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Self-Control at High and Low Levels of Mental Construal

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Abstract

The present experiment tested the hypothesis that low-level construals—a known contributor to self-control failure—can improve self-control under some circumstances. In support of this hypothesis, the authors found evidence that low-level construals (relative to high-level construals) improve performance on a measure of response inhibition that requires close attention and responsiveness to the immediate environment—the stop signal task (SST). They also found evidence, consistent with previous research, that high-level construals (relative to low-level construals) improve performance on a modified version of the SST (i.e., the delay SST) that requires both response inhibition and goal maintenance in working memory. These results suggest that, depending on the nature of the task, either low-level construals or high-level construals can enhance self-control.

Keywords

construal, goal maintenance, inhibition, self-control, stop signal task, working memory

Success at self-control contributes to success in life, insofar as people who excel at overriding reckless responses enjoy more satisfying interpersonal relationships, less anxiety, and greater health and well-being than other people do (e.g., Ayduk et al., 2000; Finkel & Campbell, 2001; Tangey, Baumeister, & Boone, 2004). Conversely, failures of self-control contribute to interpersonal conflict, drug addiction, overeating, and other adverse outcomes (Vohs & Baumeister, in press).

Given the central role of self-control in human behavior, it is perhaps unsurprising that researchers have shown a keen interest in understanding the causes of self-control outcomes. For example, research has revealed that high cognitive capacity, positive affect, and motivation can increase success at self-control (e.g., Martin & Kerns, in press; Muraven & Slessareva, 2003; Shamosh et al., 2008). Conversely, cognitive depletion, negative affect, and lack of motivation may contribute to self-control failure (e.g., Kross & Mischel, 2010; Tice, Bratslavsky, & Baumeister, 2001; Ward & Mann, 2000).

The present investigation tested the hypothesis that another known cause of self-control failure—low-level mental construals—may in fact enhance self-control under some circumstances. Consistent with previous research, we found evidence that low-level construals impair self-control. Our novel contribution is that this effect holds only when a self-control goal (e.g., to inhibit a response) must be maintained in working memory. When an external stimulus cues the goal, thereby reducing the burden on working memory, low-level construals can enhance self-control. This evidence suggests that low-level construals disrupt goal maintenance or updating processes involved in self-control while leaving the capacity for inhibitory control intact.

Self-Control and the Executive Functions

We define self-control as the capacity to override or alter a predominant response tendency. Self-control is commonly understood as resisting immediate gratification in favor of long-term gains or goals (e.g., Fujita, Trope, Liberman, & Levin-Sagi, 2006; Metcalfe & Mischel, 1999), but in our usage self-control refers more broadly to any instance in which a subdominant response is deliberately substituted for a dominant one. By our definition, self-control encompasses not only delay of gratification but also response inhibition, persistence, emotion regulation, and several other behaviors (Baumeister, Schmeichel, & Vohs, 2007). In the current investigation we assessed self-control with a response inhibition task that either did or did not require goal maintenance in working memory.

Research suggests that an assemblage of cognitive processes, collectively referred to as executive functions, play a central role in enabling individuals to exercise self-control (e.g., Hofmann, Friese, & Roefs, 2009; Schmeichel, 2007; for

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a review, see Robinson, Schmeichel, & Inzlicht, 2010). One influential line of research has identified at least three interrelated executive functions that may contribute to self-control: set shifting, inhibitory control, and updating (Miyake et al., 2000). Shifting involves managing performance on multiple tasks or shifting back and forth between mental sets. Inhibitory control involves overriding a predominant response tendency. Updating involves the maintenance of goal-relevant information processing in the face of competing information or other distractions.

The current investigation focused on two executive functions—inhibitory control and updating—to test novel hypotheses regarding the effects of mental construal levels on self-control. Inhibitory control is assumed to contribute to impulse override, emotion suppression, and performance on putative inhibitory tasks such as the antisaccade task and the stop signal task (e.g., Inzlicht & Gutsell, 2007; Joormann, 2004). Updating is thought to support delay of gratification, emotion reappraisal, and other forms of self-control that involve sustaining a goal-directed response in the presence of distractions or competing impulses (e.g., Kane & Engle, 2003; Schmeichel, Volokhov, & Demaree, 2008). Below, we review evidence that led us to hypothesize that high-level construals are particularly beneficial for updating processes involved in self-control, whereas low-level construals may be beneficial for inhibitory self-control that is cued by the external environment.

High-Level Construals and Success at Self-Control

According to construal level theory (Liberman & Trope, 2008; Trope & Liberman, 2003), events may be represented at different levels of mental construal. High-level construals encompass the gist of an event and enable a long-term or distal perspective. Conversely, low-level construals focus on the specific elements of an event and enable a short-term or proximal perspective. To illustrate, a reader may construe the act of reading an article as seeking intellectual stimulation (high level) or as following a series of words on a page (low level).

Early, prominent empirical links between construal levels and self-control emerged from delay of gratification studies. Pioneering research by Mischel and colleagues found that cool, high-level construals of otherwise hot appetitive stimuli contribute to the successful delay of gratification. One representative study found that children who thought about tempting marshmallows as abstract objects (e.g., puffy white clouds) more successfully resisted the temptation to eat the marshmallows compared to children who thought about the marshmallows' appetitive qualities (e.g., sweet, soft, and chewy; Mischel & Baker, 1975). These results and similar findings (e.g., Mischel & Moore, 1973) point to the conclusion that transcending the immediate environment by construing temptation in abstract (vs. concrete) terms contributes to successful delay of gratification (for a review, see Metcalfe & Mischel, 1999).

More direct evidence for the link between high-level construals and success at self-control was provided by Fujita et al. (2006). In a compelling series of experiments they primed participants to operate at a high level or low level of mental construal and then measured self-control on an ostensibly unrelated task. In one representative experiment, participants were instructed either to think about *why* they seek to maintain good personal relationships (thereby focusing on the abstract concerns motivating their behavior) or to think about *how* they seek to maintain good personal relationships (thereby focusing on the concrete means of implementing behavior). The results indicated that participants who had pondered why they pursued a goal showed persistence on a test of physical endurance (i.e., they squeezed a handgrip longer) compared to participants who had pondered how they pursued a goal. Thus, consistent with Mischel's work on delay of gratification, Fujita et al. found that inducing a high-level mind-set caused people to succeed at delay-oriented behavior despite the salient promise of more immediately rewarding outcomes.

In summary, research has indicated that high-level construals contribute to success at self-control (for a review, see Fujita, 2008). High-level construals may be particularly advantageous for pursuing a self-control goal in the presence of short-term temptations or other distractions—that is, when the goal must be maintained in working memory. In such instances, the evidence clearly indicates that high-level mental construals promote success at self-control.

Low-Level Construals and Success at Self-Control?

Although the majority of the literature indicates that high-level (vs. low-level) construals are best for self-control, theory and evidence suggest a more nuanced view. Under some circumstances, task performance improves under low-level construals. Might this improvement extend to acts of self-control? We hypothesized that low-level construals can be advantageous for self-control when self-control requires attending closely to, rather than resisting or transcending, the immediate environment.

Action identification theory (Vallacher & Wegner, 1985, 1987) proposed that people construe actions at the level of abstraction that is most effective for maintaining the action. Familiar or easy actions (e.g., riding a bicycle) foster abstract action identities (''traveling''), in part because people tend to prefer abstract action identities (Vallacher & Wegner, 1989) and in part because close attention to detail is unnecessary and may disrupt the performance of familiar tasks (e.g., Baumeister, 1984; Beilock, Bertenthal, McCoy, & Carr, 2004). Conversely, difficult or unfamiliar actions (e.g., riding a unicycle) tend to elicit concrete action identities (''pedaling'') because close attention to detail is necessary to perform such actions successfully.

A study by Vallacher, Wegner, and Somoza (1989) verified that concrete construals can improve performance on a difficult task. They asked participants to read a speech that was to be viewed by an easy-to-persuade audience (easy task) or a

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hard-to-persuade audience (difficult task). When a flashing light disrupted the speaker, speech fluency improved in the difficult task condition but not the easy task condition. Presumably, speech fluency was improved in the difficult task condition because the flashing light induced a concrete action identity for the task; speakers shifted their focus from trying to persuade a skeptical audience (abstract) to annunciating clearly (concrete). We know of no evidence that speaks directly to the idea that concrete action identification improves self-control, but the study by Vallacher et al. indicates that concrete construals can improve ostensibly difficult task performance.

In addition to action identification theory and research, other empirical findings provide reason to believe that low-level construals may improve self-control, at least under some circumstances. For example, a series of experiments by Watkins, Moberly, and Moulds (2008) found that adopting concrete construals in response to failure reduced the experience of negative emotion, relative to adopting abstract construals. Given that people often exercise self-control to reduce negative emotions (i.e., by replacing a dominant negative response with a subdominant neutral or positive response; e.g., Volokhov & Demaree, 2010; see Gross, 2007), evidence that concrete (vs. abstract) construals reduce negative emotional responses to unfavorable events is consistent with the idea that low-level construals can contribute to success at self-control.

Research on procrastination also supports the idea that low-level construals can be good for self-control. A series of studies by McCrea, Liberman, Trope, and Sherman (2008) found that low-level construals contribute to the timely completion of take-home assignments, relative to high-level construals. In one representative experiment, participants received a questionnaire to complete at home and return to the experimenter via email. The cover of the questionnaire depicted a painting, and the title assigned to the painting was used to manipulate construal level. In the high-level-construal condition the title drew attention to the abstract qualities of the painting, whereas in the low-level-construal condition the title drew attention to its concrete details. Participants in the low-level condition returned the questionnaire sooner than did participants in the high-level condition. Procrastination has been linked to poor self-control (e.g., Steel, 2007; Tice & Baumeister, 1997; Vohs et al., 2008), so evidence that low-level construals reduced procrastination fits with the idea that low-level construals can benefit self-control. Note, however, that McCrea and colleagues "did not conceptualize the timely completion of a task as necessarily reflecting the successful application of self-control" (p. 1309). Rather, they suggested that low-level construals caused participants to complete the assignment sooner because low-level construals prompted a present-focused action orientation.

In summary, research suggests that low-level mental construals may contribute to the successful performance of some tasks, but the extent to which low-level construals contribute to success at self-control has not been established. Prior research on the benefits of low-level construals has not assessed performance on tasks that unambiguously entail self-control (i.e., overriding or altering a predominant response tendency). Indeed, the prevailing view is that low-level construals undermine self-control (Fujita, 2008).

The Present Experiment

In the present experiment, we manipulated construal levels in a manner that has proven successful in several previous experiments (e.g., Freitas, Gollwitzer, & Trope, 2004; Fujita et al., 2006; Liberman, Trope, McCrea, & Sherman, 2007). Specifically, participants spent a few moments pondering how they pursue a particular goal (low-level-construal condition) or why they pursue a particular goal (high-level-construal condition). Next we measured performance on one of two versions of a putative self-control task known as the stop signal task (SST). We predicted that low-level construals would benefit performance on a standard version of the SST that required response inhibition, whereas high-level construals would benefit performance on a modified version of the SST that required both response inhibition and goal maintenance in memory.

In a standard SST, participants complete a primary task (i.e., a go task) and occasionally encounter a signal that tells them to withhold their response to the primary task (see Logan, 1994; Logan & Cowan, 1984). Successful performance on a standard SST thus requires participants to inhibit the predominant response whenever the stop signal appears. Given that response inhibition is a classic form of self-control (e.g., Polivy, 1998, Verbruggen & Logan, 2008), we considered good performance on the SST to reflect good self-control.

Inhibition on the SST differs from some other common self-control challenges. The SST requires the person to attend closely and be responsive to the immediate environment because the environment contains the signal indicating when to inhibit a response. In contrast, in other situations that demand self-control, such as delay of gratification tasks, the person who seeks to inhibit responses typically relies on internally generated signals pertaining to long-term goals (e.g., "remember you are on a diet") to resist or transcend salient stimuli. Because response inhibition on the SST depends on attending closely to the immediate environment, we predicted that low-level construals would improve performance on a standard SST.

We also devised a nonstandard version of the SST that required a greater degree of transcending the immediate environment than does the standard version. The "delay SST," like the standard version, requires inhibitory self-control. Unlike the standard SST, however, the delay SST instructs participants to inhibit the go response only at every third stop signal. We reasoned that the delay SST challenges participants to maintain the stop goal in working memory despite the presence of conflicting information (i.e., inapplicable stop signals). This is precisely the type of challenge for which high-level or abstract construals appear to be beneficial. Akin to maintaining a diet, resisting the temptation to hit the snooze button on the alarm clock, or persisting at a painful task, the delay SST requires that people keep in mind the goal. Hence,

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consistent with prior work, we predicted that high-level construals would improve performance on the delay SST as compared to low-level construals.

In summary, successful SST performance requires response inhibition. We predicted that low-level mind-sets would improve performance when the stop signal always cued inhibition. When the stop signal did not always cue inhibition, such that the goal to inhibit responding had to be actively maintained in working memory, we expected that high-level mind-sets would improve performance.

Method

Participants

In exchange for credit toward a course requirement, 99 undergraduate students (44 women, 55 men) participated. They were randomly assigned to condition in a 2 (construal level: high vs. low) × 2 (SST: standard vs. delay) between-subjects factorial design.

Procedure

Participants first considered a list of 10 values and ranked them in order of personal importance. The list included such values as power, achievement, benevolence, and tradition (Schwartz & Bilsky, 1987). After ranking the values, participants completed a short exercise that composed the construal level manipulation (see Freitas et al., 2004). Participants in the *high-level-construal condition* indicated their most important value in a box at the bottom of a sheet of paper and then wrote four reasons why they pursue their top-ranked value using four boxes placed in a vertical line moving up on the sheet of paper. Participants in the *low-level-construal condition* indicated their most important value in a box at the top of a sheet of paper and then wrote four ways that they pursue their top-ranked value in four boxes moving down the sheet of paper. All participants elaborated on their most important value so that the content of participants' thoughts was personally important regardless of construal-level condition. Research has found that expressing why one pursues a value temporarily induces a higher level of mental construal whereas expressing how one pursues a value temporarily induces a lower level of construal (Schmeichel & Vohs, 2009; also see Wakslak & Trope, 2009).

Next, participants completed an SST. In the *standard SST condition*, a series of numbers appeared on the computer screen, one after another, with 1.5 s of blank screen separating each number. At onset, each number appeared in black font. *Go* trials appeared 75% of the time and were indicated by the consecutive appearance of two identical numbers (e.g., 942231; 942231). *Go* trials signaled to participants to press a button when the second of two identical numbers appeared. *Stop* signals were indicated by any number that changed in font color from black to red. Stop signals (25% of trials) told participants to not press a button.[1] Participants completed 160 trials in total.

The *delay SST condition* was identical to the standard SST, except that participants were instructed to stop only on every third stop signal. The delay SST thus required participants to maintain a mental count of stop signals, akin to an *n*-back task or other goal maintenance tasks (e.g., Kane & Engle, 2003). Given that the number of applicable stop trials differed across conditions, we calculated the proportion of correct stops (i.e., correct stops/total number of stop trials) to serve as the primary dependent variable. After finishing their respective SST, participants were debriefed and dismissed.

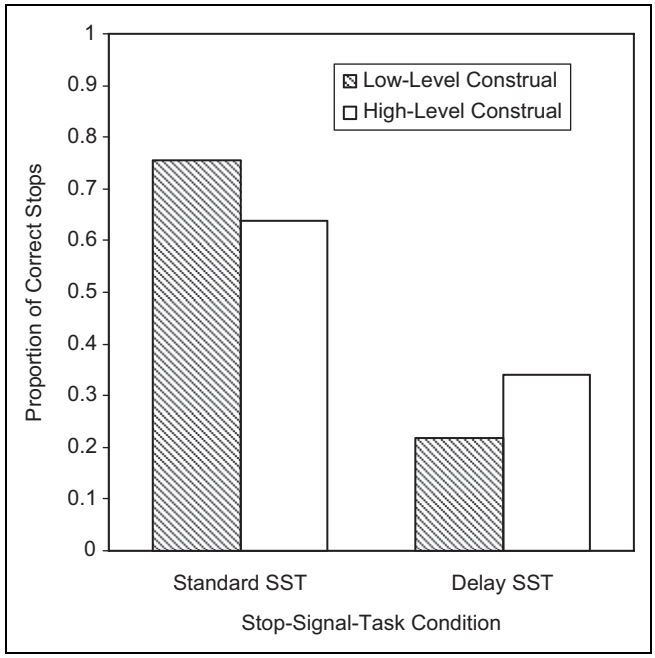

Figure 1. Proportion of correct stops as a function of stop signal task (SST) condition and construal level condition

Results

We predicted that construal level would interact with SST type to influence self-control. It did. A 2 (construal level) × 2 (SST type) analysis of variance on the proportion of correct stops revealed a main effect of SST type, $F(1, 95) = 110.86$, $p < .001$, $\eta^2 = .54$, such that performance on the standard SST exceeded performance on the delayed SST. The construal level main effect did not approach statistical significance, $F < 1$. Moreover, the predicted Construal Level × SST Type interaction was significant, $F(1, 95) = 9.17$, $p = .003$, $\eta^2 = .09$. The results are displayed in Figure 1.

Simple effects tests revealed that on the standard SST, participants in the low-level-construal condition performed better (i.e., correctly inhibited a greater proportion of button presses) than participants in the high-level-construal condition, $F(1, 95) = 4.47$, $p < .05$. On the delayed SST, however, participants in the high-level-construal condition performed better, $F(1, 95) = 6.91$, $p = .01$. Thus, successful self-control on the SST was a joint function of construal level and task type.

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We also considered the possibility that, in the delayed SST condition, the construal level manipulation influenced response inhibition on inapplicable stop signs. An across-the-board increase in response inhibition, for example, would result in an increase in the prevalence of correct stops, but at the cost of an increased rate of incorrect stops. The total number of incorrect stops did not differ between the high-level construal condition ($M = 4.13$, $SD = 4.51$) and the low-level-construal condition ($M = 4.12$, $SD = 2.37$), $t < 1$, however, so participants in the high-level-construal condition were not indiscriminate in their responses on the delayed SST. Rather, they stopped more often when the task required them to do so compared to participants in the low-level-construal condition.

Discussion

The current experiment tested the hypothesis that low-level construals—a known contributor to self-control failure—can aid self-control success under some circumstances. In support of this hypothesis, we found evidence that low-level construals (relative to high-level construals) improve performance on an inhibitory task that requires close attention and responsiveness to changing information in the environment—the SST. We also found evidence, consistent with previous research, that high-level construals (relative to low-level construals) improve performance on a modified version of the SST that requires both response inhibition and goal maintenance in working memory (i.e., the delay SST). Thus, depending on the nature of the self-control task, either low-level construals or high-level construals can enhance self-control.

Successful performance on the standard SST, much like successful self-control more generally, requires the inhibition of a dominant response. Unlike other forms of self-control, however, successful performance on the standard SST also requires a narrow focus on the details of the immediate environment, because those details signal when to override the dominant response. We reasoned that low-level construals would help participants attend to the details and therefore improve performance on the standard SST, and evidence from the current experiment supported this reasoning.

Successful performance on the delay SST, by comparison, places at least one additional demand on participants than does the standard SST—goal maintenance. On the delay SST, participants had to maintain in working memory the goal to inhibit every third response despite the presence of interfering information (i.e., inapplicable stop signals). We reasoned that high-level construals (relative to low-level construals) would improve performance on the delay SST much like high-level construals have been found to improve delay of gratification, physical endurance, and other forms of self-control that depend on the active maintenance of a self-control goal over time. Consistent with this reasoning, we found that performance on the delay SST was better under high-level versus low-level construals.

Taken together, the results of the current experiment suggest that low-level construals disrupt goal maintenance processes but leave the capacity for response inhibition intact. Indeed, when response inhibition was reliably cued by an external stimulus and therefore required little goal maintenance, low-level construals facilitated inhibition. The evidence that low-level construals have divergent effects on goal maintenance and response inhibition, respectively, is consistent with evidence that at least three loosely related executive functions enable self-control. Hofmann et al. (2009), for example, reported that inhibitory control, executive attention (linked to working memory and goal maintenance), and affect regulation each independently contribute to success at self-control (see Hofmann, Schmeichel, Friese, & Baddeley, in press). Similarly, Miyake and colleagues (2000) found evidence that inhibitory control, updating, and set shifting are interrelated but empirically distinct executive functions. The current results suggest that updating is impaired under low-level construals but inhibitory control is relatively unaffected. Additional evidence pertaining to other putative executive functions (e.g., set-shifting) is needed to further specify how and why construal levels affect self-control.

The current results stand in contrast to prior evidence derived from construal level theory. Although previous work has routinely observed that low-level construals are detrimental for self-control, we found that low-level construals enhanced response inhibition on a standard SST. The implication of this finding is that low-level construals are not wholly detrimental for self-control. Rather, under some circumstances, low-level construals can offer a self-control advantage.

Because previous research on construal levels and self-control has focused on self-control tasks that require the person to transcend the immediate environment (e.g., delay of gratification tasks), the possibility that low-level construals may sometimes improve self-control has been overlooked. It appears that when a person must rely on actively maintaining a goal in working memory to succeed at self-control (as is the case with the delay SST), low-level construals impair self-control. Conversely, when a person must respond to concrete features of the immediate environment to succeed at self-control (as is the case with the standard SST), low-level construals can improve self-control.

Two caveats regarding the dependent measures used in this experiment should be noted. First, although the standard SST is considered a valid measure of inhibitory control (e.g., Miyake et al., 2000), the variant of the SST we created for the current experiment—the delay SST—has ample face validity as a measure of updating but unknown construct validity. We assumed that although both the standard SST and the delay SST require response inhibition, the delay SST requires a greater degree of goal maintenance and updating in working memory. If that is correct, then additional research should find that performance on the delay SST (relative to the standard SST) is more strongly associated with performance on other measures of updating. Second, the delay SST was more difficult than the standard SST, so we cannot rule out the possibility that the construal level manipulation had divergent effects on performance because the two tasks differed in terms of difficulty.

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Connections to Other Theories

We have proposed that low-level construals can enhance self-control, particularly when the cues to exercise self-control are highly salient features of the immediate environment. Our proposal is consistent with the attentional myopia model (Mann & Ward, 2004; Ward & Mann, 2000). According to the attentional myopia model, factors that narrow the focus of attention including cognitive load, emotional arousal, and alcohol intoxication (e.g., Steele & Josephs, 1990) may increase or decrease success at self-control, depending on the nature of the most salient stimuli in the environment. One study, for example, found that when attention was narrowed by a cognitive load, dieters consumed less of a fat-laden milkshake when the most salient stimuli in the environment promoted weight loss goals (Mann & Ward, 2004).

The question arises, then, whether low-level construals improve self-control by narrowing the focus of attention. Although low-level mental construals may focus attention on the concrete features of the immediate environment, this may reflect an attentional bias toward specific features of the environment rather than narrowed attention. In principle, low-level construals could be applied to a broad array of concrete stimulus characteristics, contradicting the notion that low-level construals narrow the focus of attention. The extent to which the present findings fit under the theoretical umbrella of the attentional myopia model is thus unclear and will become clearer only when the effects of low-level construals on attention have been established.

As described in the introduction, the current findings also comport with action identification theory (Vallacher & Wegner, 1985, 1987) and specifically with evidence that low-level action identifications can contribute to successful task performance (Vallacher et al., 1989). The current findings extend prior work by showing that low-level construals can improve performance on a self-control task.

Both the attentional myopia model and action identification theory have examined when otherwise limiting conditions such as cognitive load or concrete action identification can improve performance. In our view, construal level theory may also benefit by addressing when and why the otherwise limiting conditions of low-level construals may contribute to success at self-control. The current investigation represents initial evidence for the self-control benefits of low-level mental construals, findings that stretch and therefore strengthen construal level theory and self-control research generally.

Conclusion

We propose that the key to knowing when low-level construals will impair self-control (which is the typical pattern) versus when they will improve self-control (which is the atypical pattern observed in the present experiment) is a function of the immediate environment. When the person must transcend the immediate environment to succeed at a goal that is held in working memory, low-level construals will be harmful. Conversely, when one must attend closely to the physical environment to succeed at self-control, this same psychological state can be helpful. The current findings thus help to paint a more nuanced—and more accurate—picture of when, why, and how people succeed at self-control.

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Note

1. Stop signals were presented at one of four latencies (75 ms, 150 ms, 250 ms, and 350 ms) following number onset. Stop signal latency did not interact with construal level condition or stop signal task type to influence performance, so stop signal latency was not included in the analysis.

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