FORECASTING SELF-CONTROL: HOW DO PEOPLE THINK ABOUT THE DIFFICULTY OF FUTURE SELF-CONTROL?

by

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(Under the Direction of Michelle vanDellen)

ABSTRACT

Three studies investigated how people view the difficulty of exerting self-control in the future. Study 1 provides strong evidence that people's predictions of the difficulty of exerting self-control in the future increase as temporal distance increases, and this pattern is greater among people with high self-efficacy optimism, low self-regulatory skill, and a low promotion regulatory focus. In Study 2, people accurately predicted the difficulty of completing math problems one day before they completed the math problems but not three days or one week before. Last, Study 3 suggests that the details known about a future temptation may not play a role in people's predictions of resisting the temptation in the future nor do the details of the future temptation relate to the accuracy of those predictions.

INDEX WORDS: Future, Planning, Forecasting, Self-regulation, Self-control, Goal pursuit

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# DEDICATION

This manuscript is dedicated to every person who has helped me along the way in my life and graduate career.

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# CHAPTER 1

## INTRODUCTION

Thinking of the future and planning ahead is a necessity for human survival. Almost every long-term goal requires some form of plans—eating a healthy diet entails specifying what to eat and resisting unhealthy foods, saving money requires creating a budget and avoiding spending, and building a house involves determining what needs built and setting up and adhering to a construction timeline. These examples illustrate that long-term goals inevitably also require self-control, for instance, following through with intentions to avoid sweet temptations and spending grueling hours in the heat to complete a day's work on the house.

Although planning for future goal pursuit is important, plans can be formed based on many aspects. One can plan when and how to pursue a goal, for example, planning to exercise tomorrow by going on a bike ride. However, determining if the plan will require self-control and how difficult it will be to exert self-control in the future may also be important. Consider Katie. If she decides she will go biking tomorrow at 6pm, she may benefit from thinking about the difficulty of this plan in terms of self-control. If she thinks about how she is usually exhausted after work, she may predict that it will be hard to want to go biking. She may decide to pack extra food in her lunch or plan to take a quick nap beforehand to get some extra energy for her bike ride. Instead, Katie may predict that it will be easy to make herself go biking and may simply make her plan to go biking at 6pm and move on. Therefore, Katie's beliefs about her future bike ride have implications for if and how she prepares in the present.

Investigating whether or not people can accurately predict how difficult it will be for them to exert self-control in the future is important for at least two reasons. First, as illustrated above, people's future predictions affect how they plan to face future events. Thinking that it will be easy to exert self-control in the future can be detrimental because when the future arrives, the challenge may be harder than one had imagined, and consequently, the individual may not try the next time the challenge is encountered. When an individual constantly underestimates how hard it will be to exert self-control in the future, she may continuously fail at her goals. Second, people's future predictions influence present behavior. For instance, if Joe thinks it will be easy to read for his finance class later in the week, he may justify that he doesn't need to read right now. Consequently, people may not only have trouble pursuing their goals in the present because they do not view self-control in the present as necessary, but they may also have trouble pursuing them in the future. In sum, the predictions people make for future goal pursuit can affect their plans for the future, what they will do in the present in the service of the goal, and what will happen when it comes time to actually make efforts to pursue the goal.

I define forecasting self-control as thinking in the present about how difficult it will be to exert self-control in the future. I hypothesize that people will be optimistic about how hard it will be to exert self-control in the future and that temporal distance will increase this optimism. Previous research supports this idea; for instance, when people think that they will have more chances to exert self-control later, they are more likely to give into temptations in the present (Khan & Dhar, 2007). Therefore, someone who continuously thinks there will be more instances to exert self-control in the future may habitually refrain from exerting self-control in the present due to optimistic thoughts about future self-control. A vicious cycle can ensue when one keeps thinking that *next* time one will exert self-control.

**Do People Accurately Predict the Future?**

People constantly think about what the future will be like, whether it is figuring out a vacation to schedule months away or deciding where to live that will make them the most happy. Future orientation is a part of the self-system, and people can readily think about who they hope to become or are afraid of becoming (Markus & Nurius, 1986; vanDellen & Hoyle, 2008). One downside of being future oriented is that people may not benefit from these predictions as much as they think.

When people attempt to predict how they will feel in the future, known as affective forecasting, they tend to overestimate the intensity and duration of their emotional reactions to both positive and negative events (Dunn, Wilson, & Gilbert, 2003; Gilbert, Gill, & Wilson, 2002; Wilson & Gilbert, 2005). Exaggerating how events will affect emotions is referred to as the impact bias, and one cause of this bias is focalism, overestimating the extent to which one specific event will affect emotions in the future (Wilson et al., 2000). Someone who has recently bought a new car may experience this bias by imagining cruising down the highway smiling indefinitely in the car, forgetting that ahead is an intense month of long hours at work, or that the money that went to buying the new car means eating out less often and cooking at home. Hence, by paying close attention to one event and ignoring other important events that can have an impact on emotions, people are inaccurate when predicting how they will feel in the future.

Not only do people make false predictions about their future emotions, people are optimistic about future outcomes and future behavior (Markus & Nurius, 1986; Taylor & Brown, 1988; Weinstein, 1989; Weinstein, Slovic, & Gibson, 2004). People tend to think that certain risks are less severe and will not affect them (Weinstein, 1982) and believe that they are more likely than others to benefit from positive events (Weinstein, 1980). This optimistic bias is

exemplified in smokers who believe that they have a lower chance of getting addicted to smoking than they actually do (Arnett, 2000; Cohn, Macfarlane, Yanez, & Imai, 1995; Waltenbaugh & Zagummy, 2004), in marriage license applicants who are aware of divorce rates but think divorce will not happen to them (Baker & Emery, 1993), and in people who think that they are immune to health problems (Weinstein, 1982). People also tend to have an overconfidence bias of thinking that their judgments are more correct than they really are (Kenny & DePaulo, 1993; Taylor & Brown, 1988). This past research can be applied to self-control, in that when people think about exerting self-control in the future they may be optimistic about their predictions, overweighting the probability of possible self-control successes and underweighting the probability of failing at self-control.

Furthermore, there is some evidence suggesting that people may not accurately predict the difficulty of future self-control efforts. For instance, people often think that they will complete tasks faster than they actually do (the planning fallacy; Buehler, Griffin, & Ross, 1994; Kahneman & Tversky, 1979). Individuals are optimistic about their likelihood of exerting self-control in the future, choosing to exert self-control later and to indulge in the present when given a choice between the two (Read, Loewenstein, & Kalyanaraman, 1999). Read et al. (1999) asked participants to make three movie choices, choosing between high-brow movies (self-control option) and low-brow movies (indulgent option). Participants who made three movie choices at one time compared to people who made one movie choice per day over three days were more likely to choose a high-brow movie compared to a low-brow movie for the second and third day. Thus, people who made future choices planned to exert self-control later rather than in the present. This study suggests that people think they will want to engage in self-control, in this case watch a high-brow movie, more than they may want to when the time comes. In addition,

people tend to think that hedonic states will be less intense in the future than in the present and this is known as future anhedonia (Kassam et al., 2008). Consequently, people may prefer to put off self-control efforts for later because they want to get the most benefit from indulgences, thinking that they will not be as strong later as they are now.

People also overestimate their capacity to exert self-control (the restraint bias; Nordgren, van Harreveld, & Pligt, 2009). Participants who exerted self-control in one instance assumed they would be able to do so again in the future and allowed themselves to be exposed to temptations, which in turn led to decreases in self-control (Nordgren et al., 2009). Thus, people may be optimistic about their abilities to exert self-control in the future because of having exerted self-control in the past or present. Further evidence suggesting that people are optimistic about later self-control can be seen in balancing goal pursuits. If temptations and goals are thought of as complementary versus competing, one may balance a temptation and goal by preferring the temptation in the present and postponing goal actions for the future (Fishbach & Zhang, 2008). Thus, this research suggests that when people balance indulgence and self-control, they tend to put self-control actions off for later and indulge in the present.

**Why do People Think Optimistically about the Future?**

Being able to predict the future is not easy, and there are many reasons why people are unable to paint an accurate picture of the future. First off, people may benefit from relating similar past experiences to future tasks or events; however, people may not have past comparable experiences (Kahneman & Tversky, 1979). Still, people continually overestimate how much they can complete in a given timeframe even after failing at the same task in the past (Kahneman & Tversky, 1979). Additionally, people's predictions of their own versus others' completion times suggests that people are relatively unaware of the obstacles that they might face in the course of

completing a task. People focus narrowly on the task at hand when they are planning for themselves but tend to focus more abstractly when planning someone else's completion times, considering multiple factors that may affect their performance (Beuhler et al., 1994). Thus, one reason why people may be optimistic about the future is because people tend to be poor at accounting for situational factors that may thwart their success. Moreover, the fundamental attribution error (e.g., Jones, & Davis, 1965; Kelley 1967) can be applied to optimism about future self-control, such that people may be more likely to regard past prediction failures to external, transient, and specific factors (e.g., Buehler et al., 1994). Instead of learning from past failures, people may disregard negative past experiences in their predictions or may blame their failures on external factors rather than on internal factors, such as fluctuating motivation or lack of skills (Buehler et al., 1994; Taylor & Brown, 1988).

In addition to neglecting past experiences and trying to maintain positive self-evaluations, temporal distance plays a role in people's thoughts about the future. People think differently about near and far events; that is, thinking about tomorrow is different than thinking about a da next month. Temporal construal theory states that distant events are construed abstractly and are known as high-level construals, and events that are closer in time are construed as concrete and specific and are known as low-level construals (Trope & Liberman, 2003). People who are in a high-level construal (i.e., thinking about why they pursue a goal-related action) tend to exert more self-control in the present than people who are in a low-level construal (i.e., thinking about how they pursue a goal-related action; Fujita, Trope, Liberman, & Levin-Sagi, 2006). On the contrary, being in a high-level construal may not be effective when people are thinking of the difficulty of exerting self-control in the future. Thinking abstractly about the future should decrease predictions of difficulty and the actual likelihood of self-control in the future. For

instance, the details of a temporally proximal event are more salient than a more distant event, and as a result, temptations may be more vivid. Trying to resist a slice of homemade chocolate cake right now versus next month exemplifies this theory. Being in front of the cake, the details of the cake are salient because you can see and smell the cake. The features of the cake are not as salient when you think about facing the cake in the future, and as a consequence, one may think that when the future becomes now, one will not be as tempted. Because thinking about temporally distant events tends to be abstract, people may be less likely to think about how the temptations will actually feel when they face them in the future. Based on the theory behind temporal construal, Study 3 will address how the details of a temptation in the future affect predicting future self-control.

I hypothesize that thinking abstractly about future self-control efforts may be maladaptive. When people think of the future, they make predictions by imaging the event as occurring now and then edit their predictions based on displacements in time, in essence, temporally correcting for the event (Gilbert et al., 2002). Thus, more distant events may be harder to predict compared to less distant events (Gilbert et al., 2002), and the farther away a task or an event is, the more likely a prediction about it will be inaccurate. Furthermore, it takes more cognitive resources to think of far future events compared to near future events (Becker & Mulligan, 1997), and far future events that require more cognitive resources can lead to a reduced valuation of the far future event (Ebert, 2001). These findings suggest that when people are predicting self-control needed for the distant future, they may be more inaccurate due to the lack of resources needed to construct what the situation may be like and may not value the event or value pursuing self-control for a goal that is so distant.

**Individual Differences in Forecasting Self-Control**

People tend to view immediate rewards differently than delayed rewards; that is, people tend to choose indulgence in the present instead of waiting to indulge later Ainslie & Haslam, 1992). This difference can be measured through delay discounting, which determines impulsive decision-making with one's preference for smaller but immediate rewards compared to larger delayed rewards (for a review see Green & Myerson, 2004). People who are more impulsive, such as pathological gamblers and alcoholics, tend to prefer the immediate reward and have a higher discounting rate (MacKillop, Anderson, Castelda, Mattson, & Donovick, 2006; MacKillop et al., 2011; Madden, Petry, & Johnson, 2009). Additionally, research using fMRI shows that there are actually two separate neural systems that are involved in making decisions for the present versus for the future (McClure et al., 2004). Certain areas in the limbic system are activated when people make decisions regarding immediate rewards, whereas areas in the prefrontal cortex are activated when choices are made that involve a delay in rewards (McClure et al., 2004). Overall, people who are impulsive have stronger automatic tendencies that may interfere with their ability to be successful at self-control. Impulsive individuals may also be unable to predict how much self-control they will need in the future since they do not have a tendency to exert self-control in the past.

Furthermore, individuals likely vary in their predictions of how hard it will be to resist a temptation in the future, as the research on gamblers suggests. Previous research has identified discounting as being domain-specific (Chapman, 1996), possibly due to within-person differences in temptation strength (Tsukayama & Duckworth, 2010). People who find a temptation to be strongly tempting will be more likely to prefer to indulge in the temptation sooner than people who do not find the temptation as strong (Tsukayama & Duckworth, 2010).

For instance, someone may show stronger discounting patterns for resisting candy than for motivating oneself to go to the gym because for that person, the temptation of candy is stronger than the temptation to avoid the gym. Thus, individual differences in temptation strength are likely to be important to consider when understanding how people predict future self-control efforts.

Additionally, focalism may play a role in future predictions of self-control. Remember that focalism as applied to affective forecasting is focusing on one specific event and overestimating its effect on emotions. Applying focalism to forecasting self-control, focusing on the outcome of a goal or task and not thinking about the process needed to arrive at goal attainment may be one reason people are not accurate at predicting their future self-control. People who solely focus on the outcome of a goal may neglect important information that is needed to assess how difficult the goal may be to achieve. Thus, people who think of their goals in terms of the processes needed to achieve the goal rather than just focusing on the goal outcome should be better at forecasting self-control.

Furthermore, individuals who are effective at self-regulation (i.e., who have high self-regulatory skill) may be more accurate at forecasting future self-control compared to individuals who are less effective at self-regulation. Self-regulation is the collection of processes that are directed at one's self and one's environment to accomplish goals (Boekaerts, Maes, & Karoly, 2005). Self-control is one specific aspect of self-regulation (vanDellen, Hoyle, & Miller, 2011), namely it is the conscious, effortful override of a dominant response (e.g., Tangney, Baumeister, & Boone, 2004). Because effective self-regulators tend to be successful at goal pursuit, they may be better at predicting future self-control due to making plans that increase the likelihood of self-control success. In a recent study, participants with high self-regulatory skill planned to complete

difficult tasks earlier in the day compared to participants with low self-regulatory skill, who planned to put off the harder tasks for later in the day (Delose, vanDellen, & Hoyle, 2013). Additionally, people with high self-control tend to be better at seeing the value of future self-control (Ein-Gar, Goldenberg, & Sagiv, 2012), and thus they may not be as likely to discount the difficulty that future self-control challenges will carry.

Effective self-regulators may also be more accurate because they have more experiences and strategies of success from which to draw from when making predictions about future self-control). Related to the planning fallacy (Kahneman & Tversky, 1979), since people with less effective self-regulation have more past experiences of not exerting self-control, they should be even more inaccurate in predicting self-control for the future. On the contrary, effective self-regulators should have more past experiences of succeeding at self-control, thus if they use comparable past experiences to predict the future of their self-control efforts, then these experiences should help them make accurate predictions (Buehler et al., 1994).

In general, people tend to think that they are better than the average person (Guerin, 1994; Headey & Wearing, 1987; Hoorens, 1995), and as stated earlier, people tend to be optimistic about their future emotions and future actions. Of course, some people are more optimistic than others. A specific aspect of optimism focuses on thinking one is generally able to complete tasks and overcome encountered challenges. Schweizer & Koch (2001) define self-efficacy optimism as the tendency to expect positive outcomes of ones' own behavior. I expect that people who are high on self-efficacy optimism will be less accurate about the difficulty of exerting self-control in the future. Thinking that one is able to successfully complete tasks in general may cause one to think little about a future task they will have to complete, and it may be harder than expected since one didn't worry about their performance on the task.

Moreover, regulatory focus theory distinguishes between two independent self-regulatory orientations: prevention and promotion. A prevention focus is concerned with non-losses, avoiding losses, and on responsibility and safety; a promotion focus is concerned with approaching gains, avoiding non-gains, and on achievement (Higgins, 1997). Therefore, people who tend to be high on a promotion focus, compared to low, may be more accurate because they want to make sure they succeed at the task. Since they are focused on achievement, they may be better at coming up with obstacles that could get in their way of being successful.

In sum, although in general people may not be able to predict how difficult it will be to exert self-control in the future, there may be certain individual differences linked to accuracy of predictions. Such differences may be impulsivity, temptation strength, thinking of goals in terms of the process versus outcome, level of self-regulatory skill, level of self-efficacy optimism, and a chronic promotion regulatory focus. The present studies will address some of these individual differences.

**The Present Studies**

Whether it is predicting how much self-control a dieter will need to resist a favorite dessert an hour from now or how much self-control a student will need to exert to study for the GRE in a month, determining if the task will be easy or difficult in the future is a complex endeavor. Overall, there is evidence suggesting that people may be optimistic about their future self-control efforts. Drawing on temporal construal theory, I expect that people will overestimate how easy it will be to exert self-control in the future, with optimistic evaluations of self-control efforts increasing as time increases (Hypothesis 1). Furthermore, I predict that temporal distance will influence the accuracy of those predictions (Hypothesis 2). I hypothesize that the details given about a temptation will influence predictions of future self-control and the accuracy of

those predictions, such that the less information known about a temptation, the greater the optimism about future self-control efforts and the less accuracy (Hypothesis 3).

Finally, I expect that some people may be more accurate in their predictions of future self-control events. Specifically, I propose individuals who are low on self-efficacy optimism will have lower ratings of difficulty of exerting self-control in the future compared to individuals high on self-efficacy optimism (Hypothesis 4). Effective self-regulators, individuals with high self-regulatory skill, should also be less optimistic about future self-control efforts compared to less effective self-regulators (Hypothesis 5). Additionally, focusing on goal outcomes compared to the processes involved in goal pursuit may lead to increased optimism about future self-control efforts (Hypothesis 6), and a chronic high promotion focus should be related to less optimistic predictions (Hypothesis 7).

The purpose of Study 1 was to examine how people view the difficulty of exerting self-control in many different domains over various temporal distances. Studies 2 and 3 determine whether people are accurate in their predictions of how difficult it will be to exert self-control in the future. Participants predicted the difficulty of completing math problems (Study 2) and resisting dessert (Study 3) and after being faced with the relevant self-control dilemma, I measured the actual difficulty of exerting self-control through both self-reports and observation. In Study 2, the amount of time between predictions and completing the problems was manipulated. In Study 3, the information given about the temptation they may face was manipulated. These studies investigated two different self-control contexts, one that requires one to persist on a task (initiation) and one that requires resistance of a temptation (inhibition).

# CHAPTER 2

## STUDY 1

Study 1 investigated whether or not individuals' predictions of future self-control vary based on temporal distance, specifically testing that temporal distance is associated with predicting that self-control will be less difficult to exert (H1). Study 1 also addressed individual differences in discounting future self-control—self-regulatory skill, as operationalized as scores on two measures of trait self-control, self-efficacy optimism, focusing on goal outcomes versus goal processes, and a chronic promotion regulatory focus. These variables are examined as moderators of the relationship between future self-control predictions and temporal distance.

In addition, Study 1 addresses the question of whether or not perceptions of exerting self-control are domain-specific or domain-general. Previous research shows that temporal discounting is domain-specific (Chapman, 1996; Tsukayama & Duckworth, 2010). However, it is not known whether predicting self-control for the future is domain general or domain specific. This study examines self-control in an array of domains, examining whether predictions of self-control differ from one domain to another.

### Method

#### Participants.

Participants were 121 undergraduate students (88 female) from the University of Georgia's research participation pool and self-selected into the study for credit as part of a course requirement. The entire session for each participant lasted approximately 30 minutes. Eight participants were omitted from analyses either from failure to pay attention or because they were

not fluent in English, leaving the total sample at 113 participants (83 female). The average age of participants was 18.92 years (*SD* = 1.55) and ranged from 17 to 27 years. Participants reported being White (61.95%), Asian (including Indian; 15.93%), Black (15.04%), Hispanic and Multiracial (6.19%), and one participant did not indicate race.

**Procedure.**

Participants came into the lab and were seated at a computer. Using Medialab software (Jarvis, 2008), participants rated their current feelings of tiredness and their overall mood. Next, they rated how difficult they predicted it would be to complete tasks that potentially require self-control (e.g., not skipping class). They rated each of the six tasks for seven different time points. The order of presentation of the tasks and time points was randomized for each participant. After rating the different tasks, participants completed questionnaires of self-regulatory skill, self-efficacy optimism, regulatory focus of prevention and promotion, goal commitment, action versus state orientation, and goal focus in terms of the process versus the outcome. Last, participants indicated demographic information and were debriefed.

**Measures.**

***Tiredness and mood.*** Measures of current tiredness and mood were included because individuals tend to refrain from exerting self-control when in a negative mood, such as feeling anxious or depressed (Tice, Bratslavsky, & Baumeister, 2001). Participants in a negative mood may view future self-control difficulty differently from participants in a positive mood.

Six items assessed participants' current state of feeling tired: "I feel drained right now," "I feel tired right now," "I feel physically tired right now," "Today I have a lot on my plate, more than usual for me," "I feel sleepy right now," and "I feel mentally exhausted right now." Participants rated the items using the scale 1 (*strongly disagree*) to 7 (*strongly agree*).

Additionally, a one item measure of mood was asked: "Overall, my mood is:" and participants selected a number from 1 (*very unpleasant*) to 11 (*very pleasant*).

***Predictions of future self-control.*** The dependent variables in this study were participants' predictions of difficulty of exerting self-control for six tasks at different time points. Participants were instructed to "Imagine that these tasks are things that you really would do and would do in the time frame that is given. For instance, even if you might not be in school now, in a week, or in six months, imagine that you are and that you have to decide whether or not to skip class." The six tasks that participants rated were not skipping class, resisting a favorite dessert, waking up earlier than usual, going to the gym, reading a long text, and not buying something they wanted.

Each of the six tasks above were presented for seven different time periods—now, in 30 minutes, in one hour, tomorrow, in one week, in one month, and in six months. The order of the different tasks and time periods were in random order for each participant. In total, participants made predictions of future self-control for 42 scenarios. Examples include, "Imagine you are shopping right now. How hard would it be to keep yourself from buying something you really want (e.g., clothes, apps, video games, etc.)?" and "Imagine that in one week you will have to wake up earlier than your usual wakeup time. How hard would it be to make yourself get up earlier?" Participants indicated their predictions using the scale 1 (*extremely easy*) to 5 (*extremely hard*).

***Regulatory focus.*** Participants completed ten items that address a person's primary tendency to focus on approaching gains or avoiding loses (Lockwood, Jordan, & Kunda, 2002). An example promotion item is "I often imagine myself experiencing good things that I hope will happen to me", and an example prevention item is "I see myself as someone who is primarily

striving to become the self I "ought" to be - to fulfill my duties, responsibilities, and obligations". Participants indicated their response using the scale 1 (*not at all true*) to 9 (*completely true*).

***Self-efficacy optimism scale.*** Participants answered ten items that addressed the tendency to expect positive outcomes of ones' own behavior (Schweizer & Koch, 2001). Example items include "No task is too difficult for me" and "I welcome every new challenge". The scale points for this measure are 1 (*incorrect*), 2 (*partly correct*), 3 (*almost correct*), and 4 (*completely correct*).

***Self-regulatory skill.*** Participants completed two separate measures of self-regulatory skill, operationalized as past success at self-control. The 13-item Brief Trait Self-Control Scale (Tangney et al., 2004) was used, and participants rated the extent to which they endorsed each statement using the scale 1 (*not at all like me*) to 5 (*very much like me*). Items include, "I am good at resisting temptation" and "I do certain things that are bad for me, if they are fun (reverse scored)." Higher scores indicate higher trait self-control ($M$ = 3.16, $SD$ = 0.66, $\alpha$ = .83).

Additionally, a 20-item measure that distinguishes between self-control inhibition and self-control initiation was used (Hoyle & Davisson, 2013). An example of an inhibition item is "I have trouble resisting my cravings (reverse scored)", and an example initiation item is "I waste a lot of time before getting down to work (reverse scored)". Participants indicated their responses to each item using the scale 1 (*hardly ever*) to 5 (*nearly always*). Again, higher scores indicate higher self-control ($M$ = 3.27, $SD$ = 0.61, $\alpha$ = .90). Because both measures of self-control (Tangney et al., 2004 & Hoyle & Davisson, 2013) were highly correlated, $r$ = .79, $p$ <.0001, an index of self-regulatory skill was created by averaging scores across measures.

***Goal commitment.*** Items were created to assess participants' level of commitment to each task domain. The six items were "Being financially responsible is important to me," "Being

a good student is important to me," "Not wasting time by oversleeping is important to me," "Maintaining my health through good diet is important to me," "Maintaining my health through exercise is important to me," and "Reading for school is important to me". Participants indicated their responses using the scale 1 (*strongly disagree*) to 7 (*strongly agree*).

***Action-state orientation scale.*** The Action-State Orientation Scale (ASC-90) determines whether an individual is more likely to respond to a situation through action or by focusing on an internal state (Kuhl & Beckmann, 1994). The ASC-90 reflects one's ability to use mental processes under demanding situations, instead of motivation or capacity (Jostmann & Koole, 2006). In Study 1, the ASC-90 was used to explore if scores on the scale are related to how an individual predicts the difficulty of exerting self-control in the future.

Participants read 36 statements that each described a certain situation, and they selected one of two options that represented how they would respond to the situation, one option indicating action orientation and the other representing state orientation. There are three subscales of the Action-State Orientation Scale, with 12 items per subscale: action orientation subsequent to failure vs. preoccupation (AOF), prospective and decision-related action orientation vs. hesitation (AOD), and action orientation during successful performance of activities (intrinsic orientation) vs. volatility (AOP). An example of an AOF item: "When I've worked for weeks on one project and then everything goes completely wrong:" with options "A) It takes me a long time to get over it" and " B) It bothers me for a while, but then I don't think about it anymore"; an example of an AOD item:" When I know I must finish something soon", with options: "A) I have to push myself to get started" and "B) I find it easy to get it done and over with"; and an example of an AOP item: "When I'm working on something that's important

to me:" with options "A) I still like to do other things in between working on it" and " B) I get into it so much that I can work on it for a long time".

To score the subscales, participants received one point for choosing the option that reflected action-oriented answers. The number of points were added together for each subscale, with a range of 0 to 12 per subscale; thus, higher numbers indicated greater action orientation based on varying situations.

***Goal process versus outcome.*** Five items were created to assess whether a person is more likely to think of the steps involved in accomplishing a goal or more likely to focus on the end result. The items were: "When I think of goals I want to pursue, I focus on how I will accomplish the goals more than how I will feel after I complete them," "When I am thinking of difficult tasks I have to complete, thinking of the process involved in completing them is more helpful to me compared to focusing on the outcome," "I often think of the goal I have to complete in terms of the finished state rather than the steps involved to complete it (reverse scored)," "I am more motivated to complete a task when I imagine accomplishing the goal compared to imaging all the steps I need to complete (reverse scored)," and "I approach future goals by focusing on the end result more so than focusing on the process (reverse scored)". Participants indicated their level of agreement using the scale, 1 (*strongly disagree*) to 7 (*strongly agree*), and higher scores represent thinking of goals in terms of the process involved in achieving the goal.

***Funneled debriefing and suspicions.*** To ensure that participants were unaware of the hypotheses, participants were asked if they had any suspicions and to guess what they thought was the hypothesis (Bargh & Chartrand, 2000). None of the participants indicated that they were aware of the hypotheses.

## Results

**Descriptive statistics.** Table 1 indicates descriptive statistics for all variables and Pearson's *r* between variables. Of note, self-regulatory skill was negatively related to current level of tiredness and positively related to current mood. Self-regulatory skill was negatively related to prevention and was positively related to a promotion focus. Self-efficacy optimism (SEO) was correlated with self-regulatory skill, and the AOD subscale of the Action-State Orientation Scale was correlated with self-regulatory skill.

Table 2 shows descriptive statistics and Pearson's *r* between commitment to each domain and average predictions of exerting self-control in each domain across the seven time points. On average, participants felt highly committed to each domain. Except for the domains of resisting a food temptation and resisting the urge to spend, the other four domains exhibited a negative correlation between the amount of commitment to the domain and the amount of self-control needed. Thus, the more committed participants' were to a specific goal domain, the easier their predictions of exerting self-control in the future.

**Perceptions of time across domains.** To assess whether or not predictions of difficulty of exerting self-control in the future decrease over time, I aggregated participants' difficulty ratings across the six goal domains to examine how predictions across domain differ as temporal distance increases. As Figure 1 shows, there is a negatively sloped line. There was a main effect of time, $F$ (6, 112) = 9.46, $p < .001$, and the line was linear, $t$ (112) = 7.15, $p < .001$.

Next, I graphed participants' predictions of self-control for each goal domain for the seven time points. As Figure 2 shows, there is a negatively sloped trend for the domain of class, wakeup, gym, read, and dessert. To test the main effect of time for each domain, separate analyses were conducted for each domain. Using Proc Mixed in SAS, participant and time were

treated as repeated variables. For all six domains, there was a main effect of time for predictions of future self-control (see Table 3).

I completed contrast tests to determine if each line was linear and to determine if time that is nearer differs from time that is farther away. To test for linearity, a contrast was created by coding each time point. The coding scheme I used was [3 2 1 0 -1 -2 -3]. As can be seen in Table 3, all of the domains, except for spending, produced a significant linear effect, indicating that as temporal distance increases participants' ratings of difficulty of exerting self-control decreases. Additionally, I created a code to test the effects of time that is nearer versus time that is farther away using the coding scheme [0.75 0.75 0.75 0.75 -1 -1 -1]. Now, 30 minutes, one hour, and tomorrow were coded to represent near time points, and one week, one month, and six months were coded as far time points. For all domains, except for spending, there was significant effect of future self-control on near versus far time points (see Table 3 for significance test values). Additionally, averaging across all goal domains, near time points differed from far time points, $t$ (112) = 7.15, $p < .001$.

**Collapsing across domains and individual differences.** Next, I conducted similar repeated measures analyses to examine the effect of potential individual differences on predictions of future self-control. The criterion variable—predictions of future self-control, was averaged across all domains to represent an overall difficulty of future self-control. Each individual difference measure was entered as a main effect in each model and interactions with the individual difference measure were also examined. First, focusing on the processes involved in pursuing goals compared to the goal outcomes did not influence predictions of difficulty over time, $F$ (6, 111) = 0.90, $p$ = .50 (H6). Additionally, all subscales of the Action State Orientation Scale did not influence participants' predictions of difficulty of self-control over time, $F$s < 1.14,

*p*s >.34. A prevention focus did not influence participants' difficulty of self-control over the time, $F$ (6, 111) = 1.59, $p$ = .16. However, there were significant interactions between time and self-regulatory skill, time and self-efficacy optimism, and a promotion focus. These analyses are separated below. Including mood as a covariate did not change the effects.

***Self-regulatory skill.*** Self-regulatory skill and time interacted to influence predictions of difficulty; there was a marginally significant interaction between time and self-regulatory skill on difficulty of future self-control, $F$ (6, 111) = 1.96, $p$ = .08. Following Cohen, Cohen, West, and Aiken (2003), the interaction was plotted one standard deviation above and below the mean on self-regulatory skill. Figure 3 shows that regardless of self-regulatory skill, predictions for future self-control decreased over time, but participants with low self-regulatory skill exhibited a steeper linear decrease in the amount of self-control needed in the future, $F_{low}$ (6, 111) = 7.70, $p$ <.0001 than did high self-regulators, $F_{high}$ (6, 111) = 3.78, $p$ = .002.

***Self-efficacy optimism.*** In addition, self-efficacy optimism (SEO) and time interacted to influence predictions of future self-control, $F$ (6, 111) = 2.99, $p$ = .01. Figure 4 shows that predictions for future self-control decrease over time, but participants with low levels of SEO exhibited a shallower linear decrease in the amount of self-control needed in the future, $F_{low}$ (6, 111) = 5.67, $p$ < .0001 than did participants with high SEO, $F_{high}$ (6, 111) = 6.70, $p$ < .0001

***Promotion focus.*** In addition, a promotion focus and time interacted to influence predictions of future self-control, $F$ (6, 111) = 2.84, $p$ = .01. Figure 5 shows that participants with low levels of promotion focus exhibited a steeper linear decrease in the amount of self-control needed in the future, $F_{low}$ (6, 111) = 8.97, $p$ < .0001, than did participants with high levels of promotion focus, $F_{high}$ (6, 111) = 3.57, $p$ = .003.

**Commitment to domains.** Next, I assessed whether being committed to the specific domains influenced predictions of self-control over time. Again, I used Proc Mixed analyses in SAS to examine the difficulty of exerting self-control in the future as a repeated measure criterion. The predictors were time (repeated measure) and commitment to each domain. Both predictors were continuous variables. Six analyses were conducted, one for each goal domain. Results showed that only the goal domain of resisting dessert produced a marginally significant interaction between commitment and time, $F$ (6, 111) = 2.03, $p$ = .07. As can be seen in Figure 6, participants with low commitment to healthy eating exhibited a decrease in predictions of difficulty over time, $F_{low}$ (6, 111) = 4.90, $p$ = .0002. However, participants high on commitment to eating healthy did not show a linear effect of time, $F_{high}$ (6, 111) = 1.70, $p$ = .13. For the other five domains, there was not a significant interaction between time and commitment on difficulty of future self-control, $F$s = 0.35-1.16, $p$s > .33.

**Discussion**

Results of Study 1 show that predictions of future self-control decrease linearly over time. Collapsing across goal domains to create an index of the average difficultly showed that for each time point, predictions of future self-control difficulty decreased over time. Furthermore, this negative relationship between predictions of self-control and temporal distance was present for five out of the six goal domains examined—resisting dessert, waking up earlier than usual, studying, exercising, and reading. Additionally, predictions of self-control differed based on being closer in time compared to being more distant in time for all goal domains except for spending.

Support was found that individual differences matter for predictions of future self-control difficulty (H4, H5, and H7). Across all seven time points, participants with low and high self-

regulatory skill differed in their predictions of difficulty. Even though all participants demonstrated linear decreases in difficulty predictions, people with high self-regulatory skill were less likely than low self-regulators to discount difficulty of self-control over time. Participants with high self-regulatory skill started with lower predictions than those with low self-regulatory skill, but that may reflect that they have more past experiences successfully pursuing their goals. Participants high on self-efficacy optimism were more likely to discount how difficult it would be to exert self-control across domains compared to those low on self-efficacy optimism. Furthermore, participants with a low promotion regulatory focus discounted the difficulty of future self-control to a higher degree than participants high on promotion.

Results also show some support for domain specificity of self-control. These analyses show that people think of self-control domains differently, supporting the idea that self-control is domain specific not domain general. Predictions of future self-control differed in the goal domains, with the tasks of resisting skipping class, going to the gym, and waking up earlier than usual as, on average, being less difficult to complete over time compared to the other goal domains. Additionally, in the domain of eating healthy foods, participants' commitment to resisting a favorite dessert influenced predictions of difficulty over time. Highly committed participants did not show a linear of effect of time, suggesting that being highly committed to eating healthy foods may buffer against optimism of future self-control. Participants low on commitment to eating healthy foods did show linear effects of time, suggesting that over time, predictions of the difficulty of exerting self-control in the future decreased.

Study 1 provides strong evidence that people tend to think that it will be easier to exert self-control the farther away it is in time. Evidence was also found for individual differences in predictions of difficultly of exerting self-control in the future, namely self-regulatory skill, self-

efficacy optimism, and a promotion focus. Although Study 1 showed that people are optimistic about their future self-control as temporal distance increases, Study 1 did not address the accuracy of these predictions. Therefore, Study 2 addresses this concern.

# CHAPTER 3

## STUDY 2

In this experiment, participants made predictions about the difficulty of completing math problems in the future. The time that they completing the survey was manipulated such that they completed the survey either one day, three days, or one week prior to their lab session. Then, participants came into the lab and were faced with the math problems. Afterwards, they were asked to give subjective ratings of how hard the problems were and how tired they felt. More importantly, an objective measure of actual difficulty, operationalized by state depletion as assessed by the Stroop Task (MacLeod, 2005) was employed. The Stroop Task has been used in many studies to measure participants' state self-control. Self-control is limited in capacity, and someone who has exerted a lot of self-control will deplete this capacity (Baumeister et al., 1998). Therefore, the Stroop Task was administered to assess whether or not participants' predictions of how difficult it would be to exert self-control matched how depleted they felt after completing the math problems.

### Method

#### Participants.

Participants were undergraduates from the research participation pool at the University of Georgia. They self-selected into the two-part study, and received credit for a course requirement. Participants were asked to complete a survey prior to their lab portion and within a specific time frame. Participants who did not complete the survey in the required time frame were emailed prior to their lab session and were told they were not eligible for the lab portion.

Of the participants who completed the survey, eight did it later than asked, six participants missed more than one attention filter, and five participants completed the survey but either cancelled their second portion or did not show up for their schedule lab timeslot. Additionally, one participant indicated being colorblind and three participants guessed the hypothesis of the study.

After all these exclusions, a total of 73 (86.3% female) participants were left. Because the sample size only included ten males, and they were not approximately even across conditions (six in one day, three in three day, and zero in one week), we excluded males from analyses, resulting in a total of 63 participants. Twenty-four participants (38.10 %) were in the one day condition, nineteen participants (30.16 %) were in the three day condition, and twenty participants (31.75 %) were in the one week condition. The age range of participants was 17 to 32 years ($M$ = 19.03, $SD$ = 1.99). Most participants reported being White (79.37 %); the remainder were Asian (including Indian; 7.93 %), Black (7.94 %), or Hispanic (4.76 %). All participants indicated that they were fluent in English.

**Procedure.**

***Survey portion.*** Participants partook in a two part study ostensibly about how people solve certain kinds of math problems. After signing up for a specific time to come into the lab, participants were emailed a survey. The survey site used was Qualtrics, and participants were sent the survey based on random assignment of a time condition: participants were sent the survey either one day, three days, or one week prior to their scheduled lab portion. For instance, participants in the one week condition received the link one week before their session and were asked to complete the survey within the next 24 hours. Likewise, participants in the one day condition received the survey link one day before their session and were asked to complete it

within the next 24 hours. The survey software collected the date and time participants completed the survey to verify that they completed the survey as requested. The average completion time of the survey was 22.94 minutes (*SD* = 23.20 minutes).

After providing consent, participants made predictions about the difficulty of completing math problems during their scheduled lab portion. Next, participants indicated how tired they currently felt and their overall mood. Then, participants completed measures of self-efficacy optimism, goal process versus outcome, self-regulatory skill, and promotion and prevention focus. Participants also rated how much they enjoy math problems. Last, participants completed demographic questions and indicated their prior standardized test scores.

***Lab portion.*** For the second part of Study 2, participants arrived at the lab and were asked to leave all of their belongings, including their phone, and were taken to a different room. They were seated at a table with a packet of 3-digit multiplication problems and pencils. The packet of 3-digit multiplication problems contained 24 problems on each page and there were four pages total, resulting in 96 problems. Participants were left alone and were told, "The next part of the study involves completing multiplication problems without a calculator. The packet is long, but please work on it as long as you can. When you have done as many problems as you can, please come get me". Unbeknownst to participants, each participant was timed for 20 minutes, and if the participant did not come back to the experimenter before the 20 minutes was up, the experimenter went back to the participant and said, "Please stop working on the multiplication problems at this time. We have a few more things for you to complete, and I don't want you to be here longer than your scheduled appointment".

At this point, the experimenter collected the packet of math problems and administered the Stroop Task. Afterwards, participants rated how tired they felt and their current mood. Next,

participants completed a subjective measure of the math problem task. Last, participants indicated any suspicions and were asked to guess the hypothesis of the study, and then they were debriefed.

**Measures.**

***Predictions of future self-control.*** Participants were presented with eight items to rate how difficult it would be to complete math problems, depending on the condition they were randomly assigned to. The instructions given said, "Tomorrow (in three days, in one week), during your experimental session, one of the things we will ask you to do is to solve some math problems. We'd like you to tell us what kinds of expectations you have for how it will be to complete the problems. Please indicate your agreement with each statement below." The items were "Completing 3-digit multiplication problems tomorrow (in three days, in one week) will be difficult," "Persisting on the math problem task tomorrow will be difficult," "It will be easy to complete the math problems tomorrow (reverse scored)," "I will probably find the idea of quitting the math problems tempting," "I will be happy to complete the math problems (reverse scored)," "I will need a lot of mental energy to complete the math problems," "I will feel drained after completing the math problems," and "I will be able to complete the math problems (reverse scored)." Participants rated the items using the scale 1 (*strongly disagree*) to 7 (*strongly agree*). Higher numbers on the scale indicate predictions that the math problems will be more difficult and will require self-control to persist. In general, participants viewed the math problems to be relatively easy to complete and not depleting ($M$ = 3.16, $SD$ = 1.09).

***Tiredness and mood.*** As in Study 1, six items were given to assess participants' current state of feeling tired either due to lack of sleep or from feeling depleted, "I feel drained right now," "I feel tired right now," "I feel physically tired right now," "Today I have a lot on my

plate, more than usual for me," "I feel sleepy right now," and "I feel mentally exhausted right now." Participants rated the items using the scale 1 (*strongly disagree*) to 7 (*strongly agree*). Feeling more tired is indicated by higher numbers on the scale. Additionally, a one item measure of mood was asked: "Overall, my mood is:" and participants selected a number from 0 to 20.

***Self-regulatory skill.*** As in Study 1, two measures of trait self-control were used to operationalize self-regulatory skill. Again, the Tangney et al. (2004) scale ($M$ =3.43, $SD$ = 0.62) and the Hoyle & Davisson (2013) scale ($M$ =3.41, $SD$ = 0.63) were highly correlated, $r$ = .77, $p$ <.0001. Thus, they were aggregated to create an index of self-regulatory skill.

***Goal process versus outcome.*** As in Study 1, participants completed the five items measuring tendencies to think of goal pursuit as a process or as the final outcome.

***Math enjoyment.*** Participants rated the extent to which they find math important and enjoyable. The five items were "Being good at math is important to me," "I enjoy working on math problems," "I avoid doing math as much as possible (reverse scored)," "The only reason I take math courses is because I have to (reverse scored)," and "I find it difficult to make myself work on math problems (reverse scored)." They rated their agreement using the scale 1 (*strongly disagree*) to 7 (*strongly agree*), with higher scores on this measure indicating greater math enjoyment.

***Math ability.*** Math ability was operationalized as scores on the SAT math section. Participants were asked to indicate their highest SAT math score earned and their highest ACT math score. Most participants indicated an SAT math score, but for those who did not indicate a SAT math score but indicated an ACT math score, a SAT score was gathered by using a score converter. Eight participants did not report a SAT or an ACT math score.

***Multiplication problems.*** All but four participants worked on the math problems for the full 20 minutes. The range of number of attempted math problems was 7 to 72 (*M* = 26.73, *SD* = 11.23), but on average, participants correctly answered only 18 math problems.

***Stroop task.*** The Stroop Task is a measure of state self-control (MacLeod, 2005). In this task, participants are presented with a card that has words printed in different color inks. Participants are asked to read the color of the ink for each word printed, and as quickly as possible without making mistakes. They are told they will be timed and that the timer will start as soon as they start reading out loud. While the participant reads the words, the experimenter follows along on a sheet with the correct answers, marking any mistakes and timing the participant's completion of the task.

There are two trials on the Stroop Task. The first trial only presents words and color inks that are congruent (e.g., the word blue is in blue ink). The second trial presents both congruent and incongruent words and ink colors. Thus, it is more difficult to say the color of the ink on incongruent trials (i.e., the word blue is in yellow ink). Participants who are in a state of greater self-control depletion should do worse on the second trial, such that they should be slower and/or make more mistakes. Four pieces of data are collected during the Stroop Task—time on trial one, time on trial two, mistakes on trial one, and mistakes on trial two. On average, participants took 26.11 (*SD* = 5.47) seconds to complete the first trial, and all participants made no mistakes. On trial two, the average time was 32.95 (*SD* = 7.36) seconds, with an average of 0.98 (*SD* = 1.49) incorrect answers.

***Post-state tiredness and mood.***

Prior research suggests that subjective accounts, such as fatigue and mood are indicators of ego-depletion (Neal, Wood, & Drolet, 2013). Accordingly, participants' subjective levels of

tiredness after the math problems was assessed with the same six items measures current tiredness level in Study 1 and in the survey portion of this study. Because the item "Today I have a lot of my plate, more than usual for me" does not necessarily address depletion from the math problems and because it was not correlated with the other five items, this item was not included in the aggregation of tiredness items. Participants also rated their current mood using the same one item from the survey, but with the scale points ranging from -10 to 10.

***Math problems evaluation.*** Participants completed 33 items after the math problems to evaluate the task on a scale from 1 (*not at all true*) to 7 (*very true*). Using the Task Evaluation Questionnaire from the Intrinsic Motivation Inventory (citation), participants were asked to answer the 22 items, with four subscales: interest/enjoyment ("Doing the task was fun"; seven items, $\alpha = .94$), perceived competence ("I felt pretty skilled at this task"; five items, $\alpha = .92$), perceived choice ("I felt that it was my choice to do the task"; five items, $\alpha = .84$), and pressure/tension ("I felt tense while doing the task"; five items, $\alpha = .81$). On average participants found the task somewhat uninteresting ($M = 2.74$, $SD = 1.3$), felt skilled at completing the task ($M = 4.38$, $SD = 1.46$), felt it was their choice to complete the task, ($M = 4.85$, $SD = 1.44$), and did not feel much tension during the math problem task ($M = 2.84$, $SD = 1.18$)

Additionally, 11 items were created to assess how drained participants felt after completing the math problems and how difficult it was for them to persist on the math problems. Example items include "The task I completed was very draining", "I had to resist the urge to stop working on the math problems", and "The task I completed did not take much effort to complete (reverse scored)". Internal consistency was good, $\alpha = .89$, and on average participants reported that the math problems were not too difficult ($M = 3.26$, $SD = 1.17$; range).

## Results

**Data preparation.** A composite score of Stroop Task performance was created by first subtracting the time spent on the Trial 1 ($M$ = 26.10 sec, $SD$ = 5.47) from Trial 2 ($M$ = 32.95 sec, $SD$ = 7.36) and then standardizing the difference. Next, the number of incorrect answers on Trial 2 ($M$ = 0.98, $SD$ = 1.49) was standardized. Last, an average of the standardized time difference and the standardized number wrong on Trial 2 was calculated, representing overall Stroop Task performance. As lower scores on the composite indicate faster completion of the task and fewer errors, lower scores reflect better performance on the Stroop Task.

**Preliminary analyses.** Descriptive statistics for the variables are displayed in Table 4. In Table 5, Pearson correlations between variables are displayed. Of note, participants' level of self-regulatory skill was not related their predictions of the difficulty of completing the math problems, $r$ = -.14, $p$ = .26, nor was self-regulatory skill related to how much participants enjoyed doing the math problems, $r$ = .17, $p$ = .17.

Moreover, participants' level of tiredness when they made their predictions was not related to their predictions, $r$ = .20, $p$ = .11, and focusing on the process versus the outcome was not related to their predictions, $r$ = -.16, $p$ = .21, neither was a promotion focus, $r$ = -.18 $p$ = .15, nor a prevention focus, $r$ = .20, $p$ = .11. However, self-efficacy optimism was related to participants' predictions, $r$ = -.46, $p$ = <.0001, meaning that the more optimistic participants were in general self-efficacy, the easier they perceived the math problems to be. Additionally, participants' SAT math score was related to their predictions of the math problems, $r$ = -.26, $p$ = .06, indicating higher SAT math scores were related to predictions of less difficulty.

**Predictions of self-control.** Participants' current mood at the onset of competing the survey did not relate to their predictions of difficulty, $r$ = -.06, $p$ = .66. Contrary to predictions,

the amount of time between predictions and lab session did not relate to their predictions, $F$ (2, 60) = 1.40, $p$ = .26.

**Accuracy of predictions.** I used linear multiple regression between subjects design to examine the effects of the time condition and predictions of difficulty on the math problems on Stroop Task performance. Time of predictions (one day, three days, one week) was a categorical, independent variable, math problem predictions was a continuous, independent variable, and Stroop Task performance was a continuous, dependent variable. There was not a significant main effect of condition, $F$ (2, 57) = 1.19, $p$ = .31, nor was there a main effect of math problem predictions, $F$ (1, 57) = 1.36, $p$ = .25. The interaction between predictions and condition was marginally significant, $F$ (2, 57) = 2.96, $p$ = .06.

Including participants' enjoyment of math as a covariate in the model enhanced the interaction, $F$ (2, 57) = 4.00, $p$ = .02. Figure 7 shows the interaction plotted. There was a marginally significant positive relationship between predicted difficulty and Stroop Task performance in the one day condition, $t$ (56) = 1.72, $p$ =.09. However, in the three day condition, there was not a significant relationship between predictions of difficulty and Stroop Task performance, $t$ (56) = -1.54, $p$ =.13, nor was there a significant relationship in the one week condition, $t$ (56) = -1.12, $p$ =.27.

Furthermore, instead of using Stroop Task performance as the dependent variable, the amount of math problems participants answered correctly did not produce a significant time × prediction of self-control interaction, $F$ (2, 57) = 1.06, $p$ = .35. Moreover, subjective difficulty of the task as the dependent variable did not produce a significant time × prediction of self-control interaction, $F$ (2, 57) = 1.67, $p$ = .20, nor did participants' feelings of tiredness after the math

problems as the dependent variable produce a significant time x prediction of self-control interaction, $F$ (2, 57) = 0.39, $p$ = .68

**Individual differences in accuracy.** I examined whether certain individual difference measures interacted with predictions of difficulty on Stroop Task performance. There was not a significant SRS × predictions of difficulty interaction, $F$ (1, 59) = -1.37, $p$ = .18, nor SEO × predictions of difficulty interaction, $F$ (1, 59) = 0.48, $p$ = .63, nor a promotion regulatory focus × predictions of difficulty interaction, $F$ (1, 59) = 0.24, $p$ = .81, nor a process versus outcome goal focus × predictions of difficulty interaction, $F$ (1, 59) = 0.78, $p$ = .44.

## Discussion

Study 2 provided evidence that the amount of time between predictions of difficultly for completing math problems and actually completing the math problems is related to the accuracy of those predictions. Specifically, the more temporal distance between predictions and actual pursuit, the less accurate participants were about how difficult it would be to exert self-control. Participants who made their predictions only one day before coming to the lab to complete the math problems were pretty accurate at knowing how difficult it would be to complete the math problems, such that the more difficult they predicted the math problems to be the worse they did on the Stroop Task, a measure of objective depletion. Participants who made their predictions three days or one week before coming into the lab to complete the math problems were not at all accurate. Note that the differences in accuracy were not observed when using participants' subjective assessments of self-control exerted on the math problems.

People may only be accurate at predicting the difficulty of exerting self-control over very small time points. Study 2 shows that the difference between making a prediction one day before compared to three days can make a big difference in accuracy. Because Study 2 provided

evidence of the influence of time on predictions of future self-control difficulty, Study 3 addressed how the details of a future temptation influence predictions of future self-control difficulty. Additionally, Study 3 addressed predictions of self-control for a task in a different domain (i.e., resisting the temptation to eat an appealing dessert) and for a task that involved more inhibition of self-control compared to initiation of self-control.

# CHAPTER 4

# STUDY 3

The procedure in this experiment was similar to that of Study 2. Participants predicted the difficulty of resisting a food temptation for when they would complete their lab session. Instead of the time being manipulated, the details given about the temptation differed based on random assignment to a condition. They were either asked to rate the difficulty of resisting a dessert, chocolate cake, or chocolate cake with chocolate ganache frosting. Then, they came into the lab and were faced with chocolate cake with chocolate ganache frosting. Afterwards, they were asked to give subjective ratings of how hard it was to resist the cake and how tired they felt. Finally, the Stroop Task was administered.

## Method

### Participants.

Participants (119) were recruited from the research participation pool at the University of Georgia and self-selected into the study if they were female and received credit as part of a class participation requirement. Fifteen participants completed the survey portion but not the lab portion, two participants indicated that they were not fluent in English, and the first three participants were given a piece of cake double in size than the rest of the sample. Excluding these participants, the sample size was 99 females. Participants ranged in age from 18 to 29 years ($M$ = 19.52, $SD$ = 1.71). Participants reported being White (63.27 %), Asian (14.29 %), Black (16.32 %), Hispanic (3.06 %), other (3.06 %), and one participant did not indicate race.

**Procedure.**

***Survey portion.*** Participants were told that they would be participating in a two part study that was ostensibly about food preferences and puzzles, and they selected a specific timeslot indicated by date and time for which they would come in the for the lab portion of the study. Additionally, they were told that before they came to their lab session they would be asked to complete a survey emailed to them and to complete the survey prior to their arrival to the lab session. Last, they were told not to eat for at least two hours before coming to the lab session.

The average completion time of the survey was 20.71 minutes (*SD* = 22.89). After providing consent, participants were asked items about their current feelings of tiredness and their mood. Next, participants answered items about their predicted experiences for the lab portion of the study. Participants were randomly assigned to a temptation information condition, in which one of the items asked participants how hard they would find it to resist a dessert (N= 35), chocolate cake (N=29), or chocolate cake with chocolate ganache (N=35).

Next, participants completed measures of self-regulatory skill, self-efficacy optimism, process versus outcome questions, and prevention versus promotion focus. They also indicated their commitment to maintaining a healthy weight. Last, participants completed demographic items and indicted their weight and height.

***Lab portion.*** Prior to each participants' arrival, one of three female experimenters set up the room by placing a piece of cake on a paper plate that was previously weighted in ounces (*M* = 4.51, *SD* = 0.47), a fork, a water bottle, sharpened pencils, and three word search puzzles. Participants were greeted by an experimenter, who asked participants to leave all belongings and walked them to the set up room. Participants were told:

"In this study, we are interested in how different foods affect working on a cognitive task. You have been assigned to the food condition of chocolate cake. You will taste the cake while completing word search puzzles. In order to make sure every participant will spend the same amount of time on the task, we will leave you to work on the puzzles and sample the cake for 10 minutes. You must try at least some of the cake, but you may have as much cake as you like. Later in the study we will ask you questions about your opinions about the cake and puzzles. I will come back in the room after 10 minutes. Do you have any questions?"

Afterwards, the experimenter left the room and set the timer for 10 minutes. After 10 minutes, the experimenter went back into the room and asked the participants to move to the computer set up in the room in order to evaluate the cake and puzzles. The experimenter left the room again, and participants were asked to get the experimenter when they were done, who was sitting outside of the room. At that point, the experimenter came back into the room and administered the Stroop Task. Then, participants indicated when they last ate, and they completed a funneled debriefing measure. Participants were suspicious about a two way mirror in the room and the majority of participants thought that the hypothesis focused on how eating the cake affects cognitive performance on the puzzles. No participant guessed the hypotheses of the study. Last, participants read the debriefing form, and the experimenter walked them back to gather their belongings.

**Measures.**

***Tiredness and mood.*** As in Studies 1 and 2, participants rated their current feelings of tiredness using the items listed above. This time, they only completed the items "I feel drained

right now," "I feel physically tired right now," "Today I have a lot on my plate, more than usual for me," "I feel sleepy right now," and "I feel mentally exhausted right now".

To measure mood, participants completed the Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988), which asked participants to rate how 16 adjectives reflected how they felt at the present moment, using the scale 1 (*definitely do not feel*), 2 (*do not feel*), 3 (*slightly feel*), and 4 (*definitely feel*).

***Predictions of future self-control.*** Participants rated seven items that asked them to "Please read each of the questions below and answer them with regards to *how you think your experiences during the second part of this study will be*". The main item of interest was "When you come to the lab you may be tempted with dessert (chocolate cake, chocolate cake with chocolate ganache frosting). How difficult do you think it would be for you to resist eating more than you should of the dessert (chocolate cake, chocolate cake with chocolate ganache frosting)?" The other six items were included as filler items and to disguise the hypotheses. Examples of the other filler items: "How difficult will it be for you to stop worrying about your academic life during the study?" and "When you come to the lab you may be tempted with candy. How difficult do you think it would be for you to resist eating more than you should of the candy?" Participants indicated their responses using the scale 1 (*not at all difficult*) to 5 (*extremely difficult*).

***Self-regulatory skill.*** As in Studies 1 and 2, participants completed the Brief Self-Control Scale (Tangney et al., 2004; $M = 3.18$, $SD = 0.67$) and a revised Trait Self-Control Scale (Hoyle & Davisson, 2013; $M = 3.29$, $SD = 0.58$). The revised scale has three subscales: Inhibition, Initiation, and Continuation. The added Continuation subscale refers to being able to keep up with good self-control over time and being committed to keeping with good behavior ("After I

have started a challenging task, I find it easy to stick with it"). Combining across all subscales, the Hoyle & Davisson (2013) measure was highly correlated with the Brief Self-Control Scale (Tangney et al., 2004), $r = .83$, $p < .0001$. Thus, as in Studies 1 and 2, scores on both scales were averaged to represent an index of self-regulatory skill ($M = 3.23$, $SD = 0.60$, $\alpha = .96$).

***Tiredness and mood after cake and puzzles.*** Participants were asked the same six items from Study 2 to measure level or tiredness as in the survey portion of this study. For the purpose of analyses, only items that specifically address depletion were of interest ("I feel drained right now" and "I feel mentally exhausted right now"; $M = 3.51$, $SD = 1.60$, $\alpha = .90$).

***Commitment to healthy weight.*** Participants were asked two items regarding their commitment to being a healthy weight: "I am committed to maintaining a healthy weight" and "It is important to me to maintain a healthy weight". These items were combined to represent commitment to a healthy weight.

***Word search puzzles ratings.*** On average, participants found 18.37 words ($SD = 6.19$).Because the word search puzzles were not a primary variable of interest, participants were not asked to find a specific number of words, and because word search puzzles tend to be relatively easy, analyses with the word search puzzles were not done. Additionally, participants did not make predictions of how difficult it would to complete the puzzles, so the puzzles are not relevant to the study hypotheses.

Participants rated the puzzles using the same questionnaire as in Study 2, rating the puzzles on a scale from 1 (*not at all)* to 7 (*very* true). Confirming my assumption that the puzzles were not difficult, participants viewed them as somewhat fun ($M = 4.17$, $SD = 1.36$; $\alpha = .94$). They also felt like doing the puzzles was their own choice ($M = 4.76$, $SD = 1.33$; $\alpha = .84$), felt

somewhat competent (*M* = 3.79, *SD* = 1.25; α = .94), and felt little pressure (*M* = 3.28, *SD* = 1.31; α = .85).

***Cake ratings.*** Participants completed seven items using the scale 1 (*not at all*) to 7 (*very true*). Four items were aggregated to reflect how appealing and tasty the chocolate cake was to participants: "I was tempted to eat a lot of the chocolate cake," "The chocolate cake was delicious," "The chocolate cake tasted dry," and "I would like to eat more chocolate cake". Three items were combined to reflect the difficulty of resisting the chocolate cake: "It was difficult to keep myself from eating the entire piece of chocolate cake," "I had to restrain myself from the urge to eat more of the chocolate cake," and "I did not have to prevent myself from eating too much chocolate cake".

***Stroop Task.*** Participants completed the Stroop Task the same way as in Study 1. On average, participants took 26.42 (*SD* = 5.83) seconds and got 0.04 (*SD* = .20) incorrect on trial one. On trial two, participants took 33.01 (*SD* = 6.94) seconds and got 0.77 (*SD* = 1.01) incorrect

***Other measures.*** Participants completed the measures of self-efficacy optimism, process versus the outcome, and prevention and promotion described in Study 2.

**Results**

**Data preparation.** As in Study 2, a composite score of Stroop Task performance was computed by subtracting time on Trial 1 from the time on Trial 2 and then standardizing, standardizing the number of incorrect answers on Trial 2, and taking the average of both. Additionally, the 16 mood adjectives were scored to reflect an overall pleasant level of feelings, with higher scores indicating greater feelings of pleasant emotions.

**Preliminary results.** Descriptive statistics for the variables are presented in Table 6. On average, participants did not think it would be too difficult to resist eating more than they should

of the dessert, and participants' indicated they were highly committed to maintaining a healthy weight. In addition, Pearson's *r* between variables are presented in Table 7.

**Predictions of self-control.** The amount of details about the dessert did not influence participants' predictions of how difficult it would be to resist the dessert in the future, $F$ (2, 96) = 0.15, $p$ = .86 (H3).

Examining participants' current tiredness level when they completed the survey, level of tiredness was not related to their predictions of difficulty, $r$ = .04, $p$ = .72, and tiredness did not differ by condition, $F$ (2, 96) = 1.02, $p$ = .36. Furthermore, there was not a significant tiredness × condition interaction on predictions of the difficulty of resisting the dessert, $F$ (2, 96) = 0.48, $p$ = .62. Examining mood, participants' present mood did not influence their predictions of resisting the dessert, $r$ = -.03, $p$ = .75, and mood did not differ by condition, $F$ (2, 96) = 0.36, $p$ = .70. There was not a significant mood × condition interaction on predictions, $F$ (2, 96) = 0.16, $p$ = .86.

Predictions of the difficulty of resisting the chocolate cake were not related to self-efficacy optimism, $r$ = -.11, $p$ = .29, nor to goal process versus outcome, $r$ = .01, $p$ = .90, a prevention focus, $r$ = -.13, $p$ = .21, or commitment to maintaining a healthy weight, $r$ = -.00, $p$ = .98. Predictions of self-control were nonsignificantly related to a promotion focus, $r$ = .17, $p$ = .10. Predictions were related to self-regulatory skill, $r$ = -.20, $p$ = .05, such that the more skill participants had the less difficult they predicted it to be to resist the dessert. Additionally, the time between their predictions and lab session was not related to their predictions, $r$ = -.06, $p$ = .55. Interestingly, as shown in Table 7, participants' predictions of how hard it would be to resist the cake were related to how appealing the cake was to them in the lab session and how hard they felt it was to resist the cake, indicating some accuracy of difficulty.

Level of self-regulatory skill and the amount of details given did not interact to influence predictions, $F$ (2, 96) = 0.56, $p$ = .57, goal process versus outcome orientation did not interact with amount of details given on predictions of difficulty, $F$ (2, 96) = 0.27, $p$ = .76, nor did self-efficacy optimism, $F$ (2, 96) = 1.05, $p$ = .35, a promotion focus, $F$ (2, 96) = 0.76, $p$ = .47, nor commitment to maintaining a healthy weight, $F$ (2, 96) = 1.28, $p$ = .28.

**Cake consumption.** How much participants ate of the cake was related to how tempting it was to them, $r$ = .48, $p$ <.0001, but how much they ate was not related to their commitment to maintaining a healthy weight, $r$ = .00. In addition, how much of the cake they ate was not related to their predictions of the difficulty of resisting the chocolate cake, $r$ = .15, $p$ = .14. The amount of details that were given about the dessert did not relate to the amount of cake consumed, $F$ (2, 96) = 0.45, $p$ = .64.

**Accuracy of predictions.** First, using the information given about a temptation and participants' predictions of future self-control, a regression analysis was conducted to predict Stroop Task performance. Stroop performance was the dependent variable, condition was a categorical independent variable, and predictions of the difficulty of resisting the cake was a continuous independent variable. There was not a main effect of predictions, $F$ (1, 93) = 0.02, $p$ = .89, or condition, $F$ (1, 93) = 0.22, $p$ = .80. There was also not a significant interaction, $F$ (2, 93) = 0.50, $p$ = .61. Thus, participants were not accurate about how difficult it would be to resist eating more than they should of the dessert, and his inaccuracy was not stronger in one condition than in another. Using how much cake they consumed as the dependent variable did not result in a significant two-way interaction between details given about the dessert and predictions, $F$ (1, 93) = 0.81, $p$ = .45.

Attempting to replicate Study 2 results with time of predictions before lab session as a continuous variable, I examined whether the amount of time between completing the survey and the lab session and predictions of difficulty interacted to predict Stroop performance. There were no main effects nor was there a significant interaction between time before lab session and predictions of self-control on Stroop Task performance, $F$ (2, 95) = 0.68, $p$ = .41. To determine if there was a three-way interaction with condition and time predicting Stroop Task performance, a regression analysis was conducted, but there was not a significant interaction, $F$ (2, 87) = 0.90, $p$ = .41.

**Individual differences in accuracy.** Finally, to examine individual differences in accuracy, I conducted regression analyses using the individual difference measures and predictions of difficulty to predict Stroop Task performance. As in Study 2, none of the individual difference measures interacted with predictions of difficulty on Stroop task performance (SRS, SEO, Promotion focus, process versus outcome, and commitment to having a healthy weight, $F$s < 2.17, $p$s > .14).

**Discussion**

In Study 3, the details given about the future temptation did not influence participants' predictions of the difficulty of resisting the temptation. Furthermore, evidence did not support the idea that participants were accurate in their predictions of self-control—their predictions of difficultly were not related to how drained they felt after being in front of the cake. The absence of a relationship between predictions of future self-control difficulty and Stroop performance, and the absence of a relationship between predictions and their subjective feelings of depletion show that people may not know how to predict how they will feel about temptations they may face in the future.

Participants' predictions of difficulty of exerting future self-control were related to how much they liked the cake and how hard it was to resist the cake in the lab, but their predictions were not related to how much they ate of the cake. If participants were accurate about their predictions, then the more tempting the cake was to them, the more they would have reported being depleted and the worse they would have done on the Stroop Task. However, both of these relationships were nonexistent.

# CHAPTER 5

## GENERAL DISCUSSION

Three studies examined how people's predictions of the difficulty of exerting self-control in the future differ across time and whether or not people are accurate about those predictions. Study 1 provided evidence that people generally think that exerting self-control will be easier the father away it is in time. Additionally, Study 1 indicated that individuals who are effective self-regulators, low on self-efficacy optimism, and high on a promotion regulatory focus are less likely to discount the difficulty of future self-control efforts. Study 2 provided evidence that the temporal distance from predictions of the difficulty of exerting self-control in the future plays a role in the accuracy of those predictions, such that people are accurate about the difficulty of exerting self-control one day away from the event of self-control, but tend to be inaccurate when they make their predictions more than one day away. Finally, Study 3 showed that the amount of details given about a future temptation did not influence people's predictions of the difficulty of resisting that temptation in the future. Moreover, the amount of details given did not relate to the accuracy of those predictions. Participants were somewhat accurate about how difficult it would be to resist the cake, such that the more difficult they predicted it would be to resist the cake, the more appealing the cake was to them and the harder they felt it was to resist the cake. Taken together, the results of all three studies suggest that people are optimistic about how difficult it will be to exert future self-control in the future and that they are generally inaccurate at determining how hard it will be to exert self-control more than one day away.

**Is Predicting Future Self-Control Helpful?**

The present research expands the literature on self-control and self-regulation by revealing insight into how people think about future self-control, specifically, the *difficulty* of exerting self-control in the future. The results of the present studies are in line with research about how people make predictions about the future, namely their future emotional states (e.g., Wilson & Gilbert, 2005) and their future outcomes (e.g., Weinstein, 1980). The present research suggests that people are accurate about how difficult it will be for them to exert self-control one day away, but not even three days and one week away there was not a relationship between predictions of difficulty and actual feelings of depletion. Thus, people may only be able to make accurate predictions when temporal distance from the event is very small. That people are optimistic about the future and are, in many cases, unable to accurately predict how the future will pan out begs the question of whether thinking about the far future self-control events are worth predicting at all.

Predicting future self-control can be ineffective due to dynamic inconsistency (i.e., people's preferences can change over time; Read & van Leeuwen, 1998). Because people are dynamically inconsistent, their predictions aren't always accurate because they are based on their current states, not their future states. If Jimmy is fully satiated from a large, unhealthy dinner, he may predict that he will have fresh vegetable juice in the morning. However, when the morning arrives he may be starving and in the mood for pancakes and sausage. His prediction the night before was based on his state of feeling full and indulgent, but his plan backfired because in the morning he was hungry. People may make predictions that are based on how they are feeling now and these predictions may not be accurate if their current states differ from their future states. Making predictions of the difficulty of future self-control may only be feasible for events

that are close in time (e.g., hours away), because individuals are more likely to be in a similar state when they exert self-control as they are to when they make their prediction.

Temporal construal theory explains people's thoughts of near versus distance events, but it may be that there is more to temporal distance than just level of concreteness or abstractness. Remember, temporal construal states that events that are far away are construed as abstract and events closer in time are construed as concrete. Results from Study 3 did not suggest that the details of the temptation influence predictions of the difficulty of exerting self-control in the future, so potentially there are other aspects to temporal distance that affect how people think about near and far events. As stated early, people tend to imagine future events as occurring now and then adjusting them based on time (Gilbert et al., 2002), and the farther away in time the event is, the higher chance for inaccuracy. Also, more cognitive resources are needed for events farther out in time (Becker & Mulligan, 1997). If it is not only harder to predict far future events but it gives more chances for inaccuracy, it may be in the best interests of people to stop trying to predict events that are so far away and instead focus on near events and predicting those accurately.

**Limitations of the Present Studies & Future Research**

Even though Study 2 provided support that temporal distance is associated with accuracy of predictions of the difficulty of self-control, evidence was not supported in Study 3. There are a few reasons why this may be the case. First, the time that predictions were made was not randomly assigned to participants. Therefore, individual differences may have predicted how close or far away from the lab session participants chose to complete the survey. One example may be self-regulatory skill. Participants who are more effective at self-regulation may have signed up earlier for the study, therefore, having more temporal distance in their predictions

about the lab session. And, participants with effective self-regulation may have completed the survey faster than less effective self-regulators after they actually received the survey. Indeed, in Study 3, self-regulatory skill was marginally related to the amount of days before their session that they completed the survey, $r$ =.18, $p$ = .07. The higher the self-regulatory skill of the participants, the greater the temporal distance was before their lab session.

Second, in Study 3, the absence of a relationship between predictions of difficulty and time on actual depletion may have been due to the nature of the study. Namely, participants were asked not to eat at least two hours prior to arriving at the study, and may have been in a visceral state. A visceral state is a highly adaptive physiological state that directs them to satisfy physical needs, such as being hungry, thirsty, or sexually aroused (Loewenstein, 1996). Previous research indicates that how people respond to temptation depends on whether or not they are in a visceral state. If people are in visceral state, then a temptation leads to impulsive behavior, but if they are not in a visceral state, a temptation leads to self-control (Loewenstein, 1996; Nordgren & Chou, 2011). In Study 3, the more tempting the cake was to participants, the more they ended up eating. Therefore, participants' predictions of self-control may not have been accurate because when they arrived at the lab, they may have been in a visceral state, leading them to eat more cake than they predicted.

It is important to note that people underweight, or even ignore, visceral factors that they have experienced in the past and will experience in the future (Loewenstein, 1996), and the empathy-gap effect states that people have trouble valuing the power of impulsive states. It may be that participants in Study 3 did not incorporate feelings of hunger when they made their predictions of the difficulty of resisting the dessert. In order for people to make accurate predictions about a future visceral state (e.g., resisting food), it may be helpful if they are in a

visceral state when they actually make their predictions (Nordgren, van der Pligt, & van Harreveld, 2006).

Furthermore, because there was a relationship between predictions of difficulty and time on actual depletion with the math problems in Study 2, it may be that tasks that are more initiation focused that are close in time are easier to predict compared to inhibition tasks, especially when people are in visceral states. Results of Study 1 provide some support for this idea and shows that in terms of future self-control predictions, self-control seems to be domain specific. Therefore, people may be more or less accurate depending on the domain of the self-control task they are making predictions about, and future research could delineate the differentiation between tasks.

There is also the possibility that the details of the temptation in Study 3 were not differentiated enough to elicit differences in predictions. Perhaps the amount of information would have influenced predictions, such that giving them more information (e.g., describing the cake in terms of weight, color, smell, and ingredients) or put the temptation in front of them when they make their predictions would have increased the variation between conditions. Future studies should develop stronger methods of disparity of the amount of information known about a future self-control event. Another way to determine how abstract versus concrete information is related to people's predictions of future self-control could be to manipulate construal level before people make their predictions. People who are in a high-level construal should think of self-control in the present, thereby being more likely to resist the cake in the present, but they may be more likely to predict they can resist it in the future. The reverse pattern may occur when people are in a low-level construal, that is, they would be more likely to not resist the cake in the present but be more likely to make predictions for the future that are more accurate.

Future research should also investigate if there are ways to help people to be better equipped to predict the difficulty of future self-control. One such way may to advise people to make their predictions when they are low in cognitive resources. Prior research suggests that the extent to which an individual has limited self-control resources in the present can actually increase their accuracy of predictions because it reduces their overconfidence bias (Debono & Muraven, 2013). On the contrary, when people are depleted, they may be optimistic in their predictions when they are being made about someone else. Managers who are depleted tend to think that their subordinates are better equipped to handle their work and don't need assistance from them, potentially overestimating their abilities (Koval, vanDellen, & Fitzsimons, 2014). Therefore, being depleted may or may not be helpful when making predictions of future self-control. It may be that it differs based on the task, on the temporal distance from the task, and whether one is making a prediction about themselves or someone else.

**Conclusion**

The present studies suggest that people think it will be easier to exert self-control the farther away it in time and tend to be inaccurate about the difficulty of exerting self-control in the future, even as close as three days away. These results are important for goal pursuit because it may be that from being inaccurate about future self-control, people end up being unable to accomplish their goals, possibly the ones they care about the most. Future research should investigate how people can better predict the difficulty of exerting self-control in the future, especially for close future events.

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# APPENDICES

## Examples of Tasks for Predictions of Difficulty of Self-control, Study 1

Imagine you will have a class that is right now. How hard would it be to keep yourself from skipping class?

Imagine you will have a piece of your favorite cake in front of you in 30 minutes. How hard would it be to keep yourself from not eating a piece of your favorite cake?

Imagine that in one hour you will have to wake up earlier than your usual wakeup time. How hard would it be to make yourself get up earlier?

Imagine that tomorrow you will go to the gym. How hard would it be to make yourself go to the gym?

Imagine that in one week you will have to read a long text for school. How hard would it be to make yourself read it without getting distracted?

Imagine you will be going shopping in one month. How hard would it be to keep yourself from buying something you really want (i.e., clothes, apps, video games, etc.)?

# TABLES

Table 1

**Descriptive Statistics and Pearson's *r* in Study 1**

| Measure | *M* | *SD* | α | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Tired | 4.31 | 1.40 | .87 | | | | | | | | | |
| 2. Mood | 6.98 | 1.87 | — | -.67*** | | | | | | | | |
| 3. Prevention | 4.92 | 1.37 | .61 | .25* | -.21* | | | | | | | |
| 4. Promotion | 7.03 | 1.10 | .75 | .03 | .11 | .15 | | | | | | |
| 5. SEO | 2.74 | 0.55 | .87 | -.03 | .01 | -.14 | .23** | | | | | |
| 6. SRS | 3.22 | 0.60 | .93 | -.26** | .19* | -.19* | .25** | .18 | | | | |
| 7. AOD | 5.21 | 2.65 | .74 | -.19* | .07 | -.06 | .20* | .20* | .68*** | | | |
| 8. AOP | 8.27 | 2.30 | .60 | .02 | .11 | .06 | .04 | .13 | .14 | .14 | | |
| 9. AOF | 3.99 | 2.40 | .64 | -.24** | .19* | -.23* | -.06 | .04 | .15 | .17 | -.08 | |
| 10. P vs O | 3.98 | 1.02 | .68 | .06 | -.15 | -.15 | -.16 | -.03 | .15 | .22* | -.02 | .17 |

*Note*. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Table 2

**Descriptive Statistics and Pearson's *r* of Goal Domains in Study 1**

| Variable | *M* | *SD* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.Student | 6.74 | 0.46 | | | | | | | | | | | |
| 2. Oversleep | 5.11 | 1.71 | .25** | | | | | | | | | | |
| 3. Good diet | 5.88 | 1.23 | .12 | .44*** | | | | | | | | | |
| 4. Exercise | 5.88 | 1.21 | .17 | .34*** | .68*** | | | | | | | | |
| 5. Read | 5.42 | 1.36 | .36*** | .44*** | .34*** | .11 | | | | | | | |
| 6. Financials | 6.27 | 1.04 | .04 | .27** | .31*** | .40*** | .23* | | | | | | |
| 7. Class | 2.30 | 1.15 | -.23** | -.25** | -.18* | -.21* | -.13 | -.02 | | | | | |
| 8. Wakeup | 3.83 | 1.03 | -.07 | -.22* | -.16 | -.03 | -.17 | -.12 | .05 | | | | |
| 9. Dessert | 3.81 | 1.15 | .11 | .03 | -.04 | -.03 | .03 | -.10 | -.17 | .17 | | | |
| 10. Gym | 2.98 | 1.16 | -.05 | -.21* | -.38*** | -.68*** | -.05 | -.24** | .28** | .14 | -.02 | | |
| 11. Read | 4.24 | 1.10 | -.17 | -.29** | -.20* | -.09 | -.38*** | -.10 | .09 | .25** | .09 | .16 | |
| 12. Spend | 3.55 | 1.21 | .06 | .01 | -.09 | .03 | -.21* | .02 | .06 | .14 | .26** | -.00 | .16 |

*Note*. Variables 1-6 refer to commitment to domains and variables 7-12 refer to predictions of self-control.
* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Table 3

**Main Effects and Contrast Tests for Goal Domains in Study 1**

| *Domain* | *Main effect of time* | *Linear* | *Near vs. Far* |
|---|---|---|---|
| Cake | $F$ (6, 112) = 4.49*** | $t$ (112) = 2.74*** | $t$ (112) = 2.27* |
| Class | $F$ (6, 112) = 5.34*** | $t$ (112) = 5.40*** | $t$ (112) = 5.26*** |
| Gym | $F$ (6, 112) = 6.69*** | $t$ (112) = 6.00*** | $t$ (112) = 5.74*** |
| Read | $F$ (6, 112) = 3.07** | $t$ (112) = 3.40*** | $t$ (112) = 3.34*** |
| Spend | $F$ (6, 112) = 3.11** | $t$ (112) = 0.47 | $t$ (112) = - 0.13 |
| Wakeup | $F$ (6, 112) = 11.75*** | $t$ (112) = 6.71*** | $t$ (112) = 7.10*** |

*Note*. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Table 4

**Descriptive Statistics of Individual Difference Measures in Study 2**

| *Variable* | *M* | *SD* | $\alpha$ |
|---|---|---|---|
| 1. Ratings of tired, survey | 4.53 | 1.21 | .86 |
| 2. Ratings of mood, survey | 16.02 | 3.11 | — |
| 3. Self-control predictions | 3.16 | 1.09 | .89 |
| 4. SRS | 3.43 | 0.59 | .94 |
| 5. SEO | 2.82 | 0.64 | .93 |
| 6. Promotion | 7.00 | 1.02 | .78 |
| 7. Prevention | 4.96 | 1.61 | .73 |
| 8. Process versus outcome | 4.17 | 0.96 | .74 |
| 9. Math enjoyment | 4.54 | 1.67 | .94 |
| 10. SAT math score | 635.72 | 71.98 | — |
| 11. Ratings of tired, lab | 3.67 | 1.44 | .90 |
| 12. Ratings of mood, lab | 5.63 | 2.82 | — |

*Note*. SRS = self-regulatory skill, SEO = self-efficacy optimism.

Table 5

**Correlations between Variables in Study 2**

| *Variable* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. SC predictions | | | | | | | | | | |
| 2. SRS | -.14 | | | | | | | | | |
| 3. SEO | -.46*** | .28* | | | | | | | | |
| 4. Promotion | -.18 | .41*** | .48*** | | | | | | | |
| 5. Prevention | .20 | -.09 | -.18 | .02 | | | | | | |
| 6. P vs O | -.16 | .40** | .27* | .26 | -.23 | | | | | |
| 7. Math enjoyment | -.67*** | .17 | .16 | .04 | -.04 | .06 | | | | |
| 8. SAT math score | -.25 | .07 | .16 | -.01 | -.23 | -.00 | .37 | | | |
| 9. Stroop Task | .17 | -.32** | -.12 | -.18 | -.01 | -.17 | -.22 | -.11 | | |
| 10. Mood, time 2 | -.00 | .28* | .30* | .27* | -.22 | .04 | -.02 | .02 | .00 | |
| 11. Tired, time 2 | .19 | -.24 | -.20 | -.25* | .16 | -.00 | -.21 | .04 | .19 | -.42*** |

*Note.* SC= Self-Control, SRS= Self-regulatory skill, SEO = Self-efficacy optimism, P vs O= Process vs. Outcome.
* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Table 6

**Descriptive Statistics of Variables in Study 3**

| Measure | *M* | *SD* | α |
|---|---|---|---|
| 1. Self-control predictions | 2.10 | 1.06 | — |
| 2. Health commitment | 5.75 | 1.05 | .83 |
| 3. Self-regulatory skill (SRS) | 3.23 | 0.60 | .94 |
| 4. Self-efficacy optimism (SEO) | 2.57 | 0.54 | .88 |
| 5. Process versus outcome | 4.56 | 1.20 | .65 |
| 6. Promotion | 6.96 | 1.18 | .77 |
| 7. Prevention | 4.98 | 1.54 | .65 |
| 8. Body mass index (BMI) | 23.75 | 5.30 | — |
| 9. Stroop Task composite | -0.02 | 0.81 | — |
| 10. Cake consumption | 1.48 | 1.13 | — |
| 11. Subjective depletion after cake | 3.52 | 1.60 | .90 |
| 12. Time before lab | 4.5 | 2.63 | — |
| 13. Ratings of cake appeal | 4.86 | 1.38 | .72 |
| 14. Ratings of hard to resist | 3.24 | 1.65 | .87 |

Table 7

**Pearson's r between Variables in Study 3**

| Variable | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. SC predictions | | | | | | | | | | | | | |
| 2. Health commitment | -.00 | | | | | | | | | | | | |
| 3. SRS | -.20* | .24* | | | | | | | | | | | |
| 4. SEO | -.11 | .33*** | .42*** | | | | | | | | | | |
| 5. PvsO | .01 | .04 | -.26** | .05 | | | | | | | | | |
| 6. Promotion | .17 | .32* | .22* | .46*** | -.07 | | | | | | | | |
| 7. Prevention | -.13 | -.08 | -.14 | -.17 | -.21* | -.09 | | | | | | | |
| 8. BMI | -.10 | -.44*** | -.30** | -.22* | -.04 | -.16 | .04 | | | | | | |
| 9. Stroop Task | .00 | .06 | -.05 | -.08 | -.19 | .13 | .14 | -.13 | | | | | |
| 10. Cake consumed | .11 | -.00 | .14 | -.14 | .12 | .09 | .02 | -.21* | -.04 | | | | |
| 11. Subjective depletion | -.02 | -.08 | -.04 | -.14 | -.32*** | .02 | .15 | . 01 | -.10 | -.11 | | | |
| 12. Time before lab | -.06 | -.16 | .18 | .11 | .04 | .02 | -.23* | -.04 | -.10 | .11 | .21* | | |
| 13. Appeal of cake | .34*** | .05 | -.00 | -.04 | .14 | .12 | -.07 | -.11 | -.05 | .48*** | -.08 | -.04 | |
| 14. Hard to resist cake | .26** | .18 | -.06 | -.06 | -.02 | .03 | .04 | -.11 | .10 | .37*** | -.13 | -.07 | .61*** |

*Note*. SC = Self-control, SRS = Self-regulatory skill, SEO = Self-efficacy optimism, PvsO = Process vs outcome, BMI = Body mass index. *p ≤ .05, **p ≤ .01, ***p ≤ .001

FIGURES

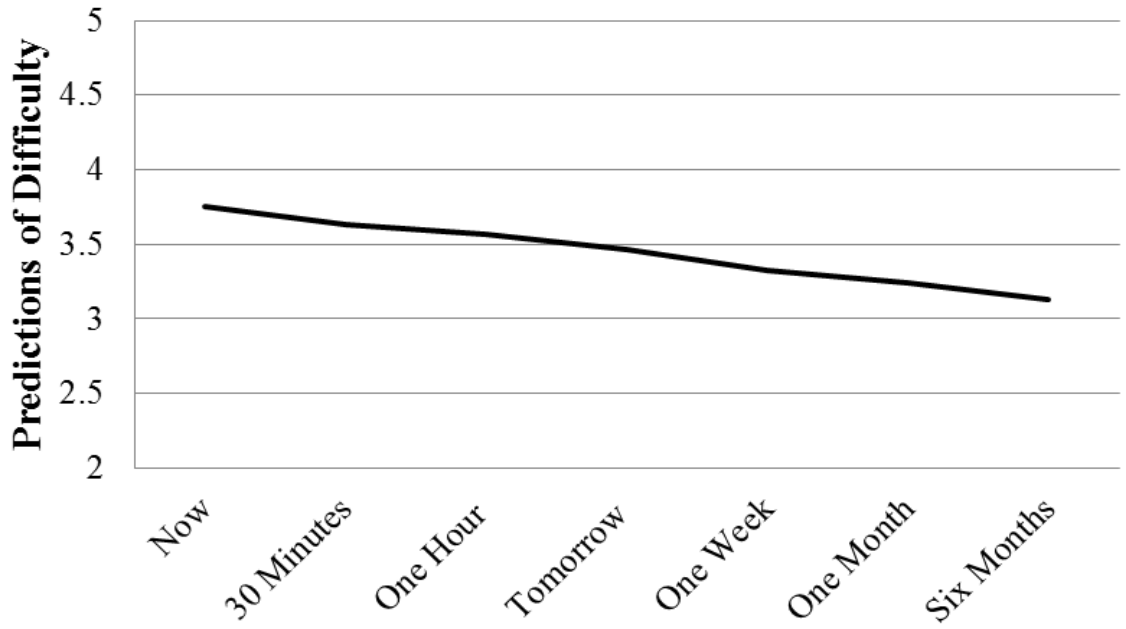


*Figure 1.* Predictions of self-control difficulty across all six goal domains, Study 1.

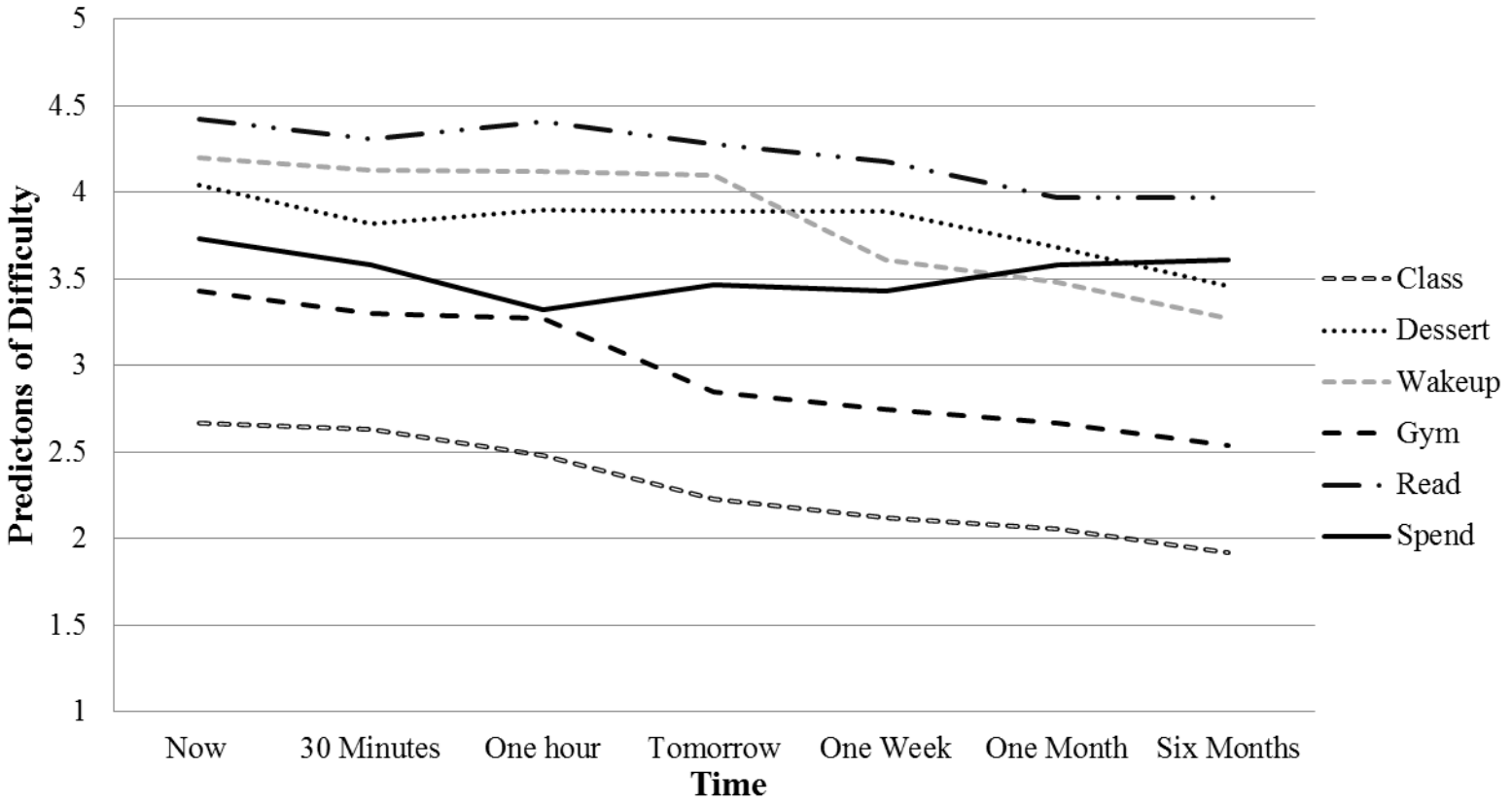


*Figure 2*. Predictions of self-control difficulty for six domains, Study 1.

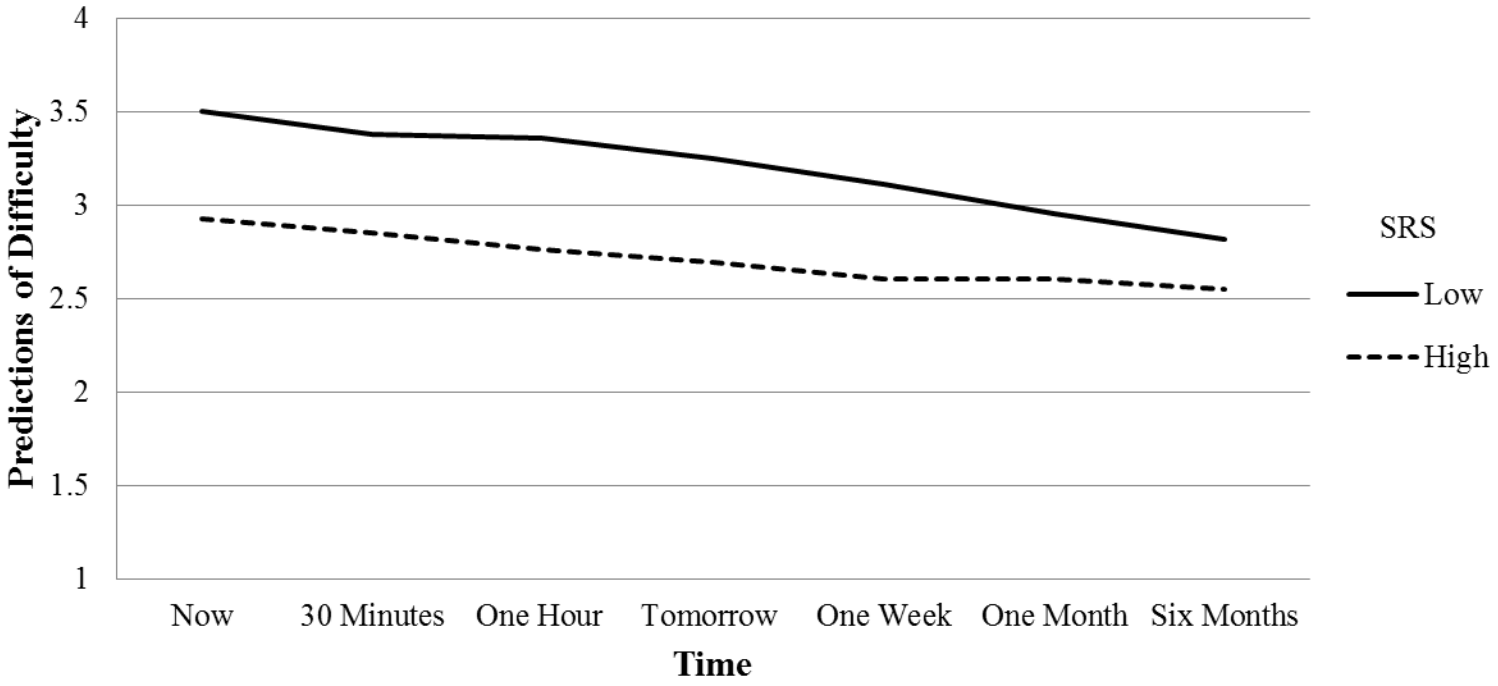


*Figure 3*. Predictions across all goal domains for low and high in SRS, Study 1.

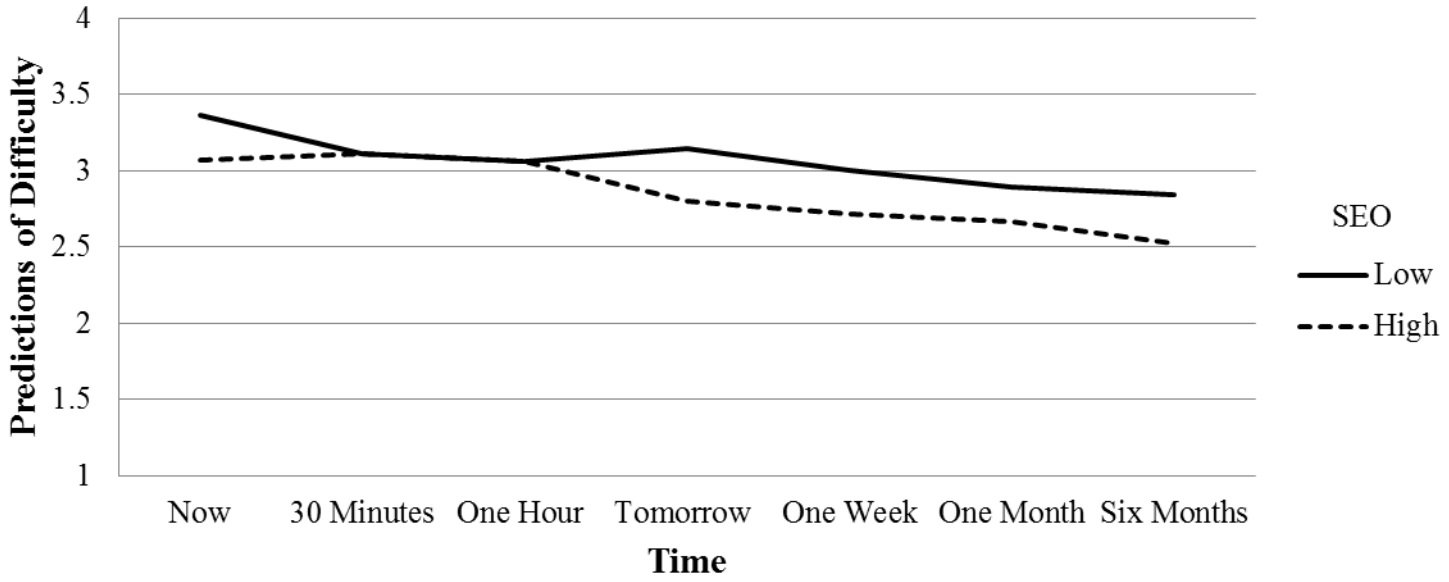


*Figure 4*. Predictions across all goal domains for low and high in SEO, Study 1.

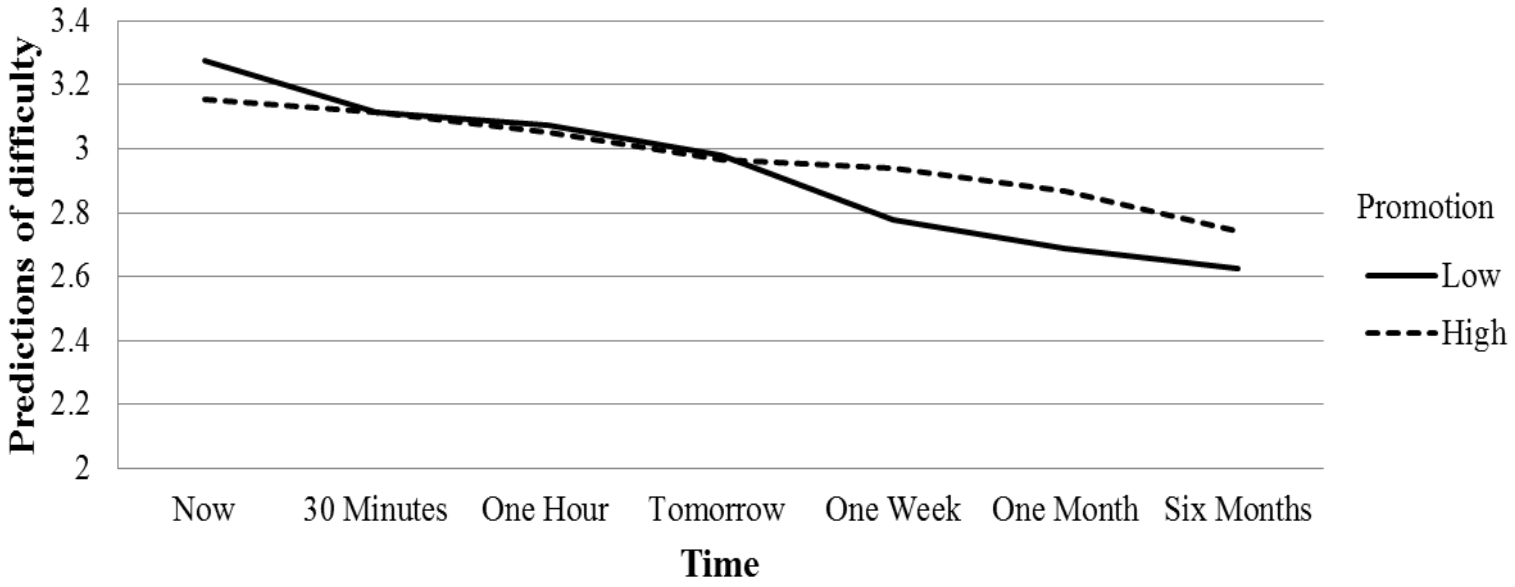


*Figure 5*. Predictions across all goal domains for low and high promotion, Study 1.

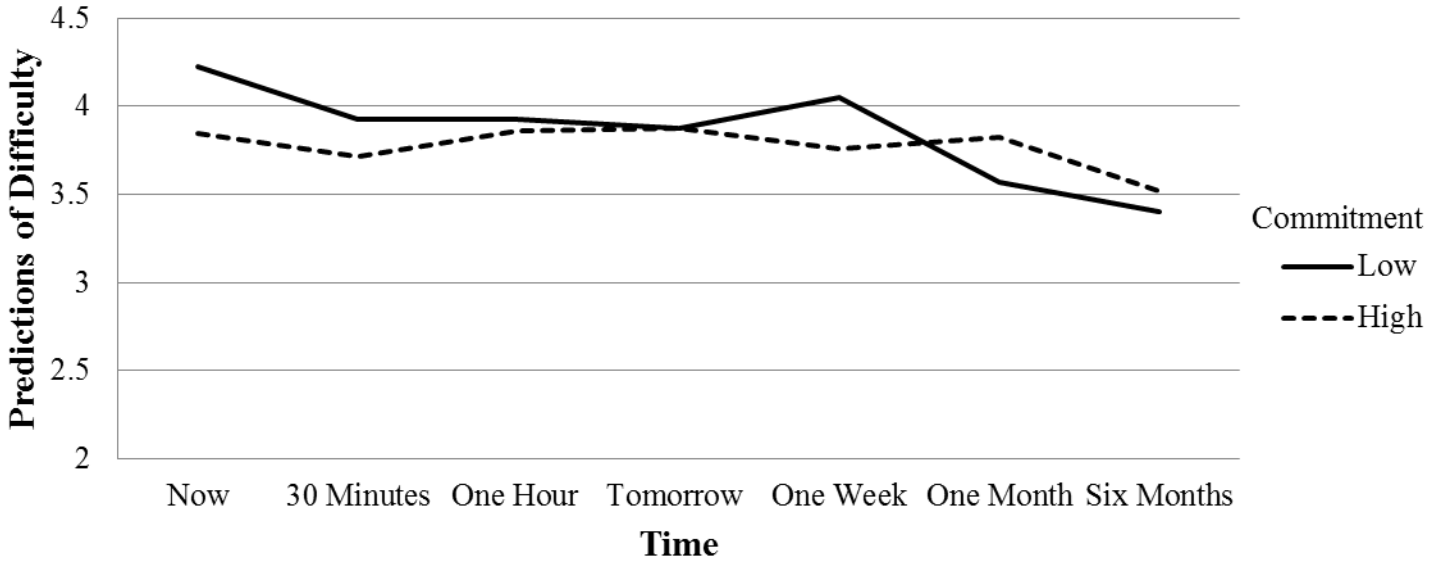


*Figure 6.* Level of commitment to eating healthy and predictions of dessert, Study 1.

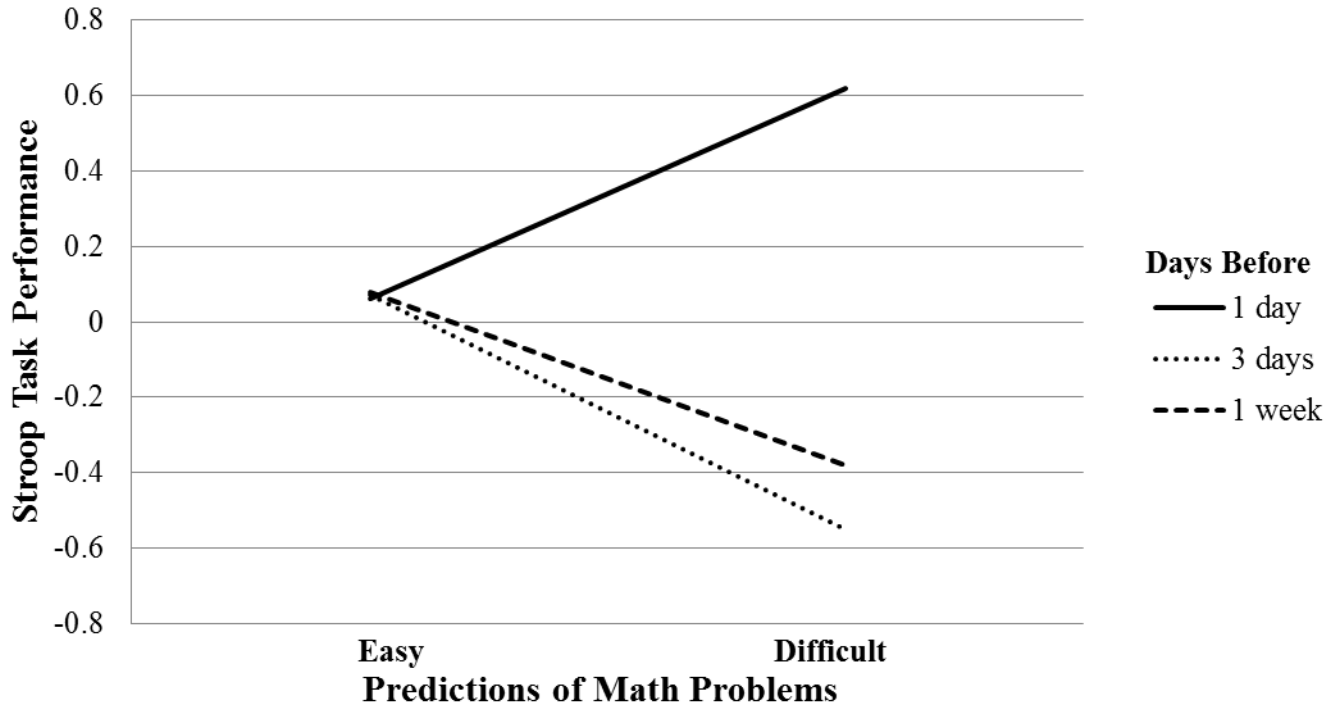


*Figure 7*. Stroop Task performance on predictions of difficulty and time, Study 2.