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Goal-Setting Training and Self-Regulation: A Treatment for Procrastination

Morin, Christopher

UNIVERSITY OF CALGARY

Goal-Setting Training and Self-Regulation: A Treatment for Procrastination

by

Christopher Morin

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Abstract

Negative references to procrastination can be found as far back as 800 BC, and one in five adults today identify themself as a chronic procrastinator. The purpose of this thesis is to develop and deliver a treatment for procrastination. Literature on motivation, goal-setting and self-regulation is reviewed to develop a computer-based procrastination treatment that incorporates principles from the literature. The treatment is tested with undergraduate participants who keep journals of intentions to study versus the time actually spent studying. The treatment reduces the participant's intention-action gap, but with less efficacy than the individual exercises that compose the treatment. A self-report measure of impulsiveness is found to identify people who will benefit most from the treatment. Experimental literature is reviewed to identify specific improvements to the methodology, literature streams for further review, and a promising field setting for future studies.

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This thesis could not have been possible without the mentorship of my supervisor, Piers Steel. He encouraged me to apply to the program, accepted me as his student, and guided me through the entire writing process. He showed me everything I needed to know in developing this paper. Any errors in the final product are my own. I also want to thank Scott Radford, Kibeom Lee and Michael Wright for serving on my examination committee. They are each gentlemen.

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Finally, and with deepest sincerity, I need to acknowledge my parents, grandparents, aunts, uncles and siblings. They gave me nothing to complain about and the liberty to complain anyway. I took that liberty and tested their patience. My trials were their trails, and in my way I ordained them as saints. I am blessed by their love, patience, and support.

To every over-worked, under-employed wage-slave I had the pleasure to serve with, and

To every incompetent, entitled or nasty manager whom inspired me to do something better.

You are always on my mind.

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In his exploration of the nature of procrastination, Steel (2007) finds the earliest reference to procrastination in the writing of the Greek poet Hesiod, 800 BC:

> Do not put your work off till tomorrow and the day after; for a sluggish worker does not fill his barn, nor one who puts off his work: industry makes work go well, but a man who puts off work is always at hand-grips with ruin. (*Works and Days*, 1.413, as cited in Steel, 2007)

Steel finds similar, negative references with increasing frequency at pace with the rate of industrialization. The same article reports 15 to 20% of adults today consider themselves chronic procrastinators. Among college students, 75% describe themselves as procrastinators and 50% say they spend up to one third of each day avoiding something they should be doing. The amount of time lost through procrastination seems exaggerated, but educators can attest that many student projects could benefit from more time spent on them (Day, Mensink & O'Sullivan, 2000; Kachgal, Hansen & Nutter, 2001).

Steel (2007) offers a formal definition of procrastination: "voluntarily delay [of] an intended course of action despite expecting to be worse off for the delay" (p. 66). When a person procrastinates, he or she risks creating a behavioral and affective cycle characterized by lost time, lowered performance, negative emotions, and detachment from subsequent tasks (Bandura, 1997). Fortunately, the cycle can turn in the opposite direction where early effort leads to success, success creates self-efficacy and, in turn, self-efficacy leads to earlier task engagement and more success (Lindsley, Brass & Thomas, 1995).

The purpose of this Master's thesis is to develop and deliver a treatment to reduce procrastination. The treatment is tested with undergraduate participants who use the treatment and keep journals of their intentions to study versus the hours actually spent studying. The aim of the procrastination treatment is to reduce the intention-action gap (Lay, 1986) by developing

motivation for an otherwise distasteful task, and helping participants begin distasteful tasks sooner. The long-term objective is to optimize a computer-based delivery system for the treatment that can also be used as a research tool to compare procrastination treatments.

The treatment incorporates principles of *goal-setting* and *self-regulation*. The positive relationship between goal-setting and performance is one of the most widely studied and robust findings of the motivation literature (Locke & Latham, 1990; Vroom, 1964). A recent survey of the empirical goal-setting literature estimates the efficacy of goal-setting has found support with over 40,000 participants in over 100 tasks with time frames ranging from 1 minute to 25 years (Day & Unsworth, 2013). The goal-setting literature is selectively reviewed for the most effective motivation principles of the goal-setting literature.

Much of the goal-setting literature is concerned with performance on a single goal (Mitchell, Harman, Lee & Lee, 2008, pg. 220; Vancouver & Day, 2005), but procrastination implies a choice between at least two goal-directed tasks: the primary task that is delayed, and the second task that distracts from that task. The decision to delay a task despite expecting to be worse-off for the delay (procrastination) is one example of self-regulatory failure (Judge & Bono, 2001). Self-regulation is loosely associated with willpower, but self-regulation's nature, source, and development are only recently being explored (Kuhl, 1992; Muraven, Tice & Baumeister, 1998).

This thesis begins with a review of the motivation literature for some of the most effective strategies for goal-setting and self-regulation, followed by a description of how these elements are combined and operationalized to deliver a novel, ten-step treatment for procrastination. The results of two trials of the treatment establish a need for goal-setting training, identify self-report measures that can be used to identify people who may benefit most from goal-setting training, and demonstrate support for the efficacy of the treatment. The thesis concludes with a discussion

of the challenges of observing procrastination, the nuances of studying self-set goals, and the complex reality of multi-goal pursuit.

Literature Review

The principle focus for the procrastination treatment is Steel and König's (2006) *Temporal Motivation Theory* (TMT) and its central, intuitive insight to the relationship between goal proximity and effort. TMT combines Vroom's (1964) *Expectancy Theory of Motivation* with theories of *Picoeconomics* (Ainslie, 1992) and *Hyperbolic Discounting* (Ainslie & Haslam, 1992). The latter two describe the observed tendency for people to undervalue distant rewards. In other words, as a reward becomes less distant (more immediate), its perceived value increases. This law draws independent support from a variety of research streams: sociology, social psychology, psychodynamic psychology, behaviorist psychology, and economics. The latter two streams produced several efforts to express behavioral observations as a formal, mathematical law. The expression preferred by Steel and König is Mazur's (1987) *Matching Law*. Adapted for TMT, the law becomes:

$$\text{Motivation} = \text{Expectancy} \times \text{Value} / [Z + \Gamma(\text{Delay})] \quad (1)$$

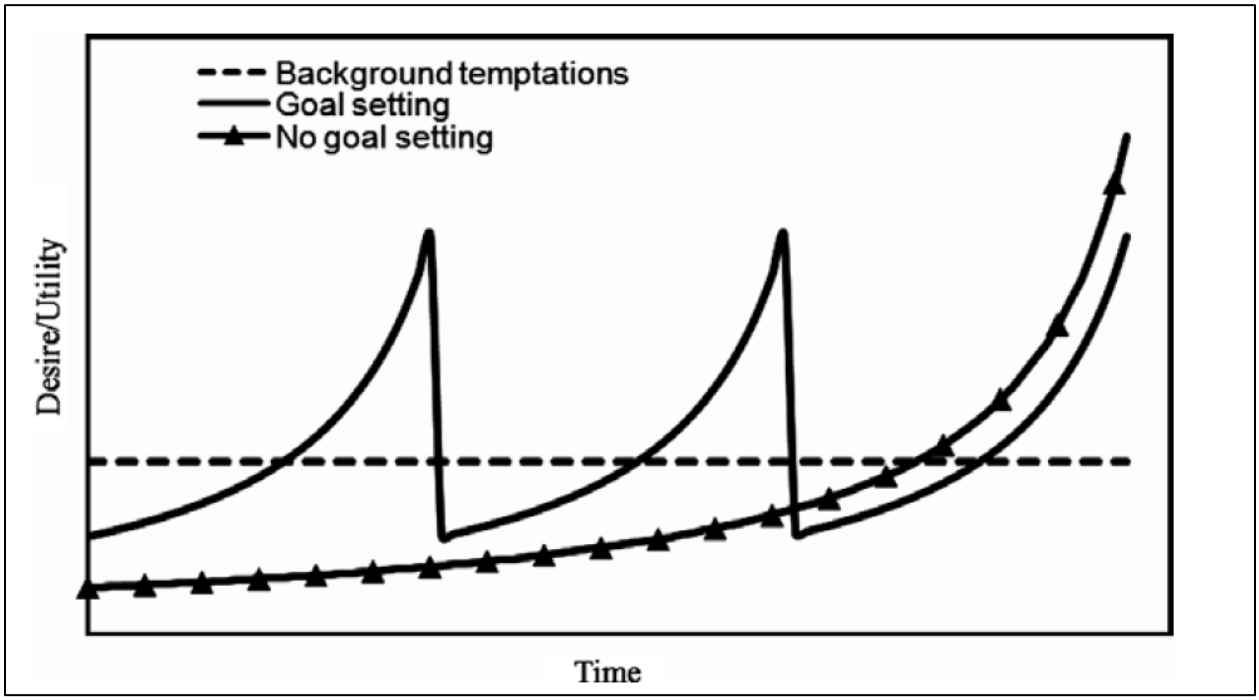
The relationship between motivation, expectancy, and value are the foundation of motivation theory (Vroom, 1964). The expression in the denominator captures the hyperbolic discounting effect. Delay is the time until the goal is achieved and the value is realized. Γ (Greek, capital gamma) is the individual's sensitivity to delay, and Z is a constant. As long as the pay-off is yet-to-come, the expression is positive. As delay approaches zero, motivation increases.

By staggering a larger goal into a series of smaller goals (Figure 1), the perceived utility of the larger goal peaks more often, and more effort is expended toward the larger goal. When the

reward is immediate, delay is very near zero and the denominator is at its smallest value, Z. When delay is large, the denominator gets larger in proportion with Γ. The objective value (numerator) remains the same so the effect of delay is that motivation increases as delay is reduced.

Figure 1

The Hyperbolic Motivation (Desire/Utility) Curve Predicted by TMT for a Single Project under No-Goal and Goal (Sub-Goal) Conditions (Steel & König, 2006).



The following sections review key elements of effective goal-setting and strategies for self-regulation. The purpose is to develop a motivation-based procrastination treatment that is easy to use and requires minimal explanation. The proposed format for the treatment is a ten-step goal-setting exercise. The following review is not a complete review of motivation or goal-setting, but provides the foundation for the content of the ten-step goal-setting exercise.

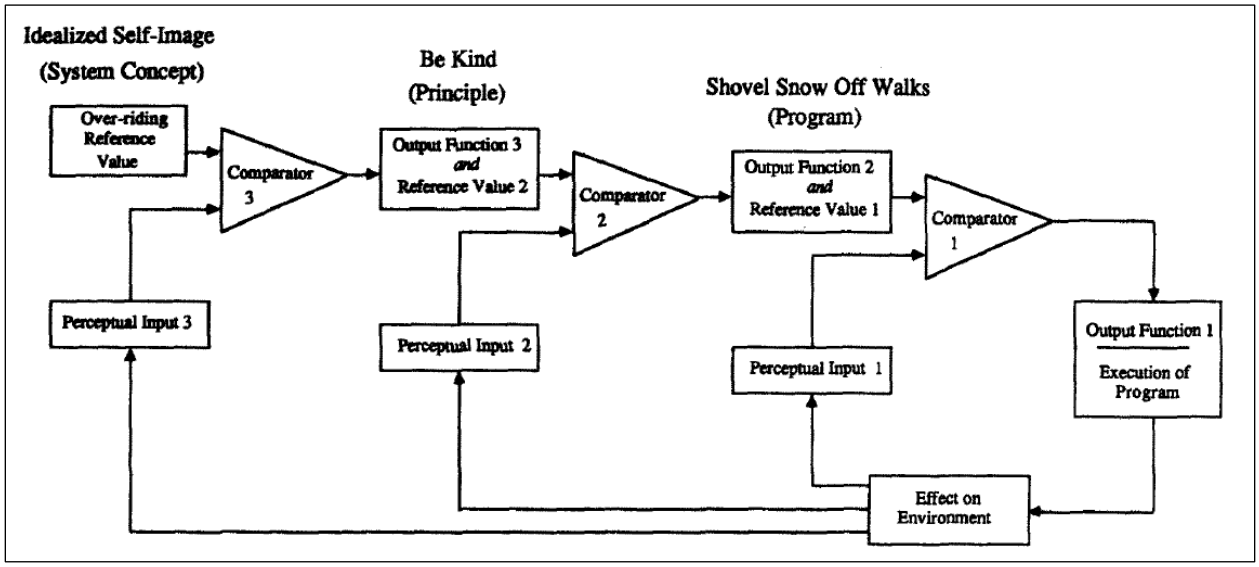
Expectancy, Value, and Commitment

A variety of studies support the positive relationship between goal difficulty and performance (Locke, Shaw, Saari & Latham, 1981; Tubbs, 1986). Difficult goals can inspire prolonged effort as long as the goal seems achievable. If a goal seems impossible, expectancy and thus motivation are reduced (Vroom, 1964). Conversely, easy goals inspire no more effort than is required (Schlinger, Derenne & Baron, 2008). A more challenging goal elicits more effort, which leads to higher performance. Highest performance is reached when goals are challenging but realistic.

Value can refer to both objective rewards (e.g., money) and intrinsic rewards (e.g., accomplishment or mastery). This review is primarily interested in intrinsic motivation because self-regulation implies an absence of outside motivation, thus the cultivation of intrinsic motivation is essential (Deci, 1975; Deci & Ryan, 1985). The principles of intrinsic motivation were notably incorporated into Hackman and Oldham's *Job Characteristics Model* (1976) and they continue to influence job design. Their model is concerned with aligning the goals of the organization with the goals of its members by incorporating intrinsically motivating elements like identity, significance, and autonomy into job design. One challenge of cultivating intrinsic motivation and self-regulation is linking the significance of otherwise distasteful tasks with high-order personal goals (Vancouver & Putka, 1995). A diagram of the principle of *Action Control Theory* (Powers, 1973; Figure 2) illustrates how mundane tasks are linked to higher-order goals. The treatment will help users reflect on the value of their goals.

Figure 2

A Three-Level Feedback Loop Linking Tasks to Self-Image and Higher-Order Principles (Carver & Scheier, 1990, p. 21)



Commitment to self-set goals, or goals with only intrinsic value, is closely linked to the expectancy and value of the goal. As Locke, Latham and Erez (1988) describe, "it is virtually axiomatic that if there is no commitment to goals, then goal setting does not work." A contemporary review of commitment in goal setting (Klein, Cooper & Monahan, 2013) concludes that where commitment is measured it is highly correlated with performance and that its strongest antecedents are task attractiveness, self-efficacy and expectancy. Due to commitment's centrality to goal-striving and performance, a reliable and popular five-item self-report measure has emerged (Klein, Wesson, Hollenbeck, Wright & DeShon, 2001) and is used to measure goal commitment in this study.

H1: A treatment that optimizes subjective expectancy of a task will reduce the intention-action gap.

H2: A treatment that increases subjective value of a task will reduce the intention-action gap.

H3: A treatment that confirms commitment to a task will reduce the intention-action gap.

Goal Specificity

In an early review of the goal-setting literature, Latham and Locke (1991) called the higher performance on challenging, specific goals versus vague or "do your best" goals one of the most studied and most consistent findings of goal-setting theory. One explanatory observation is that people with vague goals tend to rate their performance more favorably than people with specific and challenging goals (see Kernan & Lord, 1989; Mossholder, 1980). A second observation is that performance is more variable on a vague task than on a specific task because the standard for success is ambiguous on a vague task (Locke, Chah, Harrison & Lustgarten, 1989). For these reasons, any successful goal-setting exercise should use specific goals, rather than vague goals.

Evolutionary cognition provides a complimentary explanation for the effectiveness of specific goals. Human decision-making systems are composed of at least two different areas of the brain (Fudenberg & Levine, 2006). The first is the limbic system. It evolved earlier and is shared with other species. It makes decisions quickly based on immediate context. The second system is the prefrontal cortex, and is uniquely human. It is capable of abstract thinking and making long-term plans, but is slower than the limbic system. The limbic system is thought of as the impulsive drive that sabotages long-term intentions, e.g. eating cake rather than going to the gym, spending rather than saving. The power of specific goal-setting is to rely less on the abstract concepts in the prefrontal cortex and make goals more tangible so they are more difficult for the limbic system to over-ride (Steel, 2010b).

H4: A treatment that helps users set specific, tangible goals for themselves will reduce the intention-action gap of goal-directed activity.

Approach Goals vs. Avoidance Goals

A goal framed as an approach toward a desirable outcome is more effective than a goal framed as the avoidance of a negative outcome (Heimpel, Elliot & Wood, 2006, p. 1295). Heimpel et al. cite three negative effects of an avoidance focus. First, an avoidance focus reminds an individual of a negative state and evokes fear, anxiety, and self-doubt. Such negative affect is detrimental to persistence in goal-directed behavior (Di Paula & Campbell, 2002). In an illustrative thought exercise, Wegner (1989) asks readers *not* to think about polar bears for one minute. For most, it cannot be done. Even tremendous self-control creates the impression of a "polar bear-shaped hole" in the mind of a participant. Smokers or dieters who try to change their behavior with thought-suppression encounter similar difficulties. By not thinking about smoking or snacking, a person is effectively thinking about it.

Second, an avoidance goal does not offer a reference standard to guide behavior (Carver & Scheier, 1998). Third, and related to the previous point, success on an avoidance goal becomes defined as the absence of the negative state. Taken together, these two points suggest the effective difference between approach and avoidance goals are "potentially thriving, or merely surviving" (Elliot, Sheldon & Church, 1997).

H5: A treatment that helps users frame goals in terms of approach versus avoidance will reduce the intention-action gap for goal-directed activity.

Energy Maintenance and Self-Control

In a survey asking why students procrastinate, low energy was cited in 28% of responses, which placed low energy among the top three reasons for procrastination (Steel, 2007). Low

energy has been linked to task averseness (Baumeister, Muraven & Tice, 2000) and is associated with negative affect like boredom and depression (Gröpel & Steel, 2008). When a person's energy is low, self-control becomes more difficult. Research on a wide range of self-control tasks illustrates that self-control is a limited resource that can be depleted. Typical research design has participants engage in one type of self-control exercise, and then measure their performance in a second self-control exercise. Examples of self-control exercises used in experiments include squeezing hand-grip gauges, altering emotions, suppressing thoughts, solving anagrams, dieting and controlling spending (Gailliot et al., 2007, p. 325-6; Muraven, Tice & Baumeister, 1998). Participants consistently perform worse or withdraw sooner from the second task compared to a group whose self-control was not depleted previously. The implication is that physical, cognitive, and affective self-control draw from a single, limited source of energy.

Though there is support for a model of self-regulation as a muscle that becomes fatigued with repeated use and may be replenished with glucose (Gailliot et al., 2007), there is a psychic component to self-regulation that is replenished by means other than calorie intake. Thayer, Newman and McClain (1994) explore energy and mood maintenance and report the results of several surveys on how respondents maintain their mood. Solitude, distraction, music, socializing, eating, religious practice, exercise, shopping, self-reward, alcohol, tension reduction, expressive behavior, cognitive restructuring, problem-directed activity, and affiliation are all ways people regulate their mood to stay energized.

H6: a treatment that helps users allocate energy will also reduce the intention-action gap on goal-directed activity.

Implementation Intentions

Implementation intentions are specific statements of goal-directed activity, typically in the form of an "if-then" statement (see Gollwitzer & Sheeran, 2006, for a review of implementation intentions). Implementation intentions can be specific plans on when, where, and how a task gets initiated, or they can anticipate situations that lead to distraction and associate those situations with behavior intended to maintain focus on the task. The importance of identifying situational cues or triggers to behavior, productive or counter-productive, as a means of self-regulation can be understood in terms of the discussion on evolutionary cognition in the *Goal Specificity* section, above. Distractions are often enjoyable activities offering more immediate pay-offs like sweet foods that derail health goals, or socializing that distracts from academic goals. By making specific and actionable intentions in advance, the events that lead to distraction are instead associated with the plan to stay focussed on goals.

Specific, actionable implementation intentions have been shown to add a higher rate of performance to a wide variety of activities from collecting coupons (Aarts, Dijksterhuis & Midden, 1999), to job seeking (van Hooft et al., 2005), to completing chores and writing assignments (Gollwitzer & Brandstätter, 1997), to exercising and sorting garbage for recycling (Rise, Thompson & Verplanken, 2003).

H7: A treatment that helps users set specific, actionable, and measurable implementation intentions should also reduce the intention-action gap of the goal-directed activity.

Mental Contrasting

Mental-contrasting was developed as a problem-solving exercise that asks users to reflect on the positive aspects of reaching their goals, and link those aspects to aspects of their current condition. The practice helps users define the gaps between their current and desired states,

identify barriers to success, and create realistic optimism (Oettingen & Gollwitzer, 2009). Realistic optimism has the dual-benefit of avoiding unproductive focus on either positive future outcomes or negative current states. Instead, people can focus on what needs to be done to link the current and future conditions.

H8: A treatment that includes the mental contrasting exercise should also reduce the intention-action gap for goal-directed activity.

Pre-Commitment and Binding Behavior

In contrast to the strategies of implementation intentions, pre-commitment is a set of creative strategies to add value to a goal, or impose real costs to deviating from intended behavior. The term, "pre-commitment" has a history of use in financial management and decision-making (e.g., Casari, 2009; Spencer & Brander, 1991), and the concept is now being applied to behavioral economics. Ariely and Wertenbroch (2002) conduct a study where participants improve performance by voluntarily imposing costs to missed deadlines. In the same article, Ariely and Wertenbroch describe several anecdotal examples of binding behavior: dieters who choose to dine at restaurants with healthier choices, smokers who buy smaller packs of cigarettes to reduce consumption, and recovering addicts who leave a self-incriminating letter in trust to be mailed in the event of relapse. The most promising observation in their review is that people seem to understand the value of pre-commitment and voluntarily self-impose binding behavior, though binding behavior seems to require existent will-power and is a contradiction to observed, self-defeating behavior (Baumeister & Scher, 1988). Recruiting trusted monitors, as in the example of the recovering addict, could be a powerful addition to a computer-based procrastination treatment in today's era of social-media and connectivity.

H9: A treatment that helps users pre-commit to goals should also reduce the intention-action gap of those goals.

Operationalizing a Treatment for Procrastination

This Master's thesis is intended to be the start of a larger, long-term project to develop an optimized treatment for procrastination. The purpose of this study is to create the foundation for a research tool that will allow researchers to combine and compare goal-setting exercises and self-regulation strategies. The following is a brief description of how the artifact was developed.

The artifact must be customizable so that proposed treatments can be added, adjusted, or recombined. It must also be easy to use so it is accessible to as many people as possible. Finally, the language and format for delivery must be general enough to be applicable to any of the range of activities people may set goals for themselves. The trials in this thesis are all in an academic setting, but the phrasing of the steps in the treatment are meant to be general and apply to any type of goal (Ferrari, Barnes & Steel, 2009).

The procrastination treatment used in this thesis takes the form of a simple electronic application. As a research tool, a digital treatment is easy to adjust as user data on ease-of-use or the value of the exercise is received. The connectivity of the World Wide Web allows researchers access to a larger participant pool than was previously feasible. It is easy to understand how research that relies on personality surveys or self-report measures is facilitated by the World Wide Web. The researcher can effectively administer the survey once by uploading to a secure website and directing participants to the website. Survey and treatment responses are automatically coded, stored and organized for analysis. Electronic treatment delivery and the World Wide Web create opportunity for so-called mega-trials of tens to hundreds of thousands of participants in a single study with less effort than is required to obtain a few hundred responses

on a traditional paper questionnaire (see, as examples, Gröpel & Steel's (2008) 9,351-participant mega-trial of the nature of procrastination, and Vancouver, Weinhardt & Schmidt's (2010) student scheduling simulation).

The treatment developed in this study is a *Microsoft Excel*-based prototype, but it retains the desired characteristics of the artifact proposed in this section: customizability, accessibility, and generalizability. A copy of the treatment is included in Appendix 1.

H10: The treatment will reduce the intention-action gap.

Experiment 1: Pilot Test of the Procrastination Treatment

The purpose of the initial pilot test is to confirm that the format of the delivery does not distract from the perceived value of the exercises being delivered. The treatment is a *Microsoft Excel*-based application. Undergraduate participants should be familiar with the spread-sheet program, but the treatment is a novel use of the program. Participants were introduced to the application, had time to apply the principles to their goals, and had opportunity to give qualitative feedback on the value of each exercise in the treatment.

Design

The pilot test uses a quasi-experimental design combining self-report measures, a structured questionnaire, and invites open-ended feedback. All participants were placed in a single group and performed the same procedures.

There were two stages to the pilot study. Upon providing informed consent, participants were e-mailed a copy of the treatment and instructed to work through it, following the instructions on each page. Once completed, the workbook was returned to the researcher. After three weeks, the researcher e-mailed the participants a short, 3-item questionnaire on the value

participants found in the exercise. At that time, participants were invited to make general comments on the efficacy or problems with the treatment.

Participants

Participants were recruited through an undergraduate research participation credit system. All of the participants were enrolled in a second-year human resource management class and received a 1% bonus on their final grade for participating. One condition of using the undergraduate research participant pool is that participants may only be kept for one hour. In this pilot study, the hour was split between the first stage and the second stage of the design. The University of Calgary's Conjoined Faculty Ethics Review Board reviewed and approved this project. Each participant provided informed consent to participate.

There were approximately 400 students in the class that served as the participant pool. Participation was not a requirement of the course. If students did wish to participate in research projects, they were limited to two projects. That is, students could receive a maximum of 2% in bonus credit. The recruitment letter published on the course website is included in Appendix 2. Of the 85 students who expressed interest in participating, 65 completed the exercise (a 76% retention rate). Participants were not asked why they dropped-out. At least one participant cited withdrawal from the course as a reason.

Setting and Apparatus

Participants were e-mailed the *MS Excel*-based prototype of the procrastination treatment (Appendix 1) and were asked to work through the exercises and return the completed booklet to the researcher. Participants were able to work when and where they preferred. The researcher did not give verbal instructions to participants. The only instructions were on the recruitment letter

and in the booklet itself (Appendices 1 and 2). The consent form informed participants that they may contact the researcher with any questions, but the researcher was not contacted.

Procedure

In addition to the primary goal-setting and refining exercise of the treatment, at each step participants rated, on a scale from 1 to 7, how well their re-framed goals met the instructions at each step. Three weeks after the exercise, participants were contacted to answer three questions on the progress made toward their goals, and how the goal-training exercise compared against their usual goal-striving strategies.

Results

In total, 65 participants used and rated the procrastination treatment. At each step, participants were introduced to one of the goal-setting exercises and asked to re-frame their goal to incorporate the principles of the exercise and make the goal more effective. Each time a goal was reframed implies the self-set goal was not effective enough. The more times a goal was re-framed, the greater the need for goal-setting training. The number of participants who reframed their goals at each step is presented in Table 1.

Table 1

Number of Times Participants Reframed a Goal

	Approach	Challenge	Immediate	Specific	Power hours	Cues and triggers
Number of times a goal was refined (N = 65)	48	59	63	63	58	62

At each step participants rated how well they are able to refine their goal following the instructions for that step. The number of students who reported they “somewhat disagree” or

"strongly disagree" to a statement that their refined goals met the instructions at each step is presented in Table 2.

Table 2

Number of Participants Who Reported Difficulty Aligning Goals with Treatment Criteria.

Self-report statement	Number of participants who reported difficulty (N=65)
"My primary goal is framed as an approach goal."	2
"My primary goal is appropriately challenging for me."	0
"My primary goal is meaningful to me."	0
"My primary goal is important to me." (5-item measure, Klein et al., 2001)	0
"My sub goals are framed as approach goals."	2
"My sub goals are immediate."	1
"My sub goals are specific."	1
"My sub-goals make use of my 'power hours'."	6
"My sub goals make use of cues and triggers."	4

Finally, three weeks after the initial exercise, participants were asked to comment on the overall value of the exercise. Participants rated their agreement with three statements on a scale from 1 to 9 anchored at 1 (*strongly disagree*), 3 (*somewhat disagree*), 5 (*neither agree nor disagree*), 7 (*somewhat agree*), and 9 (*strongly agree*).

Figure 3

Frequency of Scaled Responses to "I have made more progress toward my stated goal since the goal-setting exercise than I think I would have through my usual goal striving techniques." N = *65;* m = *7.2)*

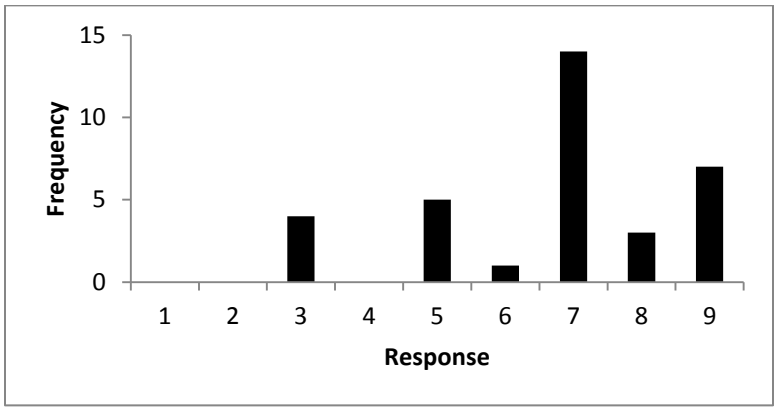


Figure 4

Frequency of Scaled Responses to "I have spent more time striving toward my stated goal, as compared to my usual goal striving, since the goal-setting exercise." N = *65*, m = *6.0*

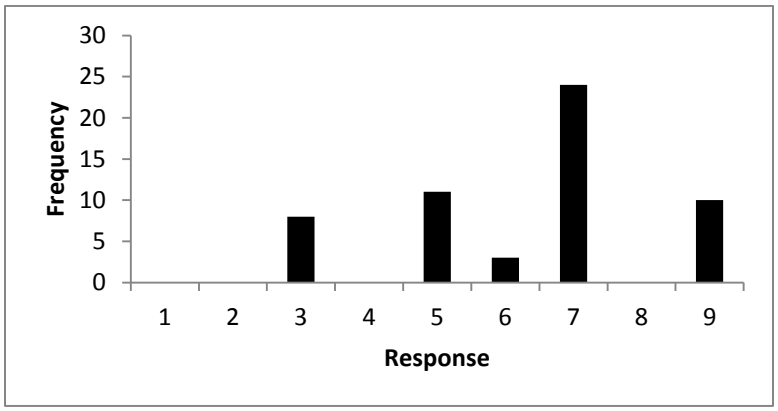
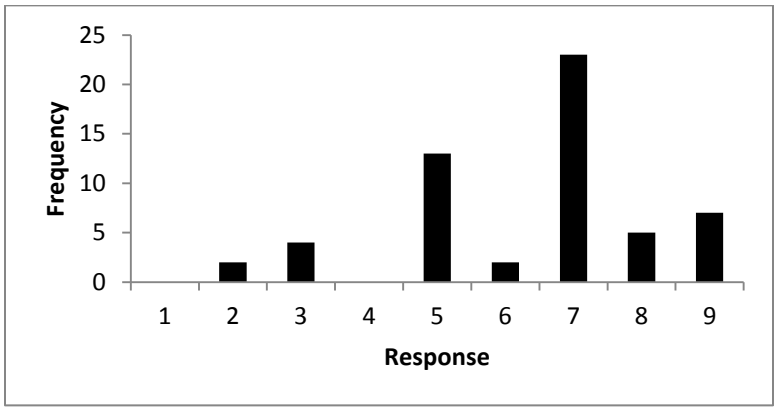


Figure 5

Frequency of Scaled Responses to "When I do strive toward my stated goal my striving has been more intense, as compared to my usual goal-striving since the goal-setting exercise." N = *65*, m = *6.2*



Discussion

The results summarized in Table 1 confirm the need for goal-training. The instructions at each step prompted a majority of participants to refine their goals. This implies that goals set independently, prior to goal-training instruction, are deficient. It is promising for practical applications of a procrastination treatment.

Upon review of participant submissions, not every goal refinement was needed. For example, many initial goals were already approach goals, but when instructed to make their goal an approach goal, participants often rephrased an existing approach goal in a way that made the goal more specific. Despite the confusion over the need to reframe at each step, changes made at the immediate, specific, power hours, and pre-commitment steps are consistent with the intended purposes. The motivational value of meaningful, challenging, and approach-oriented goals remains, but the wording of the treatment instructions should be changed to emphasize that re-framing is not always required at these steps.

The results in Table 2 suggest the delivery needs refinement. Participants report no trouble setting and committing to challenging and meaningful goals, but a couple of participants report trouble with framing goals as approach goals, and nearly 10% of participants are dissatisfied with their ability to incorporate energy maintenance and behavioral cues and triggers. Upon review of submissions where participants reported difficulty setting approach goals, those goals were judged to be sufficiently approach ("graduate from university with a GPA of 3.5", and "prioritize projects and set a plan for completion"). Similar review of difficulties around energy maintenance and behavioral cues revealed difficulties around planning and conflicting priorities. One participant reported he could not anticipate situational cues that lead to distraction. Several participants reported their peak energy hours are already reserved for other activities. This simple observation highlights the reality that as much as is known about effective single-goal pursuit, multiple-goal pursuit is far more realistic but receives far less attention (Louro, Pieters & Zeelenberg, 2007).

The results to the follow-up questions (Figures 3 to 5) indicate a largely positive response to the goal-training exercise and its delivery. In future, respondents should be asked to provide more specific details of what they liked or did not find useful in the goal-setting exercise. There is ambiguity around the meaning of the extreme answers, particularly in the last two questions. To elaborate, recall that much of motivation theory assumes single goal pursuit but the reality is that the participants are living lives with multiple, conflicting goals (Louro, Pieters & Zeelenberg, 2007; Vancouver & Putka, 1995). It is unclear whether more time spent or more intense effort on a particular goal is viewed favorably or unfavorably by the respondent. In single goal striving, more intense effort over a longer time should mean more productivity. When there are multiple goals requiring attention, less intensity over a shorter time might be considered

efficient and thus favorable. The opportunity to interview respondents at either of the extreme ends of the response scales (Figures 3, 4 and 5) would most directly address the purpose of this study, that is, to discover the best exercises for motivation and how to deliver them.

Experiment 2: Decreasing the Intention-Action Gap

Based on the feedback from the pilot study, the *Excel*-based delivery of the treatment did not cause any problems for participants. The response to the total treatment was overall positive (Figures 3, 4 and 5). The exercises to develop expectancy, value, commitment, specificity and approach-focus for goals all worked well. The exercises intended to develop implementation intentions, pre-commitment, and energy regulation caused difficulty for approximately 10% of participants (Table 2). Based on participant feedback, the general problem is finding a balance between the open-ended instructions required to make the treatment generalizable across a wide variety of goals, and the need for simple, straight-forward instruction. Before beginning the second experiment, a few changes were made to the treatment. Those changes are described in the next section, and the new version of the treatment can be found in Appendix 3.

Changes to the Goal-Training Treatment

The mental-contrasting should be separate from the sub-goal setting step. Mental-contrasting is correctly viewed as a problem-solving exercise that identifies barriers to success and creates realistic optimism (Oettingen & Gollwitzer, 2009). Mental contrasting has the dual-benefit of avoiding unproductive focus on positive future outcomes as well as negative current states. For that reason, the mental contrasting exercise should stand alone, separate from sub-goal setting. In the next iteration of the goal-training app mental contrasting is placed immediately before the commitment check, so users will be in a realistic frame of mind when they are asked to assess their commitment.

The energy maintenance "power hours" step was removed due to the reality of conflicting goal demands. The issue remains that nearly one third of procrastinators report fatigue as the reason for not starting tasks sooner (Steel, 2007). A review of literature on goals and energy offer some suggestions on how to address the issue in a generalized way.

Thayer, Newman, and McClain (1994) equate energy maintenance with mood maintenance. In other words, maintain goal striving by warding depression. Thayer et al. report the results of several surveys on mood maintenance. Solitude, distraction, music, socializing, eating, religious practice, exercise, shopping, self-reward, alcohol, tension reduction, expressive behavior, cognitive restructuring, problem directed activity, and affiliation are all ways people regulate their mood to stay energized. Each is personal, and not generalizable across all circumstances, but taken together can offer ideas to users on ways to reward themselves after a sub-task is finished. A proposed solution to the scarcity of power hours is to add a late step where users plan rewards for themselves following both minor task completion and success in the over-all goal. This has the dual effect of creating motivating incentives as well as regulating mood by avoiding an "all work and no play" mentality.

The search for ways to regulate energy also inspired an expansion of the pre-commitment step to include implementation intentions. Pre-commitment helps to avoid distraction, but specific, actionable implementation in the form of an if-then statement (if that happens, then I will do this) have been shown to add a higher rate of performance to activities like collecting coupons (Aarts, Dijksterhuis & Midden, 1999), job seeking (van Hooft et al., 2005), completing chores and writing assignments (Gollwitzer & Brandstätter, 1997), and exercising and recycling drink cartons (Rise, Thompson & Verplanken, 2003).

Design

This study used a between-group design with two groups. Groups were randomly assigned. All participants completed a short questionnaire assessing trait expectancy, perceived value of school work, trait impulsiveness, and trait procrastination (Appendix 4). Participants also agreed to maintain a journal of the time they spend on school work each day for six weeks (Appendix 6). One group also received the procrastination treatment.

Participants

Participants were recruited through the same undergraduate research participant pool used in the pilot study, but during a different semester so that none of the participants had prior experience with the procrastination treatment. All of the participants were enrolled in a second-year marketing class and receive a 1% bonus on their final grade for participating. One condition of using the undergraduate research participant pool that places limitations on this study is that participants could only participate for one hour. The University of Calgary's Conjoined Faculty Ethics Review Board reviewed and approved this project. Each participant provided informed consent to participate.

There were approximately 400 students in the class that served as the participant pool. Participation was not a requirement of the course. If students did wish to participate in research projects, they were limited to two bonus marks. That is, students will only receive bonus credit for participating in up to two projects. The recruitment letter published on the course website is included in Appendix 5. Of the 68 students who initially signed the participant consent form, 60 returned the survey (a retention rate of 88%). Of those 60 students, 36 also returned the journal at the end of the six-week period (a net retention rate of 54%). Correlations between the survey variables and whether or not the participant returned the journal were not significant.

Setting and Apparatus

Interested students were asked to visit the researcher's office to provide informed consent and receive the participation materials (survey, Appendix 4; journal, Appendix 6; and in the treatment group, the new version of the procrastination treatment, Appendix 3). The researcher arranged to e-mail the materials to the participants so they may work at their convenience. One participant declined to participate because of the electronic-based system, despite assurances of anonymity and confidentiality approved by the Ethics Review Board.

Once informed consent was received, the researcher asked each participant to review the instructions on the survey and journal, and answered any questions. Participants were all familiar with personality surveys, anchored rating systems, and understood the *Excel*-based journal (Appendix 6).

Procedure

Once informed consent was received, the materials were e-mailed to participants. Participants completed the personality questionnaire (Appendix 4) once, before the period covered by the journal began. Instructions in the journal are included in Appendix 6. At the start of the week, students reported how many hours they planned to spend on school work each day. At the end of the week, students reported how many hours they actually spent on school work each day, and at the same time reported their plans for the following week. The process is similar to completing a time sheet at a part-time job, but with the added step of estimating at the start of the week how many hours will be worked. The period ran for six weeks, and produced 42 observations for each participant.

Measures

The dependent variable is the intention-action gap: the difference between the number of hours participants planned to work each day, and the number of actual hours they report by the end of the week. Participants also completed a short questionnaire designed to measure four traits: expectancy for school work, value of school work, impulsiveness, and procrastination. The procrastination measure is Steel's (2010a) Irrational Procrastination Scale, but the correlations between self-report procrastination scales and observed procrastination has not always been significant (Ferrari, Johnson & McCown, 1995, ch. 1; Orellana-Damacela, Tindale & Suárez-Balcázar, 2000, Van Hooft et al., 2005). Expectancy and value were included because of their relationship to motivation (Vroom, 1964), and impulsiveness was added because of its role in TMT. Any of these trait variables might predict the size of the intention-action gap. Expectancy was measured with the Work Self-Efficacy Scale (Speier & Frese, 1997), value was measured with a task averseness scale for school work, and impulsiveness was measured with the Susceptibility to Temptation Scale (Steel, 2010a).The items and reliability of each measure are included in Appendix 4. Participants rated each item of the survey on a 5-point scale anchored at 1 (*very seldom or not true of me*) and 5 (*very often true, or true of me*).

Results

The constraints on participant availability meant few of the hypotheses could be tested. Only the aggregated version of the procrastination treatment was tested, which combines all steps at once, so different combinations of goal-setting steps (hypotheses 1 through 9) could not be compared. This analysis focuses exclusively on the effect of the treatment on participant intention-action gap (hypothesis 10).

As mentioned, the intention-action gap is measured here as the difference between the hours participants plan to spend studying minus the hours participants report they actually spent studying. Hypothesis 10 predicts the treatment group will have a smaller intention-action gap than the control group. An initial correlation analysis yielded few significant results (Table 3), only that *impulsiveness* had significant correlations with *procrastination* and *lack of value*. T-tests of each variable between the treatment and control groups identified a significant mean difference for impulsiveness (df = 34, t = -1.79, p = .003) between the treatment group (M = 32, SD = 7.6) and the control group (M = 28, SD = 4.1). The group receiving the procrastination treatment reported significantly higher trait impulsiveness at the start of the experiment.

The six week journal period of the study overlapped with "reading week." During this week, classes are cancelled. Many students use the time to prepare for exams and projects, but some take the opportunity for a holiday. The overall effect of that week was statistical noise over the trends of the other five weeks. Reliability analysis was used to identify days from the journal data that did not load with the aggregated journal data. Days with an inter-item reliability less than .2 were removed from the data to create a time-controlled intention-action gap (I-A Gap_T, Table 3). Ten days of the 42-day journal period were removed, which leaves 32 daily measurements, and improved the Cronbach's Alpha of the correlations across the daily journal data from .82 to .85. Of these ten days, five are from reading week, and four of the remaining five days coincide with weekends.

The treatment did have the expected negative relationship with the size of the *intention-action gap*, though the correlation was not significant. The time-controlled intention-action gap does correlate with the *impulsiveness* measure. Focusing on the significant variable, a step-wise linear regression was performed, first between the time-controlled intention-action gap and

impulsiveness (R^2 = .14 (F (1, 35) = 5.39, p < .05)), then again with the treatment is added to the model (ΔR^2 = .03 (F (2, 34) = 3.24, p = .053)). This analysis allows for a control of the significant impulsiveness variable, which was higher in the treatment group than in the control group at the start of the experiment. As can be seen, the treatment borders on significance, suggesting that the goal setting treatment is most effective for people who are impulsive.

Table 3

Correlations, Means, and Standard Deviations for Survey Responses, Intention-Action Gap, and Time-Controlled Intention-Action Gap

Variable	Expect.	Impulse.	Procras.	LoV	I-A Gap	I-A Gap$_T$	*M*	*SD*
Treatment	-.06	.30	.14	.28	-.03	-.05	--	--
Expect.		-.12	.17	-.21	-.08	-.14	4.0	0.4
Impulse.			.41*	.71**	.32	.37*	3.3	0.6
Procras.				.27	.15	.18	3.4	0.7
LoV					.02	.07	3.0	0.7
I-A Gap							18	24
I-A Gap$_T$							12	22

Note. Expect. = Expectancy; Procras. = Procrastination; LoV = Lack of Value; I-A Gap = Intention-Action Gap; I-A Gap$_T$ = Time-Controlled Intention-Action Gap. Significance is two-tailed. N = 36.

$^{*}p < .05$ $^{**}p < .01$

Discussion

The effect size of the second experiment is small (d = 0.09) and based on the ΔR^2 in the linear regression, more than 0.07 of the effect is attributable to the coincidental difference in

impulsiveness between the treatment and control groups. In comparison, an early meta-analysis of goal-setting found an average effect size of 0.502 for goal specificity alone (Tubbs, 1986). A similar meta-analysis of implementation intentions found an effect size of 0.65 with university student participants (Gollwitzer & Sheeran, 2006). Both of these studies have statistical power above .95, and the present study has a statistical power less than .02. The present study incorporates both of these principles of effective goal-setting, among others, into the treatment and expected the effect size to match, if not exceed, the effect size of the individual principles that composed the treatment. The same experimental design used in this study requires approximately 1300 participants to observe effects with statistical power above .95.

The low significance of explanatory variables is likely caused by the small participant pool. Also, participant selection was not a true random sampling of the participant pool, but instead there might have been self-selecting bias toward members with little to gain from goal-setting training. Across the six weeks of the journal period, the average participant procrastinated for 18 hours (17 hours in the treatment group), or less than 3 hours per week. The participants in this study do not seem to be from the 50% of undergraduates, cited in the first paragraph of this thesis (and Steel, 2007), who report spending one third of the day procrastinating. Participants who volunteered for this study may have been previously exposed to goal-setting strategies, enjoyed success with them, and were interested to participate in a study where they can learn more. On the other hand, Steel (2010a) reports average procrastination and impulsiveness in a much larger sample (N = 4,169), but those averages (procrastination N = 3.63, SD = 0.83; impulsiveness N = 3.23, SD = 0.73) are not significantly different from the numbers reported in this study. Recall also there was not a significant difference between the participants who completed the questionnaires but did not submit the completed journal (see “Participants”

section). The self-selection of participants to favor those who are already motivated and have little to gain from goal-setting training was considered but not supported.

The participants in this study could be highly motivated students, and some could be struggling students interested in the 1% bonus grade for participation. A chronic procrastinator could even rationalize and minimize reported delay while maintaining the journal. Rationalization is a common emotional coping mechanism associated with impulse-driven behavior (Ferrari, 1994; Tice & Bratslavsky, 2000). These participants would have procrastinated more than they report in the journals used in this study. It is more likely that chronic procrastinators would not have mustered the motivation to register to participate in the first place. In any case, the reported intention-action gaps seem smaller than expected..

One significant challenge to planning this study is that the use of student participants was limited to one hour. The researcher could not ask the treatment group to return the completed treatment, only introduce the treatment and encourage the participants to work through it. A second concern was that participants are all in the same class and might know each other. A participant might share the treatment with a friend in the control group. Both of these issues are difficult to control and the researcher can only assume participants in the treatment group used the treatment and did not share with the control group.

Another threat to validity was unknowingly identified by a participant. Upon returning the completed journal the participant commented, “Thanks for the opportunity to participate! It was useful to keep track of my goals. I will continue to use this technique.” The participant was in the control group! The act of maintaining a journal of goals and performance is itself a goal-setting and monitoring exercise. As a baseline against the treatment condition, it is not a no-goal-setting condition, but is goal-setting without the instruction of the 10-step treatment. The more the

baseline condition resembles the treatment condition, the less likely the treatment effect will be seen. This likely also impaired the statistical power of this experiment.

Despite the threats to validity, this experiment does find the impulsiveness measure to be a significant predictor of the size of the intention-action gap. People with low impulsiveness will only enjoy marginal reductions in procrastination. The ability to identify impulsive people in need of goal-setting and self-regulation training is an important step in testing the treatment in future experiments. The role of impulsiveness in procrastination found in this experiment is also consistent with *Temporal Motivation Theory* (Steel & König, 2006)

General Discussion

This thesis establishes support for the need for training in goal-setting, and delivers a simple training program that does reduce procrastination. The research also identifies a self-report measure of *impulsiveness* that can be used to identify people who may benefit the most from goal-setting training. This thesis had the loftier goal of developing a research tool for comparing the efficacy of goal-setting exercises and self-regulation strategies. The experimental design and the size of the participant pool could not address this, but the experience is a valuable first-step toward that goal.

Limitations and Directions for Future Research

Studies of goal-setting set in natural decision making situations have had less success than studies set in controlled, laboratory environments (Ferrari, 1993; Reuben, Sapienza & Zingales, 2007). One reason could be that tasks in controlled experiments are more focussed and definite, while this experiment offered significant freedom to participants to choose their own goals. Such freedom can lead participants to set easier goals which are less daunting, and thus inspire less procrastination than a more challenging goal (Locke, Shaw, Saari & Latham, 1981; Schlinger,

Derenne & Baron, 2008). Even in experiments set in natural academic environments, tasks with definite deadlines (e.g., self-paced quizzes (Moon & Illingworth, 2005; Stell, Brothen & Wambach, 2001), or term papers (Howell, Watson, Powell & Buro, 2006; Tice & Baumeister, 1997) are preferred because there is less room for interpretation on when the task was completed. Another limitation of experiments using natural decision making may be the rationalization (Ferrari, 1994; Tice & Bratslavsky, 2000) of a busy person in the zero-sum game of multi-goal pursuit (Powers, 1973; Vancouver & Putka, 1995). Delay is only procrastination when the individual expects to be worse-off for the delay (Steel, 2007). If an individual delays one task in productive attention to a competing task, it is not clear that the delay is procrastination. Participants could knowingly allocate a minimum of hours to school work as strategic delay or "productive procrastination" (Ferrari, 1994; Kuhl, 1992) and easily meet that lower commitment.

Procrastination is not only difficult to observe, but has nearly as many definitions and measurement scales as there are researchers on the topic (Ferrari, Johnson & McCown, 1995, ch. 1; Orellana-Damacela, Tindale & Suárez-Balcázar, 2000). For reasons described in the previous paragraph, the intention-action gap might be a better measure of project duration estimation, or time management, than of procrastination. Van Hooft et al. (2005) measured the intention-behavior discrepancy of job-seekers with a validated questionnaire and found support for their model of the intention-behavior relationship in job seeking, but found no correlation with Lay's (1986) General Procrastination Scale. In contrast, Howell et al. (2006) measured *say-do correspondence* with their own questionnaire, and found significant correlations with two other procrastination measures, but not with the behavioral observations (average assignment submission times in a student population). The present study did not find a correlation between the intention-action gap and the procrastination measure. The definition and measurement of

procrastination were not the primary focus for this experiment, but they clearly need to be established when studying procrastination. Future research on procrastination should include several existing measures so the appropriate context for each can be explored further.

In a recent article on self-regulation research methodology, Lord, Diefendorff, Schmidt and Hall (2010) remark that, until recently, self-regulation had been approached with a between-person perspective that emphasized individual difference, but recent research is trending toward within-person variance. Lord et al. review the recent research and make a few recommendations to guide future research. Longitudinal research with repeated measures is needed to capture within-person variance. Repeated measures and *Hazard/Survival Modeling* (Singer & Willett, 2003) or oscillating models are suggested. Sophisticated methodology and detailed measurement require appropriate statistical techniques. Repeated-measure analysis of variance, multivariate analysis of variance, and structural equation modelling are cited as appropriate techniques. Finally, the authors do not rule-out the possibility that a large number of internal and external factors may constrain self-regulatory processes. Simulation-based research (e.g., Vancouver, Weinhardt & Schmidt, 2010) might be needed to model and control these factors, but controlled laboratory experiments and real-life scenarios are also appropriate.

Applying this insight to the design in this experiment creates a clear path toward the goal of optimizing the procrastination treatment. Future research should use one group of participants in a two-stage design. As an example in an academic setting, participants should first participate in a series of self-paced quizzes or assignments without the aid of the procrastination treatment. Participants should also complete the expectancy, value, and impulsiveness surveys periodically to control for individual variability. At the end of this first stage, introduce the goal-setting training. Continue with the same self-paced activities and the periodic trait measures. Also,

incorporate elements of the first experiment where participants report on the value and efficacy of the steps of the goal-setting treatment. The open-ended feedback was insightful and instructive to the design and delivery of the treatment for the second experiment.

The experiment, outlined above, needs to be run multiple times to compare one version of the treatment to another. Given the permutations and combinations possible in a 10-step treatment (more than 3.5 million), some directed investigation is necessary. Energy level maintenance and pre-commitment caused difficulty in the first experiment, and though the total treatment was effective in the main study, the effects of the changes to the treatment were not measured. A deeper review of current research on energy level in goal pursuit and pre-commitment is required to develop competing iterations of the treatment to be compared in separate trials.

One promising field laboratory to test competing treatments and subsequent iterations is in distance learning or virtual classrooms like *Massive Open Online Courses*. Distance learning, and now online learning, continues to be an ideal environment to observe procrastination (Elvers, Polzella & Graetz, 2003; Michinov, Brunot, Le Behoc, Juhel & Delaval, 2011; Romano, Wallace, Helmick, Carey & Adkins, 2005). In these environments, teachers have less contact with students, and students have considerable freedom to choose when to study. The freedom requires more self-regulation from the students to avoid procrastination. The online delivery of course content lends itself to adding a computer-based procrastination treatment to the curriculum. Online courses are not limited by room capacities and geographic proximity for attendance. Many online courses will have enough participants to meet the 350-person requirement for the study design. A review of procrastination and performance studies in online

classrooms will provide more insight with which to plan subsequent tests of the procrastination treatment.

Once a methodology is established and a suitable source of participants is found, the hypotheses regarding the individual steps of the procrastination treatment can be revisited. Are the effects of each step additive? Or can steps be removed without decreasing the over-all effect? This study identified a self-report measure of impulsiveness and effectively identified procrastinators, or otherwise people who may benefit most from goal-setting training. Is it the best measure? These questions are significant, not just in education, but to all areas of life where people may procrastinate, from health, to finance, and general well-being.

Conclusion

This thesis reviewed motivation and self-regulation literature to develop a ten-step treatment for procrastination. A pilot test of the treatment established the need for the procrastination treatment, and informed refinements to the delivery of the treatment. A nine-item self-report measure of impulsiveness is a reliable predictor of procrastination, and can be used to identify people who may benefit most from a procrastination treatment. An empirical test of the treatment could not establish the efficacy of the treatment in reducing the intention-action gap. The statistical power of the treatment is lower than expected, but the small sample size and the design of the experiment may explain the weak results. On-line courses are identified as a promising setting for subsequent studies due to the size of the potential participant pool, the opportunity to run multiple tests to compare different versions of the treatment, and the opportunity to connect existing research on procrastination in distance education to future trials of the procrastination treatment.

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Appendix 1

Pilot Version of the Procrastination Treatment

Note: each table was a separate sheet on the workbook. Sheets are connected by hyperlinks, and the goals set at each step are references in the appropriate cells on the next page.

Goal Training

Have you ever noticed how motivation to complete a task is strongest immediately before a deadline? Despite the ultimate feeling of accomplishment, the quality of any project is higher when the project is started earlier. This goal-setting exercise is based on Temporal Motivation Theory, itself a collection of motivation theories, and is designed to help you start - and finish - tasks sooner.

Step 1, Getting Started:

Type a goal in the box,
below:

Reminder: your answers will be kept anonymous and confidential

Once you have chosen a goal, go to Sheet2

Step 2: Make it Approach

Your present
goal:

0

Focus on what you want to achieve, the destination you are heading to, rather than what you want to avoid. Approach goals are framed towards reaching a finishing line, instead of getting further from the starting line. So frame your long-term goals in terms of the success you are promoting rather than the failure you want to prevent.

Examples of approach goals:

Avoidance goals are…	Approach goals are…
Not staying home	Explore the world
Stop being tired	Pursue energy-creating habits
Not staying in a dead-end job	Find my calling
Stop being in bad relationships	Be with my perfect partner
Not struggling with bills	Make more money
Not performaning poorly	Master my work
Stop eating junk food	Choose healthy food
Don't be late	Start early
Stop using avoidance goals	Use approach goals

Reframe your goal as an approach goal, below:

Once you have reframed your goal, go to Sheet 3.

Step 3: Make it Challenging

Your current goal:

0

Your goal has to be challenging. We are motivationally efficient in that we want to do exactly enough to reach a goal but nothing more. If you don't ask much of yourself, you won't give much. Consequently, you want the goal to be as hard as you can truly mentally commit to. Not ridiculously hard - if you see the goal as unrealistic, you will later reject it - but "doably" hard.

Reframe your goal to make it appropriately challenging:

Once you have reframed your goal, go to Sheet4

Step 4: Make it Meaningful

Your current goal:

0

Not surprisingly, the more important, interesting or enjoyable a goal becomes, the sooner we are to pursue it. There are lots of ways of increasing how important or enjoyable a goal becomes, but one of the best is connecting it to your core values and greater life desires. Forget about what other people want. Why exactly are you pursing this goal? What are you getting out of it? By focusing on the personal benefits of why, you are more likely to become engaged.

Here are some common reasons why people pursue some typical goals. They don't have to be your own, they are just examples. Most people's core or intrinsic values revolve around feeling competent, having autonomy, gaining power, or helping others.

Eating Healthy:
"It improves my feeling of self-worth"
"Gives me energy to do other stuff"
"Allows me to be more active with my friends and family"
"Makes me feel I am more attractive"

Tackling tasks quickly and efficiently:
"It gives me feeling of mastery and competence"
"Allows me to take downtime guilt free"
"Advances my career so I can get more autonomy"
"Helps others who depend upon my work"

Saving Money:
"It is paying myself first"
"Reduces interest payments so I can spend more later"
"Gives me a sense of security"
"Makes me feel I am smart with my money"

In your own words, describe the meaning or importance of your goal:

Once you are done, proceed to Sheet5.

Step 5: Commitment Check

Your present goal:

0

Please rate how strongly you agree or disagree with each statement:

Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

	Rate
A) It is hard to take this goal seriously.	
B) Quite frankly, I do not care if I achieve this goal or not.	
C) I am strongly commited to purusing this goal.	
D) It would not take much to make me abandon this goal.	
E) I think this is a good goal to shoot for.	

Once you have rated your commitment, go to Sheet6

Step 6: Sub Goals

Your current goal:

0

Challenging goals can rarely be achieved in a single attempt. Breaking a large task into smaller tasks makes it more manageable. Motivation is easier to sustain for a few minutes or a few hours, then for weeks and months. Set sub goals to help you make progress toward your main goal. The following exercise in mental contrasting will help:

First, describe a positive aspect of meeting your goal:

Contrast this by describing a related aspect of reality you want to change:

Repeat this twice more:

(a positive aspect of meeting your goal)
(a contrast with a related aspect of today's reality)
(another positive aspect of meeting your goal)
(a contrast with a related aspect of today's reality)

Now, set 3-5 sub goals toward achieving your main goal (remember to frame them as approach goals!):

1	
2	
3	
4	
5	

Once you have set sub goals, go to Sheet7

Step 7: Make Them Immediate

Your current goal:

0

Your sub goals:

1	0
2	0
3	0
4	0
5	0

Remember how much motivation you have just before a deadline. Now remember how close you needed to be to that deadline before the motivation kicked in. That's how short a time frame you want for your sub goals. For most people, daily to weekly deadlines work well. For really hard tasks, a 10 minute goal may be what you need to get started. One size doesn't fit all. The key is to make it immediate enough that you will stick to it.

Distant goals are…	Immediate goals are…
Exercising	Attend the fitness class tomorrow morning
Doing taxes	Put all my tax forms in one place by Friday
Writing a book	Write 500 words today
Going on vacation	Find a hotel I like right now
Dealing with debt	Pay one bill today
Read more	Go to the library this evening and get a book
Pass my course	Read a chapter of the text tonight
Have more friends	Have a dinner party this week
Get a tattoo	Check-out three tattoo parlors this weekend

Reframe your sub goals to make them more immediate:

1	
2	
3	
4	
5	

Once you are done, go to Sheet8

Step 8: Make Them Specific

Your current goal:

0

Your current subgoals:

1	0
2	0
3	0
4	0
5	0

Make it specific is similar to making it immediate. You not only need a nearby finishing line, but it has to be crystal clear when you cross it. This is how the mind works: we tend to make abstract plans and goals in the prefrontal cortex, but we only get really motivated when they become concrete and definite enough to activate the limbic system. You want your goals to be specific enough that you could delegate them to any other person and they would all do the same thing. You have some choices here (see examples).

Vague Goals Are…	Specific Goals Are…
Exercising	Attend the 8 am yoga class at the gym tomorrow
Doing taxes	Input items into my tax software after dinner
Writing a book	Work on chapter 2 from 8 am to 12 am
Going on vacation	Before going to bed, book a hotel near the ocean
Dealing with debt	Pay the creditcard bill online before lunch
Read more	Read my new book for an hour before bed
Pass my course	Study biology from 1 pm to 3 pm at the library
Have more friends	Talk to the new person at work and learn two things about them
Get a tattoo	Show my friends pictures of three potential tattoos tonight

You can experiment with how specific you need to make your goals to maximize their effectiveness. For example, “study biology at the library at 2:00” is good. However, “studying the chapter on the principles of biology, while sitting at my favorite desk at the library” is even better.

Reframe your subgoals here:

1	
2	
3	
4	
5	

Once your sub goals are more specific, proceed to sheet9

Step 9: Use Power Hours

Your current sub goals:

1	0
2	0
3	0
4	0
5	0

The number one reason people give for procrastinating is being too tired. Lack of energy saps your willpower and makes every task more boring and unpleasant. If you find yourself delaying a task over and over again, perhaps schedule it during your power hours: the time of day you have most "zip". For many of us, it is between 10:00 and 2:00. Since not everything can be done in these four high-willpower hours, reserve this time for the really hard to pursue tasks.

Reframe your sub goals to make use of your power hours:

1	
2	
3	
4	
5	

Once your are finished, prodeed to Sheet10

Step 10: Use Cues or Triggers

Your current subgoals:

1	0
2	0
3	0
4	0
5	0

Tasks works well not only when you know when they have to finished by (i.e. a clear and specific finishing line) but when they should be started. This is related to making it specific, and if you have a detailed plan, you are far more likely to follow through. So, think about when you need to start your task, not just finish it. Think about what has to happen or does happen just before you start working on achieving your goal. As always, be specific about what cues or triggers that signal you should start your goal pursuit.

• To make it to the 8:00 yoga class, I will wake at 6:30, have breakfast and pack my gym bad so I can promptly leave at 7:30 and arrive on time. The cue or trigger here is 7:30.

• After dinner and putting away the dishes, instead of turning on the TV, pick up the non-fiction book and read in the comfy chair by the window. The cue or trigger here is finishing dinner and putting away the dishes.

• If I get hungry, I will snack on the carrots and apples I packed. The cue or trigger here is getting hungry.

• When I get bored at my work, I will take a five minute walk and then get back to my project. The key or trigger here is getting bored at work.

• When I get to the library at one, the first thing I do is sit down and read the biology text. The cue or trigger here is sitting down in the library.

You can experiment with how specific you need to make your goals to maximize their effectiveness. For example, “study biology at the library at 2:00” is good. However, “studying the chapter on the principles of biology, while sitting at my favorite desk at the library” is even better.

Reframe your sub goals to make use of cues and triggers:

1	
2	
3	
4	
5	

Once you are finished, proceed to the last sheet

Success!!

Your Goal:

0

Why your goal is important:

0

Contrast your positive, future condition with your current condition:

0
0

(a positive aspect of meeting your goal)
(a contrast with a related aspect of today's reality)

(another positive aspect of meeting your goal)
(a contrast with a related aspect of today's reality)

Your sub goals:

1	0
2	0
3	0
4	0
5	0

You are encouraged to keep a copy of this sheet to remind you of your goals.

Please answer each question below by rating how strongly you agree or disagree with the statement (enter numbers from 1-7, corresponding to your response to each statement, in the "your response" column).

Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

	Your response
My primary goal is framed as an approach goal.	
My primary goal is appropriately challenging for me.	
My primary goal is meaningful to me.	
My primary goal is important to me.	
My sub goals are framed as approach goals.	
My sub goals are immediate.	
My sub goals are specific.	
My sub goals make use of my "power hours".	
My sub goals make use of cues and triggers.	

Thank you for participating! Rename this file with a ***non-identifying*** file name (i.e., don't use your name or student number). The same non-identifying file name will be used to connect this file to your responses to the follow-up survey, to come. Please ***do*** include your student number in the ***body*** of the e-mail when you return this file. ***You must do this to receive course credit.*** Return your re-named file to morinc@ucalgary.ca. Thanks again!

Appendix 2

Pilot Study: Participant Recruitment Letter

You are invited to participate in a research project designed to further the understanding of motivation and effective goal-setting. You and other participants were chosen for this study through your affiliation with the Haskayne School of Business' Marketing-HROD Research Participation Credit System.

You will be sent an internet address to link you to a web-based program designed to help you set and accomplish goals. The program is designed to help you achieve your goal by walking you through several steps to re-frame your goal. The program is designed for ease-of-use, offering explanations and examples at each step. You will also be asked to rate how completely your goal-refinement meets each refinement-step. This process could take 30-40 minutes.

There will be a 40-question survey designed to assess your predisposition for procrastination. Each question is a brief statement (example: "I often regret not beginning tasks sooner"), and you are asked to rate each statement on a scale between "this is often true of me" to "this is never true of me". The survey is not meant to test or challenge you. You are asked to respond with your first, 'gut' response. This survey may take 10 to 15 minutes.

Finally, there will be a brief follow-up e-mail survey approximately one month after the initial survey to discover whether you met your goals, and how your process and performance were affected by goal-setting. This survey will be 5 questions and takes 5 minutes to complete.

Your participation is voluntary. You may refuse to participate altogether. If you do decide to participate, you may withdraw from the study at any time without penalty or repercussion. Data collected up to the point of withdrawal will be retained for use in this study.

No personal identifying information will be collected in this study, and all participants shall remain anonymous. Please note, you and other participants will meet as a group at the campus computer lab. Absolute confidentiality cannot be guaranteed in a group setting because the researcher cannot control what individuals say outside the group.

Please contact Chris Morin via e-mail (morinc@ucalgary.ca) to express your interest in participating.

Appendix 3

Procrastination Treatment

Goal Training

Have you ever noticed how motivation to complete a task is strongest immediately before a deadline? Despite the ultimate feeling of accomplishment, the quality of any project is higher when the project is started earlier. This goal-setting exercise is based on Temporal Motivation Theory, itself a collection of motivation theories, and is designed to help you start - and finish - tasks sooner.

Step 1: Make it Challenging

Your goal has to be challenging. We are motivationally efficient in that we want to do exactly enough to reach a goal but nothing more. If you don't ask much of yourself, you won't give much. Consequently, you want the goal to be as hard as you can truly mentally commit to. Not ridiculously hard - if you see the goal as unrealistic, you will later reject it - but "doably" hard.

Type your challenging goal in the box, below:

Once you have chosen a goal, go to Sheet2

Step 2: Make it Approach

Your present goal:

0

Focus on what you want to achieve, the destination you are heading to, rather than what you want to avoid. Approach goals are framed towards reaching a finishing line, instead of getting further from the starting line. So frame your long-term goals in terms of the success you are promoting rather than the failure you want to prevent.

Examples of approach goals:

Avoidance goals are…	Approach goals are…
Not staying home	Explore the world
Stop being tired	Pursue energy-creating habits
Not staying in a dead-end job	Find my calling
Stop being in bad relationships	Be with my perfect partner
Not struggling with bills	Make more money
Not performaning poorly	Master my work
Stop eating junk food	Choose healthy food
Don't be late	Start early
Stop using avoidance goals	Use approach goals

Reframe your goal as an approach goal, below:

Once you have reframed your goal, go to Sheet 3.

Step 3: Make it Meaningful

Your current goal:

0

Not surprisingly, the more important, interesting or enjoyable a goal becomes, the sooner we are to pursue it. There are lots of ways of increasing how important or enjoyable a goal becomes, but one of the best is connecting it to your core values and greater life desires. Forget about what other people want. Why exactly are you pursing this goal? What are you getting out of it? By focusing on the personal benefits of why, you are more likely to become engaged.

Here are some common reasons why people pursue some typical goals. They don't have to be your own, they are just examples. Most people's core or intrinsic values revolve around feeling competent, having autonomy, gaining power, or helping others.

Eating Healthy:
"It improves my feeling of self-worth"
"Gives me energy to do other stuff"
"Allows me to be more active with my friends and family"
"Makes me feel I am more attractive"

Tackling tasks quickly and efficiently:
"It gives me feeling of mastery and competence"
"Allows me to take downtime guilt free"
"Advances my career so I can get more autonomy"
"Helps others who depend upon my work"

Saving Money:
"It is paying myself first"
"Reduces interest payments so I can spend more later"
"Gives me a sense of security"
"Makes me feel I am smart with my money"

In your own words, describe the meaning or importance of your

goal:

Once you are done, proceed to Sheet4.

Step 4: Commitment Check

Your present goal:

0

Please rate how strongly you agree or disagree with each statement:

Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

	Rate
A) It is hard to take this goal seriously.	
B) Quite frankly, I do not care if I achieve this goal or not.	
C) I am strongly commited to purusing this goal.	
D) It would not take much to make me abandon this goal.	
E) I think this is a good goal to shoot for.	

Once you have rated your commitment, go to Sheet5

Step 5: Sub Goals

Your current goal:

0

Challenging goals can rarely be achieved in a single attempt. Breaking a large task into smaller tasks makes it more manageable. Motivation is easier to sustain for a few minutes or a few hours, then for weeks and months. Set sub goals to help you make progress toward your main goal. The following exercise in mental contrasting will help:

First, describe a positive aspect of meeting your goal:

Contrast this by describing a related aspect of reality you want to change:

Repeat this twice more:

(a positive aspect of meeting your goal)

(a contrast with a related aspect of today's reality)

(another positive aspect of meeting your goal)

(a contrast with a related aspect of today's reality)

Now, set 3-5 sub goals toward achieving your main goal (remember to frame them as approach goals!):

1	
2	
3	
4	
5	

Once you have set sub goals, go to Sheet6

Step 6: Make Them Immediate

Your current goal:

0

Your sub goals:

1	0
2	0
3	0
4	0
5	0

Remember how much motivation you have just before a deadline. Now remember how close you needed to be to that deadline before the motivation kicked in. That's how short a time frame you want for your sub goals. For most people, daily to weekly deadlines work well. For really hard tasks, a 10 minute goal may be what you need to get started. One size doesn't fit all. The key is to make it immediate enough that you will stick to it.

Distant goals are…	Immediate goals are…
Exercising	Attend the fitness class tomorrow morning
Doing taxes	Put all my tax forms in one place by Friday
Writing a book	Write 500 words today
Going on vacation	Find a hotel I like right now
Dealing with debt	Pay one bill today
Read more	Go to the library this evening and get a book
Pass my course	Read a chapter of the text tonight
Have more friends	Have a dinner party this week

Get a tattoo	Check-out three tattoo parlors this weekend

Reframe your sub goals to make them more immediate:

1	
2	
3	
4	
5	

Once you are done, go to Sheet7

Step 7: Make Them Specific

Your current goal:

0

Your current subgoals:

1	0
2	0
3	0
4	0
5	0

Make it specific is similar to making it immediate. You not only need a nearby finishing line, but it has to be crystal clear when you cross it. A clear starting point is equally helpful for building a sense of progress. This is how the mind works: we make abstract plans in the prefrontal cortex, but we only get motivated when they become concrete and definite enough to activate the limbic system. You want your goals to be specific enough that you could delegate them to any other person and they would all do the same thing. You have some choices here (see examples).

Vague Goals Are…	Specific Goals Are…
Exercising	Attend the 8 am yoga class at the gym tomorrow
Doing taxes	Input items into my tax software after dinner
Writing a book	Work on chapter 2 from 8 am to 12 am
Going on vacation	Before going to bed, book a hotel near the ocean
Dealing with debt	Pay the creditcard bill online before lunch
Read more	Read my new book for an hour before bed
Pass my course	Study biology from 1 pm to 3 pm at the library
Have more friends	Talk to the new person at work and learn two things about them
Get a tattoo	Show my friends pictures of three potential tattoos tonight

Be as specific as you can. “Study biology at the library at 2:00” is good; however, “studying the chapter on the principles of biology, while sitting at my favorite desk at the library” is better.

Reframe your subgoals here:

1	
2	
3	
4	
5	

Once your sub goals are more specific, proceed to sheet8

Step 8: Cues and Triggers

The greatest barrier to getting things done is everything else we could be doing! It is hard to lose weight when sweet, rich foods are always within reach. It is hard to focus on our jobs when facebook, twitter, and other cyber-

distractions are a click away. It is hard to focus on studying when we are on our second all-nighter this week. The purpose of this step is to anticipate the activites that de-rail our intentions, and make plans to address them now, while our willpower is strong.

This is a 2-step process:
1) Identify a cue that leads to distraction or temptation,
2) Plan an action to address that cue and get you back on track,
3) Repeat.

The result is a series of "if-then" statements:
Ex. 1: "If I get hungry before dinner, then I will have some fruit and granola."
Ex. 2: "If I am texting when I should be studying, then I will shut off my phone."
Ex. 3: "If I see triple-chocolate cheesecake, then I will think of fat-choked arteries."
Generally: "If (cue), then (trigger)."

Notice there are several ways to set-up triggers (the "then" statement):
Ex. 1 is satiation: satisfying a need responsibly before distraction is unbearable.
Ex. 2 is bondage: placing a barrier between you and temptation.
Ex. 3 is poison: adding disincentives to temptation (here, a disgusting mental image)
You don't need to use all three, these are just examples to get you thinking.

This is a very individual process, requiring some thought about your specific goals and the cues that lead to distractions that are de-railing your efforts. Below is a reminder of the sub-goals you've set for yourself. Below that, try to develop "if-then" statements for each subgoal. Remember: make them specific!

Your sub-goals:

1	0
2	0
3	0
4	0
5	0

Now, set-up your cues and triggers:

If I…	*(cue that leads to distraction or temptation)*
Then	*(a trigger that will address the distraction)*

I…	

If I…	*(cue that leads to distraction or temptation)*
Then I…	*(a trigger that will address the distraction)*

If I…	*(cue that leads to distraction or temptation)*
Then I…	*(a trigger that will address the distraction)*

If I…	*(cue that leads to distraction or temptation)*
Then I…	*(a trigger that will address the distraction)*

If I…	*(cue that leads to distraction or temptation)*
Then I…	*(a trigger that will address the distraction)*

Once your are finished, prodeed to Sheet9

Step 9: Reward Yourself!

Make a list of small rewards you can give yourself for meeting your sub-goals. Incentives are a large part of motivation. Treat yourself for your hard work.

Goal	0
Reward	
Subgoal 1	0
Reward	
Subgoal 2	0

Reward	
Subgoal 3	0
Reward	
Subgoal 4	0
Reward	
Subgoal 5	0
Reward	

Once you are finished, proceed to sheet10

Success!!

Your Goal:

0

Your reward:

0

Why your goal is important:

0

Contrast your positive, future condition with your current condition:

	0
	0
	(a positive aspect of meeting your goal)
	(a contrast with a related aspect of today's reality)
	(another positive aspect of meeting your goal)
	(a contrast with a related aspect of today's reality)

Your sub goals:

1	0
2	0
3	0
4	0
5	0

Rewards for meeting your sub-goals:

0
0
0
0
0

Your cues and triggers:

If I…	(cue that leads to distraction or temptation)
Then I…	(a trigger that will address the distraction)
If I…	(cue that leads to distraction or temptation)
Then I…	(a trigger that will address the distraction)
If I…	(cue that leads to distraction or temptation)
Then I…	(a trigger that will address the distraction)
If I…	(cue that leads to distraction or temptation)
Then	(a trigger that will address the distraction)

I…	
If I…	(cue that leads to distraction or temptation)
Then I…	(a trigger that will address the distraction)

You are encouraged to keep a copy of this sheet to remind you of your goals.

Appendix 4

Items of Self-Report Measures

Expectancy (Reliability = 0.743)

1. When I put in the hours, I am successful
5. When I apply myself, I see the results
9. I believe that success is a matter of when, not if
13. I am confident that my efforts will be rewarded
17. I am persistent and resourceful
21. Whatever problems come my way, I will eventually rise above them
25. I can overcome difficulties with the necessary effort
29. Winning is within my control
33. If I try hard enough, I will succeed

Value* (Reliability = 0.817)

2. Uninteresting work defeats me
6. I wish school was enjoyable
10. My projects seem pointless
14. School bores me
18. I lack enthusiasm to follow through my responsibilities
22. If I find a task unpleasant, I don't have the energy to tackle it
26. I don't find school enjoyable
30. If an activity is boring, my mind slips off onto other diversions
34. When a task is tedious, again and again I find myself pleasantly daydreaming rather than focusing

* All of these items are reverse-scored

Impulsiveness (Reliability = 0.840)

3. When I have an unpleasant task, how I react to it is decided on the spur of the moment
7. I take on new tasks that seem fun at first without thinking through the repercussions
11. When a temptation is right before me, the craving can be intense
15. My actions and words satisfy my short-term pleasures rather than my long-term goals
19. When an attractive diversion comes my way, I am easily swayed
23. I have a hard time postponing pleasurable opportunities as they gradually crop up
27. I choose smaller but more immediate pleasures over those larger but more delayed

31. It takes a lot for me to delay gratification
35. When I should be doing one thing, I will do another.

Procrastination (Reliability = 0.805)

4. I delay tasks beyond what is reasonable.
8. I do everything when I believe it needs to be done.
12. I often regret not getting to tasks sooner.
16. There are aspects of my life that I put off, though I know I shouldn't.
20. If there is something I should do, I get to it before attending to lesser tasks.**
24. I put things off so long that my well-being or efficiency unnecessarily suffers.
28. At the end of the day, I know I could have spent the time better.
32. I spend my time wisely.**
36. I get into jams because I will get entranced by some temporarily delightful activity

** Items are reverse-scored

Appendix 5

Second Study Participant Recruitment Letter

You are invited to participate in a research project designed to further the understanding of goal intentions and the implementation gap. You and other participants were chosen for this study through your affiliation with the Haskayne School of Business' Marketing-HROD Research Participation Credit System.

You will be given a journal and asked to record two sets of information each week over the course of the semester:

1. The amount of time you plan to spend on school work each day,
2. The actual time you spend on school work each day.

You will be asked to maintain your journal for six weeks of the winter semester, and may require 5 to 7 minutes each week for six weeks.

You will also need to complete a survey regarding their propensity for procrastination. The survey is 30 statements, and participants rate how well each statement describes them (e.g., "I often regret not getting to tasks sooner"). Statements are not meant to be challenging or tricky. You are asked to provide their first, "gut" response. The survey takes around 10 minutes.

This study has been approved by the University of Calgary Conjoined Faculties Research Ethics Board.

If you would like to participate, please visit SH431 any time between 2pm and 4pm the week of January 21 – 25 (Monday to Friday) and speak to Chris Morin to receive your consent form.

Your participation is voluntary. You may refuse to participate altogether. If you do decide to participate, you may withdraw from the study at any time without penalty or repercussion. Data collected up to the point of withdrawal will be retained for use in this study.

No personal identifying information will be collected in this study, and all participants shall remain anonymous.

Appendix 6

Sample Journal Page

Instructions*: the tabs at the bottom of each sheet are the dates each sheet should be completed. The dates are meant as guidelines. The principle of the exercise is to make plans to do school work before the week begins and report how many hours you actually spent on school work by the end of each week. You do not have to wait to the end of the week, but please do set goal more than a week ahead. Complete each sheet by inputting a number of hours into each green-shaded cell.*

		Below is the number of hours you planned to spend on school work this week.	How many hours did you actually spend on school work each day?
Monday	18-Feb-13	2	2
Tuesday	19-Feb-13	2	3
Wednesday	20-Feb-13	2	4
Thursday	21-Feb-13	2	3
Friday	22-Feb-13	2	4
Saturday	23-Feb-13	2	3
Sunday	24-Feb-13	2	3

		How many hours to you plan to spend on school work each day next week?
Monday	25-Feb-13	7
Tuesday	26-Feb-13	7
Wednesday	27-Feb-13	7
Thursday	28-Feb-13	7
Friday	01-Mar-13	7
Saturday	02-Mar-13	7
Sunday	03-Mar-13	7