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Self-Control, Depletion and Choice

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In several studies, we observe that depletion of regulatory resources can affect choice and that choice can affect the level of available resources. For example, we find that early choices in a sequence affect later choices. We also examine why choice depletes resources and find that trade-offs rather than choice difficulty seems to predict which choices will be depleting. Lastly, we find that individuals are not aware that choices can deplete resources and thereby affect subsequent choices.

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ments 1 and 2 by demonstrating that the effect of regulatory orientation on self control is mediated by increased positive goal-related thoughts. Undergraduate participants primed with a prevention (vs. promotion) focus using a mouse maze task also were more likely to stay focused on their goal (i.e., studying) rather than yield to temptation (i.e., taking a break with friends), even though they indicated that they would value taking the break more than promotion-primed participants. Furthermore, the results showed that positive goal-related thoughts mediated the effect of regulatory focus on choice. A thought listing task showed that goal-related thoughts were more accessible and came to mind sooner than temptation-related thoughts among the prevention- vs. promotion-oriented participants. In addition, prevention- versus promotion-oriented participants reported more regret in case of goal pursuit failure, but indicated no difference in how they felt if they were to forego the temptation. Finally, experiment 4 employed a actual choice measure and found that diet-primed prevention- vs. promotion-focused participants were more likely to choose the goal-compatible target (low fat pretzels) over the goal-conflicting temptation target (potato chips).

Taken together, these studies provide convergent evidence that self-regulatory focus influences self-control in that prevention focus leads to greater self control. People with a prevention orientation are more focused on the goal and less focused on temptations relative to those with a promotion orientation. Our results show that prevention-focused participants favored goal-related products more, have more positive goal-related thoughts, and express deeper regret in case of goal failure.

"Affect as a Cue for Self Control"

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Is the good feeling after having a rich and delicious chocolate cake the same as the good feeling after successfully restraining oneself from having fatty food while on a diet? Past research and theory on motivation and emotion commonly share the assumption that goal attainment is marked by positive affect and that part of the reason that people engage in goal related behavior is because they want to feel good (e.g., Carver & Scheier, 1990; Higgins, 1997). We believe that the role of affective processes in goal pursuit is more complex and propose that the relationship between positive affect and goal attainment depends on the type of goal that is being pursued. In particular, we focus on self-control dilemmas, posing a conflict between two goals; one that has short-term benefits and another that offers long-term benefits. We propose that the attainment of both short-term goals and long-term goals is associated with positive affect. However, the quality of this affect differs for these two types of goals such that short-term goals are associated with low-level affect (e.g., happiness) and long-term goals are associated with high-level affect (e.g., pride).

Emotion researchers typically identify affective responses with low-level, concrete processing and contrast them with cognitive responses, which are considered to be more abstract, high-level (Loewenstein, 1996; Metcalfe & Mischel, 1999). We suggest a different distinction between high vs. low level of emotions, according to which higher-level emotions are those that follow the attainment of long-term goals, whereas lower-level emotions are the outcome of the attainment of more immediate goals. We further suggest that because an association is established between specific affect and goals, affect becomes a cue for the pursuit of the corresponding goal, such that high-level affect motivates the pursuit of long-term goals and low-level affect motivates the pursuit of short-term temptations.

We present data in support of two predictions of our model regarding the role of affect in self control. The first prediction of our model is that high-level affect is associated with long-term goals and low-level affect is associated with more short-term goals or temptations. In support of this prediction, participants expected a chocolate cake (representing a short-term desire) to make them feel more happy than proud. At the same time, participants expected a vegetable salad (representing the means of a long-term goal) to make them feel more proud than happy (Study 1). The first prediction of our model also implies that the same action should lead to different affective experiences when considered from the near (making the temptation more salient) and from the distance (making the long-term goal more salient). In Study 2, participants with an accessible health goal who chose chocolate over baby carrots, reported feeling more happy than proud while eating the chocolate than while evaluating their choice later on. However, those who chose baby carrots over a chocolate bar reported feeling more proud than happy after a while than while having the carrots.

Finally, our model suggests that these two affective systems have motivational consequences for situations in which long term goals conflict with more specific, short term goals, like in self control dilemmas. We propose that since people associate actions with specific types of affect, this affect serves as a cue for engaging in an action that would result in the equivalent experience. Thus, we propose that low-level affective cues motivate succumbing to temptations whereas high-level affective cues motivate adhering to long term goals. Support for this prediction comes from two studies. In Study 3, participants with an accessible achievement goal were primed with either positive high level affective terms (e.g., pride, self-worth) or positive low level affective terms (e.g., happiness, pleasure) via a lexical decision task. We then measured the time they spent on completing a difficult verbal reasoning test. We found that participants who were primed with high-level affective terms exercised more self control by persisting longer on a difficult task than participants who were primed with low-level affective terms. Study 4 found similar results using a different self control measure. In this study participants with an accessible health goal were primed with positive high level affective terms or positive low level affective terms using the same lexical decision task as in Study 3. We then measured participants' ability to resist temptation by means of the number of chocolates they chose from a bowl of chocolates. Here, again, participants who were primed with high-level affect exerted more self control by taking less chocolate than those who were primed with low-level affect.

Taken together, our findings support the existence of two distinct affective systems in self regulation and demonstrate its implication to self control dilemmas. We show that low level, hedonic emotions are associated with short-term goals whereas high-level, self conscious emotions are associated with long-term goals. These associations have consequences for behavior such that high-level affect cues self control and low-level affect cues succumbing to temptations. We believe that the proposed model sheds light on the complex and unique functions of emotions as self regulatory feedback for goal pursuit.

"Self-control, Depletion and Choice"

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Recent research by Baumeister and colleagues has revealed that individuals have a limited pool of resources available for exerting self-control (Baumeister 1998). One important task that

requires self control is choice. Baumeister and colleagues have shown that making choices can deplete one's self-control resources. We follow up this research by examining why choices are depleting and the effects of depletion in successive choices.

In our first study, we examine a real choice between a chocolate bar and a granola bar. We find that individual leaving the library are more likely to choose a chocolate bar (80%) over a granola bar than individuals entering the library (50%). We propose that this occurs because studying in the library requires self-control and therefore depletes self-control resources. When faced with a choice between a healthy and a tasty snack, choosing the healthy snack also requires self-control. Since those leaving the library have less self-control available when making the choice they are less likely to resist the chocolate bar.

The choice observed in study 1 could be the result of several differences between those entering and leaving the library. For example, those leaving the library could be more depleted of blood sugar and choosing the chocolate bar to quickly replace that blood sugar. In study 2, participants chose between high-brow and low-brow movies to see on a weekend that is several days away, a choice that is not relevant to immediate consumption. High-brow movies typically offer less immediate pleasure (or even some pain), but provide long-term benefits in the form of educational or cultural enrichment. Low-brow movies fall more into the temptation category because they are fun but forgettable (Read and Lowenstein, 1999). We expected that choosing a high-brow movie would require self-control and we found that participants were more likely to choose this type of movie when entering (72%) as compared to leaving the library (11%). This finding reveals that depletion can affect choices whose outcomes will only be experienced later (presumably after the current depleted state is dissipated). This study also suggests that study 1 was the result of depletion rather than some other immediate need that may have been more pronounced for those leaving the library.

In subsequent studies we further examine how one choice can affect subsequent choices through the depletion of self-control. In study 3, we have half of our participants make several choices between similar items (e.g. between two different pens, two different snacks). The remaining participants saw the same set of items, but instead of choosing, their task was to determine whether they had used each product in the last year. All participants then faced a choice among a set high-brow and low-brow movies, as in study 2. We found that many more participants chose a low-brow movie among those whose first task involved choice (40%) than among those whose first task did not require any choosing (10%).

In study 4, we investigated what aspect of choosing is more depleting of self-control resources. Again, we use our choice among movies to measure depletion. In this study, we tried to distinguish between tradeoff difficulty and choice difficulty. Choices can be difficult because the trade-offs are difficult (e.g. I want a cheap apartment, but I also want one near school–which am I going to give up if I can't have both?) or because the options are difficult to distinguish (e.g. all these apartments are very similar, making it difficult to differentiate and choose among them). We propose that only trade-offs lead to depletion, so if we construct two choices where one involves large trade-offs and the other involves very similar options, both may be equally difficult, but the former should be more depleting than the latter. Using this design, we found that small trade-off choices were rated as slightly more difficult than large trade-off choices. However, as predicted, following the large trade-off choices, 54% chose a low-brow movie, while only 39% chose a low-brow movie following the small trade-off choices. This design provides evidence that trade-offs are a depleting aspect of choice, beyond any effect these trade-offs have on perceived choice difficulty. This is consistent with the notion that self-control involves giving up desirable things and accepting undesirable things. That is exactly what is involved in making trade-offs in choice.

Lastly, we investigated individuals' beliefs about depletion and choice. We described several of our studies and asked participants to intuit what would happen. We found that they could intuit that studying would lead to more depletion and they also predicted that more low-brow movies would be chosen after as opposed to before studying. However, when we described the choice versus ratings study (study 3 above), and asked participants who would be more depleted and who would choose more low-brow movies, we found that they did not predict any differences in depletion, nor any difference in preference for low-brow movies. That is, participants could intuit the effects of studying on depletion and subsequent choice, but they had no idea that choices could also deplete and thereby affect subsequent choices. If individuals were made aware of the interaction of successive choices through depletion, they might avoid making decisions about temptations following other choices and increase their ability to self-regulate in situations that require such regulation.

"A Loss of Self-regulatory Resources Makes People More Passive"

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The current research expands upon a model that portrays self-regulation as being governed by a set of finite resources. Self-regulatory resources are used when people modify, alter, or otherwise change their responses. The supply of self-regulatory resources is depleted after being taxed by a preceding act of self-control, the result of which is that ensuing acts of self-control are less successful. The results of over 60 published experiments support the self-regulatory resource model (see Vohs, Baumeister, and Tice, in press, for a review). Temporary depletion of self-regulatory resources has been shown to elicit a variety of disinhibited behaviors, such as impulsive spending, overeating among dieters, low emotional control, and narcissistic self-perceptions (see Vohs et al., in press). Hence, when people lack the ability to maintain control, they may behave disinhibitedly, which is to say that behaviors that otherwise would be regulated are released and emerge uncontrolled.

In the current research, we investigated whether depletion of self-regulatory resources may also lead people to become more passive. A look at research in this area hints of increased passivity after self-regulatory resource depletion. In one study, for instance, after participants made a series of choices, they were more likely to dazedly stare into space than were participants who did not make choices (Vohs et al., under review). Other research suggests that a loss of self-regulatory resources results in less variety seeking, relative to when people have a full complement of self-regulatory resources (Vohs and Kim 2006). In short, we hypothesized that depletion may result in passivity, a prediction that was supported in three experiments.

In Experiment 1, participants engaged in task that either did or did not require self-regulation; subsequently, they performed a physical task that involved learning to putt a golf ball. This formed the dependent measure of physical passivity. First, participants watched a six minute video (without sound) of a woman talking (modified from Gilbert, Krull, & Pelham, 1988). In the bottom corner of the screen, words (e.g., hair, hat, pulse) appeared individually for ten seconds each. Participants in the depletion condition were instructed to focus their attention only on the woman's face