat to indulging in a smaller amount right away (9, 15). Such a procedure cannot guarantee that the impulse to indulge in immediate gratification is equivalent across

children, but it is more consistent than if only one kind of treat were made available—or if intentions to wait were not verified. In summary, the failure to assess or control for the strength of a child's desire to satisfy a short-term impulse, as well as the subjective importance of a conflicting long-term goal, may lead to erroneous conclusions about that child's capacity for self-control.

What Contributes to Self-Controlled Behavior?

Self-controlled behavior is an emergent phenomenon. Researchers have proposed a variety of taxonomies for organizing the diverse contributing processes (e.g., 16). We suggest that a *dual influence framework* helps illuminate developmental trajectories. Specifically, we find it useful to distinguish processes that encourage the pursuit of immediately gratifying urges from those that encourage actions aligned with more distal goals. Similar models have a long history in the study of self-control (17–21). The dual influence framework we propose here is functional, not neuro-anatomical. Our framework (see Figure 1) groups processes according to whether they facilitate actions aligned with longer-term goals (volitional processes) or encourage actions that bring about immediate gratification (impulsigenic processes).

If, as we argue, observed self-control is the product of the interplay between impulsigenic and volitional processes, distinguishing between these two countervailing forces is essential to understanding developmental and individual differences in self-control. In particular, although lapses in observed self-control are usually attributed to deficiencies in the realm of volitional processes, they may have more to do with the relative strength of an individual's impulsigenic tendencies. For example, individuals with comparable volitional capacity demonstrate different levels of self-controlled behavior if they differ in sensitivity to rewards, either in general or with respect to particular types of temptations (22–24).

Among the psychological processes that facilitate goal-directed action are executive functions. Executive functions include working memory, response inhibition, and task switching, and are supported by prefrontal and related brain areas (4, 25). These basic processes enable individuals to suppress an undesirable urge or strengthen a desirable one. Collectively, executive functions facilitate self-controlled behavior in the presence of temptations, allowing individuals to keep abstract goals as active mental representations, voluntarily suppress undesired impulses, and switch from one schema to another in accordance with goal-related objectives. At all stages of life, executive functions as measured by performance tasks like the Stroop, dimensional card sort, and go/no-go tasks correlate reliably with ratings of self-controlled behavior by informants (5, 16). However, these associations are small, suggesting that exercising self-control in the real world, on time scales, and in contexts that are not easily tested in the laboratory depends on more than executive function. These findings also suggest that we need more research into executive function in the context of more affectively laden stimuli than those used traditionally (26).

Self-controlled behavior is also facilitated by diverse metacognitive strategies (27). For example, in the delay of gratification paradigm, wait time increases dramatically when children mentally transform the tempting stimulus into something less enticing (e.g.,

thinking of marshmallows as fluffy white clouds; 9). Children can also wait longer when they direct their attention away from the treats in view (28). Other tactics take aim at the physical situation: For instance, by age 6, most children know that waiting is easier if you cover the treats, putting them out of sight and mind (29). More recently, taking a psychologically self-distanced (as opposed to self-immersed, egocentric) perspective facilitated diligence on tedious work tasks (30) and performance on executive function tasks in young children (31). The same approach facilitated emotion regulation in school-age children (32).

In contrast, impulsogenic forces incline individuals to seize short-term rewards rather than act in their long-term interests. These impulses can be domain-general (e.g., sensitivity to rewards of any kind, sensation seeking, anxiety) or domain-specific (e.g., a craving for sugar, a desire to check Facebook or text friends). Regardless, unlike volitional processes, impulsogenic forces are automatic and involuntary—they are spontaneously activated in the absence of any conscious desire to do so. Since so many acts of self-control entail restraining a harmful behavior rather than initiating a positive one (33), the most obvious impulsogenic forces are approach-oriented as opposed to avoidance-oriented. However, both *reactive undercontrol* tendencies (e.g., restlessness) and *reactive overcontrol* tendencies (e.g., fearful responses to novelty) are evident in children as young as 2 years (6, 34). In either case, volitional processes are required to override impulsogenic tendencies that are essentially reactive rather than reflective.

Our dual influence framework is functional rather than neuro-anatomical. We do not claim that passion and reason have discrete cortical versus subcortical neuro-anatomical substrates. Indeed, overlapping and highly interconnected regions might subserve impulsogenic and volitional processes. Nevertheless, prefrontal and associated areas (e.g., dorsolateral prefrontal cortex, anterior cingulate gyrus) have been associated reliably with self-control across domains (e.g., not just for emotion regulation but also for delaying gratification and suppressing thoughts), whereas midbrain and subcortical areas have been associated with impulsogenic processes (4, 25).

Distinct Developmental Trajectories

The distinction between volitional and impulsogenic processes has only begun to influence developmental research on self-control. We know much more about the development of the former than the latter, with countless studies tracking the growth of aspects of executive control during early childhood, middle childhood, and adolescence, and showing gradual improvement across an array of capacities (4, 25). Indeed, the implicit model of self-control that guides most developmental research wrongly assumes that individuals' impulsogenic tendencies remain constant across development, and that what changes with maturation is not the strength of our impulses but our ability to exercise control over them. Not surprisingly, then, accounts of improvement in self-control over the course of childhood focus almost exclusively on volitional processes, leaving open the possibility that increases in self-controlled behavior may be due to decreases in reward seeking or other forces that prompt impulsive acts. Similarly, differences among children of the same age in displayed

self-control are invariably attributed to differences in their regulatory competence rather than differences in the strength of their urges or their need for immediate gratification.

The distinction between processes that support self-control and those that favor sensitivity to immediate stimuli has proven useful in studying adolescent risk taking. Because volitional capacity, as reflected in performance on measures of executive function, increases linearly between childhood and late adolescence (35), it is difficult to explain why reckless behavior, which often reflects lapses in self-control, apparently increases temporarily during adolescence. If overt self-control were merely a function of volitional capability, reckless behavior should decline gradually over time. However, this is not the case: Many forms of reckless behavior increase between preadolescence and late adolescence, and then decline between late adolescence and adulthood (36).

This apparent paradox can be explained by examining the trajectory of reward sensitivity rather than the trajectory of volitional capacity. In several studies using a variety of self-report and experimentally derived measures (37), reward sensitivity and sensation seeking follow an inverted U-shaped function, increasing between preadolescence and midadolescence, peaking in either mid- or late adolescence (depending on the measure and sample), and declining thereafter. In contrast, in the same studies, cognitive control improves linearly during this same developmental period (as expected). These processes apparently follow similarly shaped trajectories among both males and females (38) and in different parts of the world (39), are influenced by different forces—changes in reward sensitivity are apparently affected more directly by puberty than are changes in cognitive control (40), and develop independently of one another (41).

Midadolescence is characterized by what has been described as a maturational imbalance (35) between reward sensitivity and impulse control (see Figure 2), which is thought to account for the rise in reckless behavior during this time. Although some have pointed out that many forms of risky behavior, such as binge drinking, peak later (i.e., in the late teens; 42), this may be due to differential opportunity to engage in certain forms of reckless activity. If the legal drinking age in the United States were 15 rather than 21, binge drinking would likely peak much earlier than the early 20s.

Conclusion

The study of self-control has become a vibrant area of inquiry within the field of child development. As research on the development of self-control proceeds, studies will need to distinguish between the observed manifestation of self-controlled behavior and the two classes of psychological processes that underlie it. Apparent lapses in self-control may be due to deficiencies in volitional processes, but they may also be due to excessively powerful impulsogenic processes. For example, overweight children eat too much. But they eat too much both because they cannot control their appetitive impulses (43) and because they have larger appetites to begin with (22). More generally, as Frog wisely observes in “The Cookies,” self-control depends both on how much you *want* something and also on how much you really *want not to want it*.

We see two important priorities for ongoing research. First, more energy should be directed to developing interventions that redirect impulsogenic processes or, at a minimum, recognize that self-control is a tug-of-war between mutually incompatible desires. Advances have been made in training executive function (25) and in teaching children specific metacognitive strategies (27). Much less is known about how to weaken immediately gratifying impulses, including whether it is possible to do so. Mindfulness practices, which encourage full attention to the present moment without judgment, may strengthen volitional processes and attenuate impulsogenic ones (44). Mindfulness interventions have targeted adults primarily, but interventions are now being adapted for adolescents and even young children (44; see additional publications in the same special issue). Another promising area of inquiry is redirecting sensation-seeking tendencies from harmful to more benign ends—perhaps a fast-paced game of pickup basketball can fulfill the same needs as joy riding or binge drinking (39).

Second, we need novel measures to distinguish the strength of an individual's desires from the power of his or her ability to keep them in check. Many commonly used questionnaires assessing self-controlled behaviors are blunt instruments ill suited to distinguishing volitional from impulsogenic processes. However, researchers can ask individuals to introspect, parsing their desire to do something from their desire not to do it, either in retrospect (24) or in real time using experience sampling methods (45). Of course, the applicability of such self-report methods for young children is questionable, and so we need to create methods that apply across development. Neuro-imaging (e.g., fMRI) or event-related potential may be the ultimate tools for parsing the psychological processes underlying self-control, and collaborations between neuroscientists and psychologists will be necessary to learn more about how these processes interact (cf. 35).

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Figure 1.

A dual influence framework distinguishes between the oppositional forces of impulsogenic and volitional processes.

Figure 2. Different developmental trajectories characterize the growth of sensation-seeking and impulse control during adolescence (37).