James Madison University
JMU Scholarly Commons

Senior Honors Projects, 2010-current | Honors College

Spring 2015

Can small details bring big success? Construal levels as academic goal strategies

Christopher R. Deitrick
James Madison University

Follow this and additional works at: https://commons.lib.jmu.edu/honors201019

 Part of the Social Psychology Commons

Recommended Citation
Deitrick, Christopher R., "Can small details bring big success? Construal levels as academic goal strategies" (2015). *Senior Honors Projects, 2010-current*. 93.
https://commons.lib.jmu.edu/honors201019/93

This Thesis is brought to you for free and open access by the Honors College at JMU Scholarly Commons. It has been accepted for inclusion in Senior Honors Projects, 2010-current by an authorized administrator of JMU Scholarly Commons. For more information, please contact dc_admin@jmu.edu.

Can Small Details Bring Big Success? Construal Levels as Academic Goal Strategies

---

An Honors Program Project Presented to

the Faculty of the Undergraduate

College of Health and Behavioral Studies

James Madison University

---

by Christopher Reese Deitrick

May 2015

Accepted by the faculty of the Department of Psychology, James Madison University, in partial fulfillment of the requirements for the Honors Program.

FACULTY COMMITTEE:

Project Advisor: Jaime Kurtz, Ph.D.
Associate Professor, Psychology

Reader: Natalie Kerr Lawrence, Ph.D.
Associate Professor, Psychology

Reader: Kenneth E. Barron, Ph.D.
Professor, Psychology

HONORS PROGRAM APPROVAL:

Philip Frana, Ph.D.,
Interim Director, Honors Program

PUBLIC PRESENTATION

This work is accepted for presentation, in part or in full, at the Honors Symposium on April 24th, 2015.

Table of Contents

Acknowledgements

For my completion of this work, I am truly grateful to the many mentors who have helped shape my academic career.

My first and biggest thanks go to Dr. Jaime Kurtz, whose guidance and partnership since my freshman year has so greatly impacted me that I cannot imagine my college experience without her. From my first semester, she helped show me that I could reach the goals I set for myself, and she repeatedly empowered me to do so.

I also thank the other members of my committee, Drs. Kenneth Barron and Natalie Kerr Lawrence. Dr. Barron, as my first psychology professor and advisor, defined for me what opportunities I had in JMU's psychology department and pushed me to make the most of them. Dr. Kerr Lawrence helped me remember the excitement and rewards of research despite my decision to pursue careers unrelated to it.

I'd also like to thank four others who made a significant contribution to my undergraduate development: Daniel Yudkin, Dr. Tracy Zinn, Dr. Julia Lee, and Dr. Bryan Saville. I worked closely and for long periods with each of them, and the time we shared has benefitted me professionally and personally; this is especially true of my relationship with Daniel Yudkin, who is both a colleague and a good friend.

Finally, I would like to recognize the contributions of the Department of Psychology and the Psi Chi International Honors Society. Both organizations offered me financial support which not only directly benefited my thesis research but also significantly helped me aspire to reach ever greater heights in my professional development.

Abstract

One avenue to help students reach educational goals is implementation intentions, a tool encouraging planning the "when, where, and how" of goal-oriented actions (Gollwitzer, 1999). However, implementation intentions need validating outside of the laboratory (Gollwitzer & Sheeran, 2006). To help do so, they can be viewed through Construal-Level Theory (CLT), which explains why we may have trouble setting intentions before we can fulfill them (Trope & Liberman 2010). A study was conducted wherein 56 participants from a section of PSYC 330 either wrote about their college study habits or completed implementation intentions preparing them to study for an upcoming exam. As they wrote, participants also completed measures of construal-levels. It was hypothesized that implementation intentions would immediately reduce construal levels and, over the following week, increase time students studied for their exam and the score they received. None of these hypotheses were supported; implementation intentions had no effect on study habits, exam scores, or construal levels. Results and their implications are discussed.

Can Small Details Bring Big Success? Construal Levels as Academic Goal Implementation Strategies

Every semester, as students begin new classes, they set optimistic goals for learning and performance. They purchase textbooks and planners and populate binders with freshly printed syllabi. Students intend to work hard and do well. All too often, though, they fall short, at least anecdotally (e.g., Tough, 2014). Textbook readings begin to go undone, and lecture attendance drops. Once motivated by the merits of academic success, students fail to implement their goal intentions. And when the next semester begins, the cycle may repeat, lowering the students' attainments from their education.

Why do we fail to fulfill our goals and expectations? At times, factors outside our control inhibit our goals' completion: life events steal our time, circumstances push obtainable goals out of reach, or our abilities just do not measure up. Uncontrollable issues arise, and they may affect our potential. At times, though, we fail to exercise self-control and gain the benefits of doing so (e.g., Oettingen, Pak, & Scnetter, 2001). When illness forces students to miss class, they must accept the consequences, but when they fail to do the work necessary to catch up, they needlessly leave their potential untapped—a serious and avoidable problem. The present research intends to explore self-control failures in an academic context and aims to explore techniques for its improvement.

The Need for Self-Control Techniques

Self-control has long been defined as an action in favor of larger, delayed rewards over smaller, immediate ones (e.g., Ainslie, 1975). As such, research on the subject has emphasized self-control processes as an effortful *inhibition of impulses*, or a person's denial of a tempting stimulus (Fujita, 2011). Classic examples include research on delay of gratification, especially that of Mischel and colleagues (see Metcalfe & Mischel, 1999, for a review), who offered children the opportunity to, after a 15-minute wait, double an immediately available marshmallow reward. Delayed discounting, another theory of self-control, also tested inhibition of impulses by studying participants' evaluations of smaller, immediate

monetary rewards (e.g., $10 today) over larger but more distant ones (e.g., $100 in a year; Kirby & Hernstein, 1995). Finally, a third series of findings conceptualizes self-control as a psychological resource that permits impulse resistance (Gailliot, Baumeister, & DeWall, 2007; Vohs & Heatherton, 2000). In all of these models, delaying rewards—and overcoming impulses to do so—largely characterizes self-control.

Much research has also focused on how different self-control situations are more or less difficult to overcome. Research has shown, for example, that the presence of food makes dieters more likely to indulge (e.g., Fedoroff, Polivy, & Herman, 1997) and stronger positive associations with alcohol lead to more frequent alcohol-related self-control failures. Other studies have established the debilitating effects of cognitive load on self-control (Shiv & Fedorikhin, 1999). Much of this work leaves a gap, though, surrounding what one may do to *improve* self-control.

Recently, however, researchers have begun to shed light on self-control strategies (Fujita, 2011). Indeed, as Fujita (2011) points out, we practice self-control through many means besides impulse inhibition. Consider work that supports the engineering of an environment in which self-control failures become less likely. Thaler and Shefrin (1981), for instance, studied individuals who, counter to economic norms, stored their savings in accounts that offered less access to cash, thus reducing the likelihood of impulsive spending. Self-control could include creating a less tempting environment or carefully avoiding temptations altogether; why not go to the library, where studying is one's only choice?

Really, though, temptations are unavoidable. Even at the library, a student can choose to speak with friends, wait in line for a mocha espresso, or answer trivia questions on his or her cell phone. Rather than simply dodging impulses, then, we can orient ourselves towards taking the action we want in spite of it.

Implementation Intentions

Recently, Gollwitzer (1993) described a self-control technique that uses specific details to inoculate against temptation. Implementation intentions require people to think deeply about a future situation and picture their goal-achieving actions. To do so, they consider a specific context—a "when" and a "where"—and a specific action they will take—a "how"—and they do so using as many details as possible. Motivated students, for example, might imagine themselves at exactly 7 PM tomorrow going into their rooms, shutting their doors, clearing their desks, and sitting in silence as they reviews their notes for their next exam for exactly an hour. Ideally, they'd go on to visually imagine their apartment as they stand from their couches at 7:00 and walk into their rooms, shut their doors, sit themselves down, and so forth. Research by Gollwitzer (1993) suggests their preparation would help them tremendously.

Reviews of research demonstrate widespread effectiveness of implementation intentions. Gollwitzer and Sheeran's (2006) meta-analysis combined 94 studies, published and unpublished, that included over 8,000 participants. They found moderate-to-large effects across nearly every goal domain studied, including environmental, antiracist, prosocial, and academic, though the large majority of studies took place in closed laboratory settings. Two common problems of goal completion were most consistently and strongly addressed by implementation intentions: (a) failing to get started with and (b) getting derailed from goals. Conclusions support that, if one struggles with beginning or continuing the path to completing his goals, implementation intentions can help.

How do researchers explain implementation intentions' success? Research on implementation intentions finds that, through detailed, context-based commitments, one can ground oneself in a "critical moment"—a context in which a self-control decision takes place—and essentially prime oneself to recall her commitment and respond accordingly (Gollwitzer, 1999). Gollwitzer (1993) finds that implementation intentions act through two mechanisms: (1) making cognitively accessible the self-control moment and (2) automatizing one's response. In other words, the details a student imagines automatically trigger her goal-related action. Her desk provides a motivating spark to sit and study, her morning alarm triggers a reminder to review her study guide, and her magazines tempt her to instead flip

the pages of her textbook. Notably, it is one's immersion in the critical context that strengthens the associations and thus the likelihood of follow-through.

How, then, can researchers improve the understanding of implementation intentions? First, intention research could use more attention in real-world academic contexts. A literature review and meta-analysis by Gollwitzer and Sheeran (2006) revealed a dearth of applications for students. Also, few studies have empirically investigated the mediators of implementation intentions' effects. Although a study by Aarts and Dijksterhuis (2000) showed that increased details improved intentions' effectiveness, mediation research could be expanded. To uncover new advice for potential users, research would do well to better explore how we mentally visit the future to create the specific details that will motivate our behavior.

Construal-Level Theory

A relatively novel theoretical framework, construal-level theory (CLT) explains how our ability to conjure up specific details changes as we mentally pass through time and space can impact (Liberman & Trope, 2009). Passing over these and other psychological distances occurs whenever we mentally leave the "here and now" by imagining either faraway places, distant times, people different from ourselves, or unlikely situations. Research indicates that crossing these distances has a debilitating effect on a person's ability to conjure up specific details (Trope & Liberman, 2010). Instead, crossing distance causes a shedding of specific details in favor of general ones.

Consider, for example, students who hope to study for an upcoming exam. If they are planning tomorrow's study session, they might use specific details, like "in my dorm on the quad," "right after I get lunch with my friend," or "using the notes on chapter 13 that I will take tomorrow in class." These details are very specific. Planning for tomorrow, however, students know exactly where they live (their dorm), when they'll fit studying into their day (after a scheduled lunch), and how they need to study (using chapter notes). As students look further into the future, specific details become less useful. If they hope

to create a study plan for the coming semester, they would be hard-pressed to decide exactly when they study pages 120-140 in an unopened textbook. When someone imagines the future many details remain unknown, so it naturally helps to ignore them. CLT research has shown that this tendency occurs whenever we mentally leave the "here and now," whether by pondering distant times, faraway places, exotic people, or unlikely events.

A variety of studies have corroborated this natural tendency to shed details with psychological distance. On an Implicit Association Test, participants more quickly matched stimuli of a lower construal level (e.g., specific examples like "cherry soda") with those psychologically-near (e.g., "friend" for social distances) and stimuli of a higher construal level (e.g., general categories like "drinks") with those psychologically–far (e.g., "stranger"; Bar-Anan, Liberman, & Trope, 2006). This research has suggested that these tendencies are implicit, or beyond conscious control. Moreover, when people imagine a psychologically distant stimulus, they consider it in a higher-level way. Well-known work has shown that we tend to attribute other people's actions to their personalities, not their situation (e.g., Gilbert & Malone, 1995). This correspondence bias, CLT contends, comes from traversing social distance by considering a different person's perspective (Nussbaum, Trope, & Liberman, 2003). Thus another person's failing grade appears due to lack of motivation (a trait cause), not a sick day (a contextual one).

Conversely, an emphasis on details also triggers a bias towards contextualized thinking. These lower-level mindsets, easily primed by any detailed thinking, lead to predictable changes in behavior (Trope & Liberman, 2010). Perceptually, those primed with lower-level (vs. higher-level) mindsets—often by responding to simple questions, like "how exactly do you exercise?"—more often identified local (vs. global) visual targets when presented with Navon's (1977) task (in which "global" letters are formed from a collection of smaller, "local" letters; Liberman & Förster, 2009). More explicitly, lower-level mindsets have demonstrated similar effects on item categorization (Henderson, Fujita, Trope, & Liberman, 2006; Liberman, Sagristano, & Trope 2002), action identification (e.g., Wakslak et al., 2006),

and person perception (e.g., correspondence biases; Nussbaum, Trope, & Liberman, 2003). Across many tasks, participants followed predictable behaviors after very simple mindset primes.

If crossing psychological distance causes us to ignore context, it follows that imagining a distant future situation could cause us to neglect the details that produce strong implementation intentions. According to CLT research, this tendency stems from practicality (Trope & Liberman, 2010). But what does this mean for implementation intentions? If someone needs to imagine the future *and* picture the most details, they will probably not.

The Present Study

Implementation intentions call for an unnatural attention to detail, but people may still conjure them if prompted. Research suggesting that details mediate intentions' effectiveness implies that participants can still imagine future details (Gollwitzer, 1999; Aarts & Dijksterhuis, 2000). Students who imagine studying "at their desk, immediately after dinner, with their physics textbook and notes in front of them" will more likely study than those who only imagine "studying something tomorrow in the apartment." Those specific details help trigger the decision and motivation to study. According to CLT research, an emphasis on details also triggers a bias towards contextualized thinking.

The present empirical study will test three main hypotheses. First, it will test if implementation intentions can improve studying for and performance on an exam. Second, it will test if writing intentions primes a lower construal level mindset. Third, it will test if construal levels can mediate the intention's effect on improvement. In other words, will the construal level prime explain how much students improve when they complete their implementation intentions?

Method

Participants

Fifty-six participants (73.2% female) were taken from a section of PSYC330: Psychology of Personality in the Spring, 2015 semester. Of the class's 73 students, 76.7% participated. Those who did not either declined or were absent the day the study began. The sample was 20.3 years of age on average (*SD* = .88) and 89.3% Caucasian. All participants provided consent.

Materials

Implementation Intentions. The implementation instructions reflected those of past literature (Gollwitzer & Brandslätter, 1997). Specifically, participants (a) generated details of a specific goal-related context that related to their preparation for their exam (e.g., "where" and "when" they will study) and (b) linked these contexts with specific, goal-related actions (e.g., "how" they will study). Participants in the experimental condition wrote their intentions in the form of an "if, then" statement which clearly linked context to action.

Participants formed three intentions, each pertaining to a different, preassigned day of the week. With these instructions, for example, they could say that, "On Tuesday at noon [*when*], at my desk in my apartment [*where*], I will read my textbook chapters [*how*];" alternatively, on a day closer to the exam, they could say, "On Thursday at 8 PM after dinner [*when*], at Carrier Library on the third floor [*where*], I will review my lecture notes and quiz myself [*how*]." They created three intentions for two reasons: (1) research shows that implementation intentions are more effective for difficult goals than easy ones (Gollwitzer & Brandslätter, 1997), and requiring three separate intentions increases goal difficulty, as it offers students more opportunities to fail; (2) three implementation intentions should strengthen the hypothesized effect of implementation intentions on level of construal. That is, if participants complete only one intention, it is likely that they will all complete it and minimize its effect on exam grades. Also,

their intention might produce only a weak effect on construal level. Three implementation intentions, however, might produce the desired effects.

Finally, I chose the days on which the implementation intentions would be directed. I required students to make one intention for the Saturday, Tuesday, and Thursday preceding the exam. Participants produced a time of day for their intentions, but predetermining the days themselves increased the goal difficulty. Also, it helped improve my measurement of intention follow-through. That is, providing specific days allowed me to ask, "which of the Tuesday, Thursday, or Saturday intentions did you complete?" rather than, "which of your intentions did you complete?" See Appendix A for implementation intention instructions.

Control Manipulation. Participants in the control group completed an unrelated writing task, describing their general study habits through college. Doing so allowed us to control for writing time between the two groups. The prompt was chosen to reduce suspicion about the study's true purpose without similarly affecting construal mindset as participants consider general trends rather than specific intentions (Trope & Liberman, 2010).

Construal Measure. The measure used was a Rosch (1975; Appendix B) categorization task. It was a validated measure of one's tendency to categorize objects differently pending his or her level of construal. The 20-item task requires participants to rate the extent to which certain items (e.g., a car or elevator) fits into a given category (vehicle). According to past research (e.g., Henderson, Fujita, Trope, & Liberman, 2006; Liberman, Sagristano, & Trope 2002), participants score lower on the measure as they focus more closely on details, reflecting a lower level of construal. For the present study, the measure was split in half, so that the participants could categorize ten items before and ten after receiving their intervention.

Hours Studying. Immediately after taking the exam a week later, participants reported on which days they studied and for how many hours. Thus, a students' studying on Tuesday, Thursday and

Saturday represented their intention fulfillment. Hours were also summed overall. Also, to control for students' typical study habits, I asked how often they typically study in a given week and for a hypothetical exam.

Demographics. Participants completed a number of demographic items, capturing academic performance variables, including overall and major GPAs, weekly time spent studying, and number of credit hours taken for the current semester. See Appendix C for the full form.

Exam Performance. Exam performance data were collected and used for analysis. These data were not attached to identifying student information.

Procedure

To initiate the study, I visited the PSYC330 class one week before the exam and presented the study to students. When doing so, I specified that the project is totally separate—and unrelated to—their PSYC330 coursework, professor, and grade. Those who were present were given a consent form (absent students were excluded from the study). At this point, participants were assigned to condition based on their seating in the room. Those who consented to the study were then given the packet of materials. Students were given 20 minutes to complete the exercises at the beginning of class. Class then resumed as usual.

A week later, immediately after taking the exam, participants were given the follow-up questions., which took about X minutes to complete. They completed them, received a debriefing form, and left the classroom.

Results

Hypothesis 1: The effect of experimental condition on studying and performance.

I first hypothesized that students in the experimental condition would study more and perform better on their exams. In other words, a student who completes a concrete study intention should spend significantly more hours studying and earn a significantly higher exam score than others. Neither trend was borne out in the data. Students who completed implementation intentions (M = 8.4, SD = 5.6) studied similar hours to those in the control (M = 8.6, SD = 6.0), t (54) = -0.11, p = .91. Intention students (M = 51.5, SD = 4.2) also performed similarly on the test to control students (M = 51.8, SD = 3.8), t (54) = -.21, p = .84. Completing implementation intentions to study apparently did not meaningfully improve the number of total hours a student studied or his test performance.

To further test my first hypothesis, I also ran additional tests operationalizing study time differently. First, I tested whether students may have studied greater total hours the week preceding their exam. Also, I tested if students in the experimental condition were more likely to study at all on the specific intention days of Tuesday, Thursday, and Saturday. Finally, I repeated each test, using ANCOVA to control for variables including year in school, typical study time for a test, and overall GPA. For these various tests, all ps > .05. The data thus suggested that completing implementation intentions had no significant effect on students' study habits. Still, in order to understand if construal level research could apply to intention forming, it was worth testing if generating implementation intentions influenced a student's construal level.

Hypothesis 2: Intention formation effects on construal level mindset.

My second hypothesis posited that completing an intention would significantly lower a students' current level of construal, or construal mindset. To test this, I totaled students' scores on a categorization task meant to measure construal mindset, which students completed both before and after the intervention. First, I wanted to ensure that the groups did not differ in construal mindset before beginning their

intervention, and they did not. At Time 1, students who went on to complete the intervention (M = 62.6, SD = 10.7) had a similar score on the mindset measure as did those in the control condition (M = 58.21, SD = 8.8), $t(60) = 1.73$, $p = .09$. Therefore, students in both conditions began the experiment in a similar construal mindset, and I could thus test if the manipulation caused any differences.

To test whether implementation intentions lowered construal levels more than the control, I completed a 2x2 mixed ANOVA, with condition and time as independent variables. One significant difference emerged. Scores on the mindset measure were significantly higher when students were in the experimental (M = 62.6, SD = 1.1*)* vs. control (M = 58.9, SD = 1.2) conditions, F (1, 124) = 4.97, p = .028. In other words, there was a main effect for condition. However, there was no main effect of time, as students scored slightly lower at time 1 (M = 60.4, SD = 1.2) than time 2 (M = 61.1, SD = 1.2), F (1, 124) = .206, p = .650. Finally, there was no Time x Condition interaction, F (1, 124) = .190, p = .664. Because no interaction was found, I could not conclude that construal scores differed because of the manipulation's influence from Time 1 to Time 2, thus my hypothesis was not supported. Overall, it seems that the manipulation had neither a significant effect on exam studying, exam performance, or construal mindset.

Hypothesis 3: Mediation of Effects

My final hypothesis would test if construal mindset mediated the effect of a students' implementation intention on his studying and exam score. According to Baron and Kenny's (1986) conceptualization of mediation, however, I first must show that a students' experimental condition significantly predicted study time or exam score and my proposed mediator, construal mindset. Because it did not, my hypothesis is conclusively not supported, and it is inappropriate to test the final steps of the mediation model.

Discussion

None of my hypotheses were supported. Intention forming did not significantly effect study time or exam performance. It also made no apparent change to construal levels. As a result, data did not support that construals mediated any effect of intentions on study or outcome variables. To help understand these results, a brief follow-up survey was sent to the participants roughly a week after the experiment's end. Of those who responded (N = 22), seven were able to recall and answer questions about the implementation intentions they completed.

Despite the importance of detailed thinking, intention writing does not lead participants to construe objects more narrowly, congruent with other tested construal level primes (Liberman, Sagristano, & Trope 2002). In past research, researchers prime participants' construal mindset with quick writing exercises, but the present data suggest that intentions differ from them in key ways. Other exercises often emphasize a shift from a relatively higher level of construal to a lower one. Wakslak and Trope (2009), for instance, used a prime in which participants generated exemplars of objects. An example of "drink" might be either "Coke" or "Pepsi", but in any case participants are forced to shift from category to example. Intention writing, meanwhile, had no inherent juxtaposition of higher- and lower-level thinking. Perhaps as a result it failed to cause a parallel psychological change.

Future researchers should instead prime some students to higher- and some to lower-level mindsets, using a previously tested priming exercise. They can then observe if participants in each respective condition form more- or less-detailed implementation intentions. Using a similar prime as Wakslak and Trope (2009), experimenters could create two groups, one focusing on creating categories and the other on creating examples. Primed towards examples, participants might be more likely to include rich detail in their implementation intentions, perhaps choosing to study a chapter on person perception rather than simply one on social psychology. Past research suggests that the more-detailed intentions would be more effective (Aarts & Dijksterhuis, 2000). Researchers could possibly attribute the

differences to the participants' construal levels. In order to test this, though, researchers should first create an effective goal-setting intervention.

Participants who generated goal intentions in the present experiment studied no longer and performed no better on their exam than those who did not. Past research has shown somewhat strong effects in academic-related tasks, but few interventions take place in real academic contexts. A lexical decision making task, used by Webb and Sheeran (2007), is classified as an academic goal according to Gollwitzer and Sheeran's (2006) meta-analysis. Other experiments classified as academic-related hardly reflect the complexity of studying for a test over a week-long period (e.g., Oettingen, Hönig, & Gollwitzer, 2000). Such studies offer a high level of laboratory control, perhaps helping explain the medium-to-large effects the authors found, but little generalizability.

Meanwhile, the present study used a much closer to real-world context. Many external variables likely contributed to the statistical noise I uncovered in my data. Students in the present study, for instance, were largely (66%) third-year, and most have probably developed routine study habits. Present data support this claim, as the strongest predictor of hours studied for the exam was students' reported hours studying for a typical exam. In a follow-up questionnaire that aimed to shed light on the current findings, one student even reported that the intentions were unhelpful because she "was already going to study anyway." Participants' intentions thus may not have broken their long-held practices enough to be effective.

In future experiments, researchers might focus instead on a population of newer college students with a greater need to develop fresh habits. Freshmen in their first semester, for instance, may be more impressionable and more likely to benefit from the intervention (Wilson & Linville, 1982). They would also stand to gain more, from a practical standpoint, if they could learn and apply a new goal-striving method and gain its benefits throughout their college career. According to Gollwitzer and Sheeran's (2006) meta-analysis, implementation intentions have their most consistent effects when *initiating* goal-

striving behavior. The majority of past research has focused on this area, including intention research in academic contexts, and has produced medium-to-large effects (Gollwitzer & Sheeran, 2006). For new students, initiating new goal-striving behaviors and cognitions might be especially relevant, as they face a sensitive period in which they must generate study habits in an unfamiliar environment. Implementation intentions might prove powerfully able to help them do so.

Given the apparent past success of implementation intention research, it seems wise to continue to investigate applications in academic contexts. When doing so, especially if over long periods of time, one should encourage students to review their intentions periodically. One student in our follow-up, in fact, cited that her intentions were useless "because [she] did not write them down somewhere to remember them." Mediation studies of implementation intentions suggest that forgotten intentions might be especially unhelpful. Studies suggest that cognitive accessibility to the cues used in an implementation intention is especially important to its effectiveness (Gollwitzer & Sheeran, 2006; Webb & Sheeran, 2007). In order for an intention to work, its user must not only use specific details, but also remember them so that they can trigger the desired behavior. A study intention may use a desk as its cue, but it will only motivate behavior if the student actually remembers this connection. While I emphasized including details in my study, perhaps I did not emphasize enough that students remember them.

As an extension, the intentions may have been strengthened if they had not focused on times (or days) of the week. Originally, specific days and times were requested because they made the goals more difficult, and thus more meaningful. All students will study the night before a test, but not all students will study on the Tuesday, Thursday and Saturday preceding it. However, this may have made the goals too difficult. Past research demonstrates that, even with well-made intentions, people often fail to seize a limited opportunity to act. Oettingen, Hönig, and Gollwitzer (2000) asked participants to form intentions to complete a concentration test every Wednesday morning for four weeks. Despite a small window in which to complete their tasks, participants averaged a discrepancy of two hours to their intended start time each week (if they completed it at all). When I asked participants to choose a specific time and day

in my study, it is likely I overestimated their ability to adhere. And no doubt, as a follow-up participant mentioned, "when it came time to complete them…other work became a priority." Apparently, once the small window passed, it was too far gone.

Instead, future researchers might emphasize a response to inner states rather than the clock or calendar. After students begin a study session, for instance, implementation intentions can help keep them on track (Gollwitzer & Sheeran, 2006). Once sitting at his desk, a student's mind can quickly wander to a nearby television or conversation between roommates. Well-formed intentions, however, can shield studiers from such temptations (Achtziger, Gollwitzer, & Sheeran, 2008). A revision of my study, then, might require that students make intentions that help prolong their studying. By doing so, students will not be constrained to studying within a narrow window of time. Instead, their intentions will benefit their studying whenever they choose to do it, and my data suggests that many students would do so.

Overall, this study highlights the importance of bringing research into real-world contexts. Many of the studies described in the intention literature take place in laboratory settings, often requiring participants to use their intentions nearly immediately after they form them. In one series of studies, participants performed significantly better on tests of mathematics and analytic reasoning (Bayer & Gollwitzer, 2007). However, they formed "if…then" intentions immediately before their test that helped them do so. As they move towards application, then, researchers might encourage students to form intentions immediately before each of their study sessions. Researchers can instruct students in the lab to tell themselves "if I feel the need to turn on my television, I will resist the thought and return to studying." Then, participants can practice intentions on their own while investigators follow the effects. Doing so could help move intention research out of the laboratory and begin to highlight important differences that real-world intention users should know.

Intention research in applied contexts may be young, but other motivation and goal-setting fields have more to offer (e.g., Bandura, 1997). As one example, research on self-efficacy has demonstrated

how students' beliefs about their capabilities can predict and influence their academic and career success (e.g., Lent, Brown & Larkin, 1984), even over extended periods. Studies have shown, for instance, that high self-efficacy students will persist longer in a difficult major and experience more success (Lent, Brown & Larkin, 1984). Although correlational, such research helps identify psychological factors that have impact with large groups over the long-term. Large-scale interventions may be complex and difficult, but past research can lay a foundation.

Intention research has even begun to build upon this foundation. One team of researchers, for instance, thought to create implementation intentions that tackled self-efficacy issues (Bayer & Gollwitzer, 2007). They had participants complete tests of mathematic and analytical competency, all having made goal intentions to finish as many problems as possible. Some students, though, made an additional implementation intention geared to raise self-efficacy: "when a difficult problem arises, I will tell myself I can solve it", for example. Those who made the additional intention completed significantly more problems. In this case, intentions utilized self-efficacy research in a meaningful way. Though this study took place in controlled conditions, combining intention and other areas of research may allow us to bridge the gap between the research- and real-worlds more quickly.

And we can't bridge the gap quickly enough. Year after year, college enrollment continues to increase, welcoming new students into challenging academic environments. Higher-education enrollment is projected to increase by 14% from 2012 to 2022 (Hussar & Bailey, 2013). Growth of student bodies highlights the need to create additional tools for struggling learners. At present, scientists have discovered some powerful interventions, especially for new students (e.g., Wilson & Linville, 1982). The University of Texas at Austin recently began testing large-scale interventions geared towards salvaging graduation rates of its typically at-risk populations (Tough, 2014). At-risk incoming freshmen at the institution, when exposed to a pilot belonging intervention, closed their achievement gap by about half when they better recognized that all new students faced similar challenges. As a large-scale intervention, this one shows promise in helping new students integrate into a difficult environment.

Once students have established themselves, though, how can they motivate themselves to solve personal self-control issues? My study hoped to tackle this question, but it proved unable to do so. As researchers go forward, they can hopefully begin to mix methods that help them understand techniques in controlled conditions and apply them to create real-world solutions. That way, psychologists can offer solid, empirical advice to students tackling a variety of motivational problems. After all, students will continue setting lofty, hard-to-reach goals every semester, and this is a good thing. As researchers, we need to help them achieve them.

Appendix A: Implementation Intention Instructions

In order to help people achieve their goals and execute behaviors, researchers have developed a useful technique called **implementation intentions**. They can be described as goal commitments that include three dimensions: First is the *point in time* (when), second is *the place* (where), and third is the *type of action* (how). Implementation intentions link the when & where with the how. By making a strong declaration to do something specific in a specific time and place, you make it more likely that you follow through with your goals; rather than just say, "I want to lose weight," you should say, "when I see my running shoes in my room after I get out of bed, I will lace them up and run for at least twenty minutes."

Here are a couple of examples:

- "On Monday, when I wake up at 8 AM [*time*] and climb out of bed [*place*], I will jog for twenty minutes [*action*]."
- "On Saturday, around noon and after lunch [*time*], in my apartment [*place*], I will make a grocery list, find a ride, and do my grocery shopping for the week [*action*]."

For your upcoming exam, we'd like you to complete three implementation intentions to help plan your studying. For each of the three days listed below, write an implementation intention. Include:

1. *Time of day* (this can be based around an event for the day, such as a class, extracurricular activity, or chore)
2. *Location* (this should reflect both where you'll be when you decide to study and where you'll study)
3. *Action you'll do* (this should include how exactly you'll study, what materials you'll cover, and how long you'll work for)

After you generate these details, write an intention in the form of a "When, then" statement. You'll say "When [*time, location you'll* be], then [*action, where you'll complete the action*]. Remember, the more details, the better!

Tuesday, 2/24:

Time:

Location:

Action:

Intention statement:

Thursday, 2/26:

Time:

Location:

Action:

Intention statement:

Saturday, 2/28:

Time:

Location:

Action:

Intention statement:

Appendix B: Rosch Task

We always group things into categories. For example, a "dog" belongs in the category of "mammal," which belongs in the category of "animal."

Sometimes, things are very strong examples of a category. For instance, a "chair" is a very good example of "furniture." Other times, things are weak examples of a category. A "lamp" is a weaker version of furniture. And an "oven" is an even weaker version of furniture.

In the following task, we would like you to indicate how well each item fits in the category described. Giving a score of "1" means that it is a weak version of the category. Giving a score of "10" means it is a very good example of the category.

How well does each item fit in the category?

Category: VEHICLE

Car

1 2 3 4 5 6 7 8 9 10

Elevator

1 2 3 4 5 6 7 8 9 10

Bicycle

1 2 3 4 5 6 7 8 9 10

Feet

1 2 3 4 5 6 7 8 9 10

Truck

1 2 3 4 5 6 7 8 9 10

Skateboard

1 2 3 4 5 6 7 8 9 10

Bus

1 2 3 4 5 6 7 8 9 10

Camel

1 2 3 4 5 6 7 8 9 10

Boat

1 2 3 4 5 6 7 8 9 10

Now, I'd like you to complete another categorization task.

Category: CLOTHING

Sandals

1 2 3 4 5 6 7 8 9 10

Shirt

1 2 3 4 5 6 7 8 9 10

Cane

1 2 3 4 5 6 7 8 9 10

Vest

1 2 3 4 5 6 7 8 9 10

Dress

1 2 3 4 5 6 7 8 9 10

Purse

1 2 3 4 5 6 7 8 9 10

Stockings

1 2 3 4 5 6 7 8 9 10

Ring

1 2 3 4 5 6 7 8 9 10

Pants

1 2 3 4 5 6 7 8 9 10

Appendix C: Study Measures and Demographic Variables

Please indicate (circle) which days you studied for this exam. For each day on which you studied, please write on the adjacent line how many hours you studied (feel free to use decimals).

Monday, 2/23: _____ hours

Tuesday, 2/24: _____ hours

Wednesday, 2/25: _____ hours

Thursday, 2/26: _____ hours

Friday, 2/27: _____ hours

Saturday, 2/28: _____ hours

Sunday, 3/1: _____ hours

Monday, 3/2: _____ hours

Did you study any additional hours for this test (before 2/23)? If so, how many? _____

How many hours do you typically spend studying per week? _____

How many hours do you typically study the week before a test (specifically for the test)? _____

Finally, please answer the following demographic questions.

Are you: Male Female Transgender Other

Age: _____

Current Year: Freshman Sophomore Junior Senior 5^{th}+ year

Ethnicity: Caucasian African American Asian Native Hawaiian/other Pacific Islander

American Indian or Alaskan Native Other (please specify: _____)

Cumulative grade point average (if unknown, give best approximation): _____

Major GPA: _____

References

Aarts, H., & Dijksterhuis, A. (2000). Habits as knowledge structures: automaticity in goal-directed behavior. *Journal of Personality and Social Psychology, 78*(1), 53-63.

Achtziger, A., Gollwitzer, P. M., & Sheeran, P. (2008). Implementation intentions and shielding goal striving from unwanted thoughts and feelings. *Personality and Social Psychology Bulletin, 34*(3), 381-393.

Ainslie, G. (1975). Specious reward: A behavioral theory of impulsiveness and impulse control. *Psychological Bulletin, 82*, 463–496.

Bandura, A. (1997) *Self-efficacy: The exercise of control.* New York: W. H. Freeman.

Bar-Anan, Y., Liberman, N., & Trope, Y. (2006). The association between psychological distance and construal level: Evidence from an Implicit Association Test, *Journal of Experimental Psychology: General, 135*, 609–622.

Bayer, U. C., & Gollwitzer, P. M. (2007). Boosting scholastic test scores by willpower: The role of implementation intentions. *Self and Identity, 6*(1), 1-19.

Burgoon, E., Henderson, Marlone, D., & Markman, A. B. (2012). Conceptualizing, manipulating, and measuring abstraction: A theoretical synthesis and practical guide, 1–55.

Fedoroff, I. C., Polivy, J., & Herman, C. P. (1997). The effect of pre-exposure to food cues on the eating behavior of restrained and unrestrained eaters. Appetite, 28, 33–47.

Fujita, K. (2011). On conceptualizing self-control as more than the effortful inhibition of impulses. *Personality and Social Psychology Review*, *15*(4), 352–66. doi:10.1177/1088868311411165

Gailliot, M.T., Baumeister, R.F., DeWall, C. (2007). Self-control relies on glucose as a limited energy source: Willpower is more than a metaphor. *Journal of Personality and Social Psychology, 92*, 325-336.

Gilbert, D. T., & Malone, P. S. (1995). The correspondence bias. *Psychological Bulletin, 117*, 21–38.

Gollwitzer, P. M. (1993). Goal achievement: The role of intentions. In W. Stroebe & M. Hewstone (Eds.), *European review of social psychology* (Vol. 4, pp. 141-185). Chichester, England: Wiley.

Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans. *American Psycologist*, 54*,* 493-503.

Gollwitzer, P., & Brandstätter, V. (1997). Implementation intentions and effective goal pursuit. *Journal of Personality and Social Psychology, 73*(1), 186–199.

Gollwitzer, P. M., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. In *Advances in experimental social psychology, Vol. 38* (pp. 69–119). San Diego: Elsevier Academic Press.

Henderson, M. D., Fujita, K., Trope, Y., & Liberman, N. (2006). Transcending the "here": The effect of spatial distance on social judgment. *Journal of Personality and Social Psychology, 91*, 845–856.

Hussar, W.J., and Bailey, T.M. (2013). Projections of Education Statistics to 2022 (NCES 2014-041). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Kirby, K. N., & Herrnstein, R. J. (1995). Preference reversals due to myopic discounting of delayed rewards. *Psychological Science, 6*, 83–89.

Lent, R. W., Brown, S. D., & Larkin, K. C. (1984). Relation of self-efficacy expectations to academic achievement and persistence. *Journal of Counseling Psychology, 31*, 356-362.

Liberman, N., & Förster, J. (2009). Distancing from experienced self: How global-versus-local perception affects estimation of psychological distance. *Journal of Personality and Social Psychology, 97*, 203–216.

Liberman, N., Sagristano, M., & Trope, Y. (2002). The effect of temporal distance on level of construal. *Journal of Experimental Social Psychology, 38*, 523–535.

Liberman, N., & Trope, Y. (2009). The psychology of transcending the here and now. *Science*, *322*(November 2008), 1201–1206.

Metcalfe, J., & Mischel, W. (1999). A hot/cool-system analysis of delay of gratification: Dynamics of willpower. *Psychological Review, 106*, 3–19.

Navon, D. (1977). Forest before trees: The precedence of global features in visual perception. *Cognitive Psychology, 9*, 353–383.

Nussbaum, S., Trope, Y.,&Liberman, N. (2003). Creeping dispositionism: The temporal dynamics of behavior prediction. *Journal of Personality and Social Psychology, 84*, 485–497.

Oettingen, G., Hönig, G., and Gollwitzer, P. M. (2007). Effective self-regulation of goal attainment. *International Journal of Educational Research 33*(7): 705-732.

Oettingen, G., Pak, H., & Scnetter, K. (2001). Self-regulation of goal setting: Turning free fantasies about the future into binding goals. *Journal of Personality and Social Psychology*, *80*(5), 736–753.

Shiv, B., & Fedorikhin, A. (1999). Heart and mind in conflict: The interplay of affect and cognition in consumer decision making. *Journal of Consumer Research, 26*, 278–292.

Thaler, R. H., & Shefrin, H. M. (1981). An economic theory of self-control. *Journal of Political Economy, 89,* 392.

Tough, P. (2014). Who gets to graduate? *The New York Times Magazine*. Retrieved from: http://www.nytimes.com/2014/05/18/magazine/who-gets-to-graduate.html?_r=0

Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review*, *117*(2), 440–63. doi:10.1037/a0018963

Vohs, K., & Heatherton, T. (2000). Self-regulatory failure: A resource-depletion approach. *Psychological Science*, *11*, 249-254.

Wakslak, C. J., Nussbaum, S., Liberman, N., & Trope, Y. (2008). Representations of the self in the near and distant future. *Journal of Personality and Social Psychology*, *95*(4), 757–73. doi:10.1037/a0012939

Wakslak, C. J., & Trope, Y. (2009). The effect of construal-level on subjective probability estimates. Psychological Science, 20, 52–58.

Webb, T. L., & Sheeran, P. (2007). How do implementation intentions promote goal attainment? A test of component processes. *Journal of Experimental Social Psychology*, *43*(2), 295-302.

Wilson, T. D., & Linville, P. W. (1982). Improving the academic performance of college freshmen: Attribution therapy revisited. *Journal of Personality and Social Psychology*, *42*(2), 367-376.