The influence of regulatory mode on the use of limited self-regulatory resources and the experience of self-regulation

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entitled

THE INFLUENCE OF REGULATORY MODE ON THE USE OF LIMITED SELF-
REGULATORY RESOURCES AND THE EXPERIENCE OF SELF-REGULATION

by

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Submitted as partial fulfillment of the requirements for

the Doctor of Philosophy in Psychology

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Self-regulation contains a wide range of operations through which one can achieve their goals, such as ignoring distractions, overcoming obstacles, being able to adapt to one’s environment, and resolving goal conflict. The study of the dynamics of self-regulation is important because of the research showing the many benefits associated with self-regulation success and the many problems associated with self-regulation failure.

One finding from this research is that the cultivation of willpower at an early age is one way to improve self-regulation. The regulatory strength hypothesis treats willpower as a finite resource, such that one’s ability to control their thoughts, emotions, or behaviors is a function of a general resource, similar to muscular strength, which is limited in quantity. This resource, once depleted, cannot be fully replenished without a period of rest. The general finding is that someone who exerts self-regulation
in a first task stops working on a second task faster than those who do not exert self-regulation. Although a great deal of research now supports this initial hypothesis, little work has looked at regulatory strength within a general theoretical framework.

One such framework, regulatory mode theory, proposes that there are two independent and orthogonal modes of self-regulation: locomotion and assessment. Locomotion constitutes the aspect of self-regulation that is concerned with movement from state-to-state in general, and assessment constitutes the comparative aspect of self-regulation. Individual and situational variables, both momentary and chronic, can cause either mode to become the preferred orientation to goal pursuit.

The present studies examined differences in regulatory depletion between modes at the situational and dispositional level, respectively. The general prediction was that those in an assessment mode are more depleted than those in a locomotion mode. This prediction was not supported. The present studies also examined how the fit between dispositional and situational regulatory mode impact the experience of self-regulation. The general hypothesis was that those with a match between dispositional and situational regulatory mode feel better about the process of self-regulation than those with a mismatch. This prediction was not supported. The possible reasons for these results and their impact on future research are discussed.
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Chapter One
Self-Regulation

The studies presented in this paper focus on self-regulation. The formal definition of self-regulation used in this paper is “the capacity of individuals to guide themselves, in any way possible, toward important goal states” (Fitzsimons & Bargh, 2004, p. 151). The main purpose of the current work was to attempt to place the executive function of self-regulation into a theoretical context. First, I will discuss self-regulation in general, with a focus on success and failure. Second, I will review the literature on the hypothesis that the executive process of self-regulation relies on a finite resource that decreases during regulation (see Schmeichel & Baumeister, 2004). Third, I will review a recent self-regulatory theory that highlights the independence of various aspects of self-regulation (see Higgins, Kruglanski, & Pierro, 2003). Fourth, two studies that integrated these two areas were conducted and their results are explained. Finally, the possible reasons for these results and their impact on future research are discussed.
**Self-Regulation: Overview**

The terms “self-regulation” and “self-control” are used interchangeably in some areas of psychology. Tangney, Baumeister, and Boone (2004) recently suggested that “self-regulation” might be the better term for what has also been called “self-control”. The recent theorizing on automatic self-regulation (Fitzsimons & Bargh, 2004) also makes it more appropriate to use the term “self-regulation” rather than “self-control”. Thus, “self-regulation” will be used throughout this paper. Self-regulation is comprised of a wide range of operations such as ignoring distractions, overcoming obstacles, being able to adapt to one’s environment, and resolving goal conflict. It is through these operations that one can achieve their goals, be they goals of achievement, goals of necessity, or any other variety of goals (e.g., Higgins, 1998).

For example, a person wishes to lose a particular amount of weight for an important social function. They have a variety of ways they can accomplish this goal (e.g., dieting, working out). Each way, however, has its own set of problems that will need to be faced. The dieter needs to resist buying candy at the checkout line of the grocery store. The person who starts working out at a gym needs to stick to it even when the weather makes them want to stay home. If either person happens to fall ill, it may force them to deviate from their plan for a time; they will need to get back to their goal behavior once they are able again. Each must also make sure that they are not going beyond what they should do (e.g., eating too little food, overexerting a workout) and putting their overall health at risk. Resisting temptations, resuming an interrupted strategy, and maintaining a reasonable strategy are just a few operations that fit into the concept of self-regulation.
Perceptual control theory (PCT). A multitude of theories, in a variety of disciplines, have been developed to explain the processes in self-regulation. Consistent with the idea of indeterminacy, a hallmark of these theories is the idea of comparison and change. Specifically, one compares their current state with a desired state and, if there is a mismatch, one attempts to reduce this discrepancy by whatever means are at their disposal at the time. The most prominent theoretical framework concerning self-regulation within social psychology is based off of perceptual control theory (PCT; Powers 1973). Perceptual control theory essentially says that behavior is the process by which one responds to feedback from the environment in such a way as to maintain an expected perception (i.e., maintain a “reference signal”) despite deviations from the environment.

Powers (1998) uses the example of an automobile to illustrate this viewpoint: A person uses the steering wheel, brakes, and horn (behaviors) to control the car (the system) as to stay in the lane they are driving in (expected perception). If one sees a deer cross the road ahead (a deviation), they will honk the horn (behavior) so they can stay in the lane without swerving in either direction (resolve the deviation). Thus, the comparison component would be the feedback between what you see (the deer) and what you want to see (a clear road), and the change component is the behavior (honking the horn) that allows you to see what you want to see.

The TOTE model. PCT has evolved from a theory of perception to a general theory of behavior, thus being called simply “control theory.” The application of control theory most used by social psychology is what is known as the TOTE model (Carver & Scheier, 1981; Miller, Galanter, & Pribram, 1960), also called the cybernetic
model (see Figure 1). The TOTE model is named such as it refers to “Test, Operate, Test, Exit”. The most common metaphor for the TOTE model is that of a thermostat. Specifically, the thermostat records the current temperature of the room (“Test”). If the temperature deviates from a desired state (the temperature one sets on the thermostat), the thermostat activates the process (“Operate”) by which the temperature approaches the desired state. As this is happening, the thermostat records the temperature again (“Test”). If the difference in temperature still exists, the operating process continues. When the thermostat finds that the room temperature matches that of the desired temperature, it deactivates the operating process (“Exit”). It is common to refer to the “test” portion as the monitoring process and the “operate” portion as the operating process. This model addresses comparison and change in that one compares to the desired state (“Test”) and any necessary change (“Operate” to address a differences and “Exit” to discontinue the operating process when the desired state is met) in the manner of a feedback loop (Carver & Scheier, 1981).

The model makes clear that successful self-regulation would result when the monitoring process would accurately measure the environmental stimuli it is designed to measure and that the operating process would be capable of acting upon the environment to produce the desired change. That is, if someone’s has a forbidden food placed prominently in their environment, the successful self-regulation of their behavior would be the result of two processes. First, they would need to be able to recognize the food as being something they should not eat (successful monitoring). Second, they would be able to remove the snacks from the environment (successful operating) by walking away, saying “no, thanks”, giving it to someone else, and so on.
The model also makes clear the ways in which the process could break down and lead to self-regulation failure. One possibility is that the monitoring process is inaccurate in its assessment of the environment. This could result from the basic inability to monitor (e.g., brain damage, physical impairment), changes in what is being monitored (e.g., dietary changes, new workout regimen), or unrelated environmental fluctuations (e.g., weather change, long distance travel). Any of these could make recognizing the forbidden food as something they have considered forbidden, thus causing self-regulation failure.

Another possible antecedent of self-regulation failure is that the operating process is unable to act upon the environment. This could result from the basic inability to operate, unrelated environmental fluctuations, or that the operating process does not have the resources upon which to operate upon the environment. This lack of resources is reflected in what is known as regulatory depletion, which will be discussed at length in later sections of this proposal. Any of these could make the execution of a plan to remove the forbidden food from their immediate environment unsuccessful, thus setting the stage for self-regulation failure.

Self-Regulation Failure

The TOTE model provides insight into the functioning of self-regulation. The next step is to consider whether self-regulation success is more frequent than self-regulation failure or vice versa. A large body of research tells us that successful self-regulation, unfortunately, seems more the exception than the norm. In Baumeister and colleagues’ (Baumeister et al., 1994) cross-discipline review of the self-regulation literature, they argue that America “suffers from a spreading epidemic of self-regulation...”
They summarize self-regulation failure into two categories: underregulation and misregulation (see also Baumeister & Heatherton, 1996).

Underregulation consists of a failure to regulate oneself (e.g., choosing not to exert self-regulation, withdrawal of self-regulation effort). For example, a person tends to not monitor what they are eating or drinking when they are watching an engrossing movie or have had a few alcoholic drinks. This lack of monitoring can lead one to eat or drink much more than they would have normally. The lack of monitoring can also lead to inaccurate estimates of what one eats, compounding the problem (see Nisbett & Storms, 1974). Thus, underregulation is failure based on a lack of regulation.

Misregulation, a more unintentional form, consists of regulating oneself in a fashion that produces an undesirable or counterproductive outcome (e.g., lacking adequate self-regulation strategies, illusion of control). The phenomenon of “choking under pressure” is a classic example of misregulation. For example, most professional athletes execute a relevant skill behavior without much thought (e.g., a basketball player shooting a free throw), especially in front of a large crowd (see Zajonc, 1965). In important situations, a player may become mindful of their performance and try to regulate aspects of their behavior they may not usually be aware of (Baumeister, 1984). This can lead to the paradoxical effect of failing at a skill behavior when one is trying hard to succeed. Thus, misregulation is failure based on misplaced or unnecessary regulation.

A third category people frequently cite is “overregulation,” or the idea of exerting too much control (e.g., perfectionism, unnecessary delay of gratification). Baumeister et al. (1994) state that this is not “failure” per se, as it tends to accomplish
the goal. One could consider it an inefficient use of self-regulation, but it could not be called “failure” in the same sense as underregulation or misregulation. Further, if overregulation led to unfavorable outcomes, it would fall into the category of misregulation. Therefore, the two categories of underregulation and misregulation are adequate for a full discussion of self-regulation failure.

Although the long-term consequences of chronic self-regulation failure can be localized in the individual (e.g., dietary obesity, drug addiction), they can also cause harm to loved ones (e.g., domestic violence, financial hardship) and to society as a whole (e.g., criminal behavior, economic instability).

**Proposed solutions.** Many solutions have been offered to prevent self-regulation failures and avoid the long-term consequences. The most popular ones, however, have inevitably yielded poor, or contrary, results (Baumeister, Campbell, Krueger, & Vohs, 2003; Baumeister et al., 1994). One possible solution has been the noncontingent increasing of self-esteem. Specifically, it is thought that low self-esteem breeds a vicious cycle where feeling bad for failure simply leads to more failure. The way to break the cycle of failure, therefore, is to raise self-esteem so that one is no longer occupied with thoughts of their failings. However, it may be completely appropriate to feel bad after failing at self-regulation, as the negative affect acts as a cue to change one’s behavior in the future. Raising self-esteem may then have the paradoxical outcome of making self-regulation failure more palatable than it should be, thus removing the cue to change one’s behavior to avoid future self-regulation failure (Baumeister et al., 2003).
Another example of a flawed method of self-regulation is the day-to-day (even meal-to-meal) monitoring of a particular target of a diet plan (calories, carbohydrates, etc.) What makes this method so prone to failure is what is known as the “what-the-hell” phenomenon (e.g., Cochran & Tesser, 1996). Specifically, when one sets a proximal goal (the meal-to-meal monitoring of calories) for an inhibitory response (not go over a certain number of calories), the frequent feedback facilitated by the proximal goal tends to give violations of the goal much greater weight than successes (cf. Kahneman & Tversky, 1979). If one falls short of the inhibitory goal (too many calories in a given period), the nature of the goal can lead to a rebound effect (Wegner, Schneider, Carter, & White, 1987) where responses counter to the goal are expressed once inhibition has ceased. This heightened search for violations combined with the rebound effect can lead to a “what-the-hell” situation where one considers the goal irrevocably broken and no longer uses it as a standard of behavioral regulation (eats significantly beyond the caloric goal). Thus, the method by which one self-regulates can have the unfortunate side effect of setting the stage for future failures, and thus chronic self-regulation failure.

Successful Self-Regulation

The research cited above can lead to a fairly hopeless picture of self-regulation, as it describes some of the many types of problems that can hinder successful self-regulation. It is clear, however, that not all self-regulation ends in failure. The fact that we do not cave in to every desire that passes our way speaks to our ability to successfully self-regulate.
Automatic self-regulation. One possible reason for our frequent success at basic self-regulation comes from the possibility that the process of successfully self-regulating in a given context becomes engaged enough times as to become habitual, thus making successful self-regulation an automatic process (see Fitzsimons & Bargh, 2004). Although this seems inconsistent with the idea that self-regulation is a conscious process, it is based on the idea that the behavior must be overlearned at the conscious level before becoming automatic. For example, when people initially learn to drive, they must consciously engage in many behaviors in order to drive safely. Over time, the processes one needs to consciously engage in to drive safely decreases as one gains experience driving. Similarly, the implementation of a diet plan can lead to an initial phase where one must consciously fight temptation at every turn. Over time, the frequent use of the diet plan can lead to the development of healthy eating habits that eventually become so common as to be no longer a focus of attention. Although now automatic, the initial self-regulation was quite conscious in nature. A specific test of this possibility is beyond the scope of this proposal, but it can be looked at in an exploratory fashion based on the results of the studies.

The question then becomes how we can make successful self-regulation more prevalent, or at least more effective. This is not an easy question to answer, as what is termed “failure” and “success” is often relative to the greater environment (e.g., family, culture, cohort). At the end of their review, Baumeister et al. (1994) state that parental influence seems to stand out as the best determinant of self-regulation success and failure. They are quick to point out that many variables impact this influence, but how parents deal with this influence – and its resulting impact on their child-rearing
behaviors – is just as important as any other factor. Whether it is from parents or from other sources, it appears that the cultivation of successful self-regulatory skills at an early age is one possible way to improve self-regulation.

Delay of gratification. A common research paradigm to examine this has been looking at delay of gratification in children. The common finding is that the amount of time children delay gratification is correlated with a variety of measures, from those taken at the present time to those measure years later. For example, Funder and Block (1989) had adolescents work on various intelligence and personality assessments over six sessions for $24 remuneration. At the conclusion of the first session, participants were told they could either be paid at the end of a session (instant gratification) or wait to be paid until the very last session (delayed gratification). Participants who chose to be paid at the end of a session could vary their payout to whatever they earned to that point ($4 after one session, $8 after second session, etc.); they could even choose to not be paid at all for any particular session. Participants were also told that if they chose to wait until the last session, they would get paid an additional $4 “interest”. The number of times participants chose to delay payment, therefore, could range from 0 (some payment after each session) to 5 (no payment until last session). It was found that the number of times participants chose to delay payment, thus delaying gratification, was positively correlated with such personality descriptives as “prides self on being ‘objective,’ and rational,” “is productive; gets things done,” and “is fastidious (perfectionist),” and negatively correlated with “unable to delay gratification,” “has hostility toward others,” and “is self-indulgent”.
In their examination of the impact of childhood delay of gratification on later outcomes, Shoda, Mischel, and Peake (1990) used a “self-imposed delay paradigm,” in which people can choose between a smaller immediate reward and a larger delayed reward. Shoda et al. (1990) found that the amount of time preschool children delayed gratification positively correlated with their academic success in adolescence as well as their successful coping with frustration and stress.

Looking at self-reported trait self-regulation, Tangney et al. (2004) found that those high in self-regulation tendencies had better grades, showed fewer impulse control problems, had better psychological adjustment, and had healthier interpersonal relationships than those with low self-regulation tendencies. The research on delay of gratification and Baumeister et al.’s (1994) review of self-regulation research, when combined with this work on the outcomes of successful and unsuccessful self-regulation, strengthens the argument that successful self-regulatory strategies can lead to favorable outcomes. The next section will discuss what exactly these strategies represent as well as a relatively new model of what allows for these strategies to succeed or fail.
Based on their finding of successful delay of gratification in childhood leading to positive outcomes in adolescence, Shoda et al. (1990) suggest that the cultivation of successful self-regulation at an early age is important to achieving future success in areas requiring delay of gratification, which is what most endeavors require. It follows that individual differences in the cultivation of successful self-regulation will lead to differences in successful future outcomes. The next question to ask is what exactly is being cultivated? Also, why do some people develop good habits where others do not? Based on a review of the delay of gratification literature, Mischel (1996) advocated the reconstruction of the concept of “willpower” to explain what lies behind these individual differences in self-regulation success and failure. This would require moving away from willpower as a mysterious trait and toward a more detailed view of the willpower concept.

*The Old View: What Willpower Does*

The concept of willpower has a long history that has been relatively consistent. The Greek term *akrasia* translates to “deficiency of the will” and signifies a lack of
willpower as a negative character trait. The present day conceptualization of willpower does not stray far from this idea; willpower has come to be construed as a powerful, mysterious trait, and the lack of it has a profoundly negative impact on the person. This construal of willpower leads one to believe that the more of this a person has, the less outside assistance they will need to meet their goals. Stories of people stopping addictive behaviors “cold turkey” are regarded as holding a higher honor than those requiring various steps, methods, and tools. For example, the apocryphal story of how Miles Davis stopped his heroin addiction by locking himself in his father’s farmhouse for two weeks and walked away “cured” is cited as an example of his strength of will and dedication to his craft, when he in fact continued to use heroin, although to a lesser degree, for years after the fact.

An application of this trait-based view of willpower is the “free-will model” of addiction (e.g., Peele, 1989; Schaler, 2000), which states that all “addiction” is voluntary and can be broken by the simple application of willpower (cf. Loewenstein, 1996). This view sees individual differences in the ability to break addictions (e.g., drugs, alcohol) as merely the choice to either exercise one’s willpower or to not exercise it. It further criticizes an abstinence-only process of ending addiction, saying that one can moderate an “addictive” behavior through the exercise of one’s willpower. The point of this discussion is not to take a stance on the model itself, but to emphasize that the model makes no attempt to clarify what “willpower” encompasses. Also, the model uses willpower in the sense that we all have equal power over our will and that individual differences simply stem from the choice to use one’s willpower or not to use it.
The New View: What Willpower Is

The problem with the old view of willpower is that it simply deals with what willpower does and makes no attempt to get at what willpower is. Mischel (1996) states that this view does not tell us anything about how willpower fits into a greater framework of self-regulation. Specifically, willpower is only useful to the degree that it contributes to our understanding of goal setting, goal pursuit, and goal attainment. To this end, Metcalfe and Mischel (1999, see also Mischel, Ayduk, & Mendoza-Denton, 2003) proposed a “hot/cool-systems” framework to examine the impact of willpower on self-regulation. In this framework, there are two processing systems that enable willpower: the “hot (emotional) system” and the “cool (cognitive) system”. How these systems interact determine self-regulation success or failure.

The “hot system” is the automatic response to a stimulus object and contains the affective information that precedes the cognitions that the stimulus evokes (Zajonc, 1980). This system operates on simple, mostly physical cues, making it susceptible to inflexibility and stereotyping. An example of this would be the child who eats unsweetened baking chocolate despite being told what it is: the hot system sees chocolate and evokes the affective response to “chocolate”, ignoring what they are being told about.

The “cool system” is the complex cognitive network one develops to engage in successful self-control. This system seeks to bind the reactions of the hot system to something that will lead to the successful execution of self-regulation. Metcalfe and Mischel (1999) theorized that willpower is the ability to enable the cognitive network of strategies that allow the cool system to mute, or even nullify, the responses of the hot
system. Mischel (1996) points out that it is important to keep an abstract representation of the goal in mind during the time one is delaying gratification. Although this seems inconsistent with the literature on thought suppression (Wegner, 1994), Metcalfe and Mischel (1999) point out that a completely arbitrary distracter could lead to the hot system becoming activated again, thus defeating the purpose of delay. An abstract representation of the goal, on the other hand, would act to emphasize its “cool” aspects rather than its “hot” aspects.

The Regulatory Strength Hypothesis

The TOTE model (Carver & Scheier, 1981), as previously discussed, looks at how the discrepancy from a current state to a desired state is reduced. The “Operate” process is the act of reducing the discrepancy by whatever means available. One possible source of self-regulation failure is the inability of this operating process to decrease the discrepancy. In the context of the hot/cool-systems framework (Metcalfe & Mischel, 1999), this can be thought of as the inability of the cool cognitive system to mitigate the intensity of the hot affective system.

When considering both frameworks, two important questions arise. First, what is driving the operating process that allows for the success of the cool system? That is, what drives the process that allows for a child to look at a tempting stimulus and imagine it as a picture, thus increasing their ability to delay gratification? Second, what exactly is occurring when the operating process is not working? That is, what is actually occurring when a child fails to delay gratification? One possible explanation that was offered for many failures of the operating process was that it sometimes does not have the resources upon which to operate upon the environment. That is, the
operating process may intend to act upon the environment but simply cannot do so because it is lacking an adequate amount of necessary resources to do its job. This resource account of the operating process has been the focus of what is known as the regulatory strength hypothesis (Baumeister, 2002; Baumeister & Vohs, 2003; Muraven & Baumeister, 2000; Schmeichel & Baumeister, 2004).

Underlying assumptions of the regulatory strength hypothesis. The regulatory strength hypothesis, also known as “regulatory depletion” or “ego depletion”, uses the metaphor of muscular strength to represent the engine of the operating process. This hypothesis is based on six assumptions (see Muraven & Baumeister, 2000). First, the executive component of the self, which include the operating phase of self-regulation, requires some resource to properly function. If we use the muscle analogy, our muscles require certain basic elements (e.g., oxygen, blood) in order to work.

Second, all self-regulatory operations draw on the same resource. That is, the control of one’s thoughts, of one’s outward expression of emotions, and of one’s behaviors, draws upon the same general resource. One way to think of this is to not think of each as a separate operating process but as simply different manifestations of the same operating process. In the muscle metaphor, lifting heavy weights and holding a pencil are simply different manifestations of overall strength.

Third, these resources are limited in the sense that a person has a finite capacity for self-regulation. This provides a “ceiling” than no person can exceed. In the muscle metaphor, humans all have basic physiological limits (e.g., skeletal structure, chemical composition) that do not permit anyone to exceed past a particular functional point.
Fourth, this limited resource is expended during the self-regulation process. That is, self-regulation does not exist in a continuous unaltered loop. The continued exercise of self-regulation leads to a diminished capacity from when one began to regulate, and continues to diminish as we continue to regulate. In the muscle metaphor, as we continuously use our muscles, the chemical energy is converted into less and less efficient forms that lead to a decrease in the essential energy to continue exertion.

Fifth, the success or failure of self-regulation depends on the person’s level of available resources. This assumption accounts for the individual differences in self-regulation success and failure. That is, a person with more resources available by whatever means will be more effective at self-regulation than someone who is lower. In the muscle metaphor, the ability to continue exerting a particular muscle differs between that of a person who does not work out that muscle on a regular basis and one who does. A person who frequently lifts weights would be expected to have greater arm strength than that of someone who does not. In both cases, however, prolonged continuous exertion eventually leads to the muscle no longer being able to sustain exertion.

Sixth, people need a period of rest in which volitional regulation is not exerted to replenish the depleted resource. This also allows for individual differences in self-regulation success and failure. A person who replenishes their resources faster will have more effective subsequent self-regulation than a person who takes longer to replenish the resource. In the muscle metaphor, when one has fully exhausted their muscles, they cannot simply go back to using the muscle at full strength; they must rest the muscle for a time before they can resume their prior level of exertion.
The paradigm typically used to test the regulatory strength hypothesis contains two tasks, both requiring self-regulation. The initial task serves as the manipulation of regulatory depletion and the subsequent task serves to measure residual self-regulatory ability. The regulatory strength hypothesis is confirmed if participants who are given an initial task designed to deplete resources stop working faster on the subsequent task than those who are given an initial task designed to not deplete resources. One important component of this paradigm is that the participants consider both tasks to be independent of one another. This has been accomplished in a variety of ways. A few representative examples are using different experiments for each task (e.g., Muraven, Tice, & Baumeister, 1998), posing the second task as a pilot study for a colleague (e.g., Baumeister, Bratslavsky, Muraven, & Tice, 1998), giving participants separate consent forms for each task (e.g., Weiland, 2001), and conducting each task in a separate room (e.g., Baumeister et al., 1998).

**Thought suppression and regulatory strength.** In one of the initial empirical tests of the regulatory strength hypothesis (Muraven et al., 1998, Study 2), participants were told that the study was to see “how people use words” and would consist of two parts: using words in sentences and using letters to form words. In Part One, participants were told to list their own thoughts in sentence form for six minutes. The experimenter then gave participants instructions to “help direct their thoughts” during the task, which was in fact the depletion manipulation. Participants were either told to try to think of a white bear (*expression condition*), to try not to think of a white bear (*suppression condition*), or were given no specific instructions (*control condition*). In this case, the suppression condition is designed to be the depleting task, as suppressing
thoughts has been shown to require self-regulation that, if disrupted in some way, results in a failure to suppress (Wegner et al., 1987). The expression condition and control condition are considered nondepleting conditions because they are not designed to require self-regulation, thus maintaining regulatory resources\(^1\). The experimenter left the room while the participant worked, and returned after six minutes and told them that Part One was complete.

In Part Two, participants were then asked to complete a set of anagrams. Unknown to the participants, however, all of the anagrams were unsolvable combinations of letters. These anagrams were considered a test of regulatory depletion because the participant would have to persist in the face of a clear obstacle, (the inability to solve any of the anagrams) a hallmark of self-regulation. Participants were told to work as long as they wanted and to ring a bell on the table when they wished to stop the task and continue with the study. The experimenter then left the room and recorded the length of time the participant persisted on the anagrams. The amount of time participants persisted on the frustrating anagram task was the dependent variable.

The prediction was that participants who were told to exert self-regulation by suppressing thoughts of a white bear would stop working on the frustrating anagram task faster than participants in either the expression condition or the control condition. The results confirmed this prediction. The suppression group quit significantly sooner than the expression group, the suppression group quit significantly sooner than the control group, and there was no difference between the expression and control groups. Thus, these results suggest that a prior act of self-regulation leads to a decreased ability to exercise self-regulation in a subsequent task.
Impulse control and regulatory strength. In a different study examining the regulatory strength hypothesis (Baumeister et al., 1998, Study 1), participants were told that the current study was on taste perception and that they would eat a particular food and be given a follow-up measure on sensation memory the following day. Two foods were currently on display: a plate of chocolate chip cookies and bowl of radishes. Pilot testing found that participants were quite negative about eating radishes and quite positive about eating chocolate chip cookies. Participants were told to eat only the radishes (depletion condition) or only the chocolate chip cookies (nondepletion condition). After receiving the instructions, the experimenter left the room for five minutes and monitored through a one-way mirror whether the participant ate only the instructed food. The participants who ate only radishes were considered the depletion group because having to eat something unappetizing in the presence of something appetizing would require suppressing the impulse to eat the appetizing food.

Next, participants were told they would work on a puzzle-tracing task where they would trace a geometric figure without retracing any lines and without lifting their pencil from the paper. Participants in the food conditions were told that they were working on task as a way to wait for any “sensory memory” of the food to fade. Participants in a no-food control condition started on this task without being told of the food conditions. The experimenter completed two example puzzles in order to show how to work on the puzzles, after which they gave the participant two test puzzles to work on. Similar to the anagrams mentioned above, the test puzzles were designed to be unsolvable by including an extra line in each puzzle rendering it unsolvable. The experimenter then left the room and recorded the length of time the participant persisted
on the puzzles. The amount of time participants persisted on the frustrating anagram
task was the dependent variable, as the participant would have to continue working
despite obstacles (the unsolvable nature of the puzzles)

The prediction was that participants who were told to exert self-regulation by
eating a less-than desired food (radishes) in the presence a very desirable food
(chocolate cookies) would stop working on the frustrating puzzle tracing task faster than
both the nondepletion condition and the control condition. The results confirmed this
prediction. The depletion group quit significantly sooner than the nondepletion group,
the depletion group quit significantly sooner than the control group, and there was no
difference between the nondepletion and control groups.

*Current Directions*

A continuously expanding body of research has found results consistent with a
regulatory strength view of self-regulation. This research has examined a wide variety
of variables, including social exclusion (Baumeister, DeWall, Ciarocco, & Twenge,
2005), ostracism (Ciarocco, Sommer, & Baumeister, 2001), self-presentation (Vohs,
Baumeister, & Ciarocco, 2005), and emotional control (Vohs & Heatherton, 2000). The
general finding is that someone who exerts self-regulation (e.g., completely ostracizes
another individual) stops working on a subsequent task requiring self-regulation (e.g.,
working on unsolvable anagrams) significantly faster than those who did not exert self-
regulation previously.

*Extensions.* Research has also extended beyond the self and into more
interpersonal areas, like how accommodation in close relationships is compromised by
regulatory depletion (Finkel & Campbell, 2001) as well as how interracial interactions
deplete regulatory resources (Richeson & Trawalter, 2005). It has also been applied to a variety of populations, such as adolescents (e.g., Frijns, Finkenauer, Vermulst, & Engels, 2005; Hammer, 2005), sexual predators (e.g., Mercado, Schopp, & Bornstein, 2005), and people with various drug and alcohol addictions (e.g., Witkiewitz & Marlatt, 2004). Also, Muraven, Baumeister, and Tice (1999) have recently examined the longitudinal aspects of regulatory strength, finding that the exercise of self-regulation, similar to exercising a muscle, leads to a greater capacity for subsequent self-regulation (an increase in stamina).

**Moderators.** Recent research has also explored possible moderators. For example, Muraven and Slessareva (2003) hypothesized that regulatory depletion does not invariably lead to poorer self-control outcomes. Specifically, people who were given sufficient incentive to exert self-control after a depleting event would not have the decrements that those without such incentive would have. Consistent with this view, they found that depleted participants who were told that the second task was being tested for use on patients with Alzheimer’s disease, thus increasing the meaningfulness of the task, performed better on the subsequent task than those were depleted and told simply to do their best (Study 1).

Weiland, Lassiter, and Geers (2005) used a task designed to prime participants outside of their awareness with a goal to achieve before working on the initial depleting task. Participants who were primed with an achievement goal performed better on a subsequent task requiring self-regulation than participants who were depleted but not primed with a goal to achieve. Thus, the moderating effects of
motivation on regulatory depletion did not need to be explicitly stated to have an impact.

The regulatory strength hypothesis has generated a great deal of research, showing its breadth within self research as well as across research domains. The research, however, has only begun to look in more detail at the dynamics of regulatory strength, its possible moderators, and its boundary conditions. Another relatively untapped area of research is how regulatory strength fits in with more general theory of self-regulation. One such theory is regulatory mode theory (e.g., Higgins, Kruglanski, & Pierro, 2003), which will be explained in greater detail in the next section. One purpose of the present investigation is to look at how the regulatory strength hypothesis fits with regulatory mode theory, which will also be explained in the sections to follow, to provide a more specific picture of the self-regulation process.
Chapter Three

Regulatory Mode

As discussed earlier, a hallmark of self-regulation theories is the idea of comparison and change. One compares the current state with a desired state and attempts to reduce any discrepancy between the two by whatever means is available at the time. An important feature of models of self-regulation, such as the TOTE model (Carver & Scheier, 1981), is that comparison and change are interdependent parts that make up the whole of self-regulation. That is, the two functions work in concert to achieve self-regulatory success. The common framework for this is that comparison functions as a monitor of the change process, as to decide when to initiate change, how change is progressing, and when change has adequately addressed the discrepancy. This leads to the prediction that comparison and change should be moderately to highly positively correlated; as the intensity of the initial discrepancy increases, the change processes should accordingly increase in magnitude.

The interdependence of comparison and change processes has itself become axiomatic in self-regulatory theories. A recent theory of self-regulation has challenged
this view by proposing that the comparison and change functions are in fact more
general and more independent than previous theories have stated.

Regulatory Mode Theory

Regulatory mode theory (Higgins, Kruglanski, & Pierro, 2003; Kruglanski et al, 2000) has conceptualized comparison as “assessment” and change as “locomotion”. Unlike other self-regulation theories, regulatory mode theory proposes that locomotion and assessment are independent operating modes that have equal regulatory status in that either mode is capable of receiving primary emphasis at any given point during goal pursuit. Further, regulatory mode theory proposes that individual and situational variables, both momentary and chronic, can cause either the locomotion mode or the assessment mode to become the customary or the preferred orientation to goal pursuit. As such, they can receive differential emphasis between individuals and situations. Regulatory mode theory further proposes that locomotion and assessment are relatively orthogonal to each other. All of these concepts will be expanded upon in subsequent sections.

Locomotion. In most theories of self-regulation (e.g., Carver & Scheier, 1981), change is defined as acting in such a way as to reduce any discrepancy between the current state and a desired state. Kruglanski et al. (2000) point out that defining change in such a way creates some implicit assumptions involving change that may not be obvious at first glance. First, this definition assumes the interdependence of the comparison and change processes, as the process of reduction requires a discrepancy that can only be detected by a comparison process. Second, this definition assumes that change is unidirectional, in that it specifies the desired result as a reduction in a
discrepancy. Third, this definition assumes the concept of a desired state that change strives to meet, as there would not be a discrepancy without a desired state in which to compare to the current state.

Regulatory mode theory says that these assumptions paint a picture of change that is overly specific. The term “locomotion” is used to clearly distinguish it from change as conceptualized in other theories of self-regulation (Kruglanski et al, 2000). Locomotion constitutes the aspect of self-regulation that is concerned with “movement from state to state” as well as with “committing the psychological resources that will initiate and maintain goal-directed movement in a straightforward and direct manner, without undue distractions or delays.” (Kruglanski et al., 2000, p. 794) Locomotion motivation involves a desire to move away from the current state, even when the current state is positive.

This definition attempts to address the overly specific assumptions other theories place on change. First, locomotion addresses the interdependence assumption in that it does not assume a comparison process. Specifically, locomotion is only concerned with general movement from the current state. Second, locomotion addresses the unidirectional assumption in that it does not make any assumptions as to the direction of movement. Specifically, movement from the current state can be in the direction of a desired state, away from a desired state, or simply movement independent of a desired state. Third, locomotion addresses the singularity assumption in that it does not require a specified desired state or singular alternative. Specifically, one may move in a direction of a variety of outcomes without clearly defining a preferred outcome.
Assessment. In most self-regulation theories, the comparison process functions as a feedback monitor for the discrepancy between the current state and a desired state. A comparison between the current state and a desired state is made, be it consciously or unconsciously. When a meaningful discrepancy is detected, the comparison process allows for action on the discrepancy. As one is acting on the discrepancy, the comparison process reassesses the discrepancy between current state and desired state. If this discrepancy is still different from a satisfactory state, commonly defined as reaching the desired state, the comparison process allows for action to continue; if the discrepancy has been reasonably resolved, it allows for action to stop.

Kruglanski et al. (2000) believe that this definition of comparison contains a set of implicit assumptions similar to those of the change process. First, this definition assumes interdependence as the comparison process is what allows change to start, continue, and stop. Second, this definition assumes a clearly defined state as the comparator in the process. Without this, comparison would have no grounding, allowing change to start and stop with no real goal in mind. A third assumption, specific to comparison, is that the comparison process is focused strictly on the discrepancy. This goes back to the idea that comparison acts as a feedback monitor of discrepancy, implying that the sole unit of comparison is the discrepancy itself.

Regulatory mode theory says that this definition of comparison is overly specific and proposes a more general application of comparison than other theories of self-regulation. Similar to the use of the term locomotion, the term “assessment” is used to clearly distinguish it from comparison as conceptualized in other theories of self-regulation (Kruglanski et al, 2000). Assessment constitutes the comparative aspect
of self-regulation concerned with “critically evaluating entities or states, such as goals or means, in relation to alternatives in order to judge relative quality.” (Higgins, Kruglanski, & Pierro, 2003, p. 297) The important point is that both the current state and the end state can be independently assessed, as well as the value or utility of the means used to move toward or away from that end state.

This definition of assessment attempts to address the overly specific assumptions of comparison in other theories of self-regulation. First, assessment addresses the interdependence assumption in that it does not assume a change process. Specifically, assessment is concerned solely with the evaluation of alternatives; it makes no assumptions on how they are impacted by change or how change impacts assessment. Second, assessment addresses the singularity assumption in that it does not make any assumptions of what is being compared and how it is being compared. Specifically, one can evaluate goals, means, or states to a variety of alternatives based on a variety of criteria. This evaluation process does not have to be one-to-one or even based on an equal metric. Third, assessment addresses the monitoring assumption in a similar way as interdependence in that it does not assume a change process. It makes a further distinction in that a feedback monitoring process would seem to be critical for both locomotion and assessment. That is, locomotion would need to know whether change from the current state has occurred and is being maintained. Similarly, assessment would need to know where the evaluation of alternatives has occurred and whether it needs to be continued.
**Locomotion and Assessment as Independent and Orthogonal Modes.**

Regulatory mode theory proposes that locomotion and assessment are independent modes such that either can receive primary emphasis depending on individual and situational variables. (Avnet & Higgins, 2003; Higgins, Kruglanski, & Pierro, 2003) According to the theory, there is no reason to believe that an emphasis on moving from one’s current state (locomotion) is related to an emphasis on evaluating one’s alternatives (assessment). Regulatory mode theory also proposes that locomotion and assessment are orthogonal modes such that individuals can have either locomotion or assessment to varying degrees. (Higgins, Kruglanski, & Pierro, 2003; Kruglanski at al., 2000) As with independence, there is no reason to believe that variance in one mode implies similar variance in the other mode.

The assumptions of independence and orthogonality allow for four possible combinations of strength and emphasis, such that one can be high in both assessment and locomotion, low in both, or a mixed combination where one is higher than the other. For example, a person who is high in both locomotion and assessment can be thought of as being both active and purposeful. That is, they prefer change from the current state to staying the same, and they also prefer evaluating alternatives to simply reacting to what is around them. A person that is low in both locomotion and assessment can be thought of as passive and nonpurposeful. That is, they prefer staying where they currently are to changing their current situation, and they also prefer to react to the present environment than to take stock in their current situation and consider alternatives to their current state. Higgins, Kruglanski, and Pierro (2003) use Winnie-the-Pooh as an example of the four combinations in the same context: “Tigger is high in
locomotion, Eeyore is high in assessment, Christopher Robin is high in both, and the lovable Pooh is high in neither” (p. 298)

*Dispositional regulatory mode.* Locomotion and assessment can be measured with the Regulatory Mode Questionnaire (RMQ; Kruglanski et al., 2000). The measure is a 30-item questionnaire containing 12 questions relative to locomotion (e.g., “When I decide to do something, I can’t wait to get started”) and 12 questions relative to assessment (e.g., “I like evaluating other people’s plans”) (see Appendix A). The locomotion score and the assessment score is based on the mean of the responses to each set of items. In the initial tests of the RMQ, Kruglanski et al. (2000) administered the RMQ with a variety of other measures to participants in six separate mass testing sessions (N = 2,159). They predicted that variables that are concerned with comparison, evaluation, and reasoning should be related to an assessment orientation, but have no such relation to a locomotion orientation. Similarly, variables concerned with change, movement, and activity should be related to a locomotion orientation, but have no such relation to an assessment orientation. Participants’ locomotion and assessment scores were compared to, among others things, the Discomfort with Ambiguity subscale of Webster and Kruglanski’s (1994) Need for Cognitive Closure scale (NFCC). Kruglanski et al. (2000) predicted that scores on the Discomfort with Ambiguity subscale would be related to their assessment score (such that people high in assessment would have greater discomfort with ambiguity), but not related to their locomotion score. As predicted, participants’ Discomfort with Ambiguity subscale scores were strongly positively associated with their assessment scores ($r = .39$), but had little to no relation to their locomotion scores ($r = -.09$).
Situational priming of regulatory mode. Avnet and Higgins (2003) were the first to examine the situational activation of regulatory modes. Participants were asked to choose one book light from five options and based on five attributes. They were then given one of two strategies to decide which one to choose: Some participants were told to use a “progressive-elimination” strategy where they compared each brand on one attribute at a time, eliminating the one with the lowest value on each attribute, until one brand remained. Other participants were given a “full-evaluation” strategy where they compared one brand of lights to another based on all attributes, then chose their favorite after doing this for all five brands (see Figure 2). Avnet and Higgins (2003) hypothesized that a progressive-elimination strategy would prime a locomotion mode whereas a full-evaluation strategy would prime an assessment mode. Specifically, the fact that the criterion of evaluation changed at every step in a progressive-elimination strategy would make it a strategy best suited for a locomotion mode and its emphasis on moving from state to state. However, the fact that a full-evaluation strategy involves making all possible combinations of choice would make it a strategy best suited for an assessment mode and its emphasis on evaluating and comparison.

Regulatory mode and regulatory fit. A second goal of Avnet and Higgins (2003) was to examine the role of regulatory fit and decision-making. Regulatory fit (Higgins, 2005) refers to the relationship between the strategy of goal pursuit and the self-regulatory orientation of the person pursuing the goal and how it impacts that person’s interpretation of the process of goal pursuit. If a person experiences regulatory fit, they are more likely to feel that their current process of goal pursuit is the right thing to do than if there is not regulatory fit. In this case, regulatory fit hypothesizes that a
person with a match between their strategy of goal pursuit and their currently activated regulatory mode will feel more right about what they are doing than a person with a mismatch. For example, a person who has a locomotion mode active will feel more right about pursuing a goal with a strategy based on movement from state to state (locomotion) than a strategy based on evaluation and comparison (assessment).

Research has shown a variety of benefits from regulatory fit: people who experience regulatory fit are more likely to resist temptation during goal pursuit (Freitas, Liberman, & Higgins, 2002), are more likely to enjoy the act of goal pursuit (Freitas & Higgins, 2002), and experience an increased motivation to attain the goal (Idson, Liberman, & Higgins, 2004; Spiegel, Grant-Pillow, & Higgins, 2004). The positive feelings engendered by regulatory fit have also been shown to transfer onto an object of goal-directed behavior (Higgins, Idson, Freitas, Spiegel, & Molden, 2003).

To examine the impact of regulatory fit on regulatory mode, Avnet and Higgins (2003) used a priming task to put one in a locomotion mode or an assessment mode prior to making choices on book lights. To do this, they took three locomotion items and three assessment items from the RMQ and created a behavior-listing task designed to prime either a locomotion mode or an assessment mode. For example, they took the RMQ item “When I decide to do something, I can’t wait to get started” (locomotion) and asked participants to “Think back to a time when you decided to do something and could not wait to get started,” and ask them to give a short behavioral example. The situational primes used in the current investigation are the same as those used by Avnet and Higgins (2003, p. 528) and are included in Appendix B (Locomotion Prime) and Appendix C (Assessment Prime). After the priming task, participants chose a book
light using either a progressive-elimination strategy or a full-evaluation strategy, as outline above. Once the participant chose a book light, participants were paid $8 for participating, but were also offered a chance to buy the book light they chose. They were told they could offer to buy if for whatever price they wanted, but were told that the price they offered had to be at or above the listed price of the light or they could not buy it. The dependent variable was the amount of money they offered to purchase the light.

Based on Higgins, Idson et al., (2003), Avnet and Higgins (2003) hypothesized that the feelings engendered by regulatory fit would transfer onto the book light such that those with regulatory fit would offer more money for the book light than those with a mismatch. Specifically, participants given a locomotion mode prime would pay more for the chosen book light when using a progressive-elimination strategy (regulatory fit) than when using a full-evaluation strategy (regulatory mismatch). Also, participants given an assessment mode prime would pay more for the chosen book light when using a full-evaluation strategy (regulatory fit) than when using a progressive-elimination strategy (regulatory mismatch). The results confirmed their hypotheses: there were no main effects of Mode or of Strategy ($F$s < 1), only a significant Mode x Strategy interaction ($p = .003$). Specifically, the regulatory fit conditions would pay more for the chose book light than the regulatory mismatch conditions. Thus, participants who had a strategy of goal pursuit that matched their currently active regulatory mode felt that their method of goal pursuit was the right one, and that the feeling engendered by that fit transferred onto the object of that goal pursuit.
Regulatory mode theory (Higgins, Kruglanski, & Pierro, 2003; Kruglanski et al., 2000) proposes that the processes involved in self-regulation are more general and more independent than what prior theories of self-regulation have posited. A locomotion mode involves general movement from state to state, whereas an assessment mode involves evaluation and comparison in general. Furthermore, the independence of these modes allow for a variety of effects based on how the two modes work with or against each other. The proposed studies will be the first to look at regulatory mode in the context of the regulatory strength hypothesis (e.g., Schmeichel & Baumeister, 2004). Specifically, the proposed studies will examine differences in regulatory depletion between the modes, then look at how the interaction between the two modes impact regulatory depletion patterns.

The proposed studies will also look at how the fit between the two modes impacts regulatory depletion patterns. The only examination of regulatory fit and regulatory mode (Avnet & Higgins, 2003) examined the situational priming of regulatory mode and its impact on decision making. The proposed studies will be the first to examine how the fit between one’s dispositional regulatory mode and a situationally primed regulatory mode impacts how one feels during the process of regulatory depletion.
Chapter Four
Overview of Proposed Studies

The aim of the present studies is to expand on both the regulatory strength hypothesis and regulatory mode theory by looking at how the mode one currently operates under – be it dispositional or situational – affects regulatory depletion patterns.

The original regulatory strength hypothesis specifically expressed that the finite resource it specifies is the general operating process that drives all self-regulation. Research on the regulatory strength hypothesis has found evidence of regulatory depletion patterns in a wide variety of areas (e.g., Finkel & Campbell, 2001; Richeson & Trawalter, 2005; Seeley & Gardner, 2003; Vohs et al., 2005), thus strengthening the argument of the generality of the resource. Although this research is important, it is clear that this work has only addressed generality in terms of the breadth of the phenomenon, and not its depth.

It is only recently that research has begun to explore generality in terms of depth, looking at moderating variables and limiting conditions (e.g., Weiland et al., 2005). No research to date has sought to integrate regulatory strength into a greater model of self-regulation. Without such work, it is hard to know at what level regulatory
strength operates. Specifically, if depletion effects were found throughout the constructs of a model, there would be strong evidence that regulatory strength is a general operator of self-regulation. If depletion patterns were restricted to specific areas of a model, however, it would speak to a more specific, though no less important, segment of the regulation process. The proposed studies will begin to answer that question by examining the regulatory strength hypothesis within the general model of regulatory mode theory.

At the same time, this work is very important at elucidating regulatory mode theory. The regulatory strength hypothesis has produced a large body of research that clearly demonstrates that it is an important facet of self-regulation. Any greater self-regulation theory, therefore, would need to allow for the influence of regulatory strength at the process level, or in this case, the regulatory modes.

Locomotion, Assessment, and Depletion

In the initial study on regulatory mode theory, Kruglanski et al. (2000) state that one important question for future research is: what are the consequences of an overemphasis on locomotion, assessment or both? The proposed studies ask the similar question: what are the consequences of one’s regulatory emphasis on the resources available for self-regulation? A general hypothesis of the proposed studies is that assessment is more depleting than locomotion. This hypothesis stems from research from both the regulatory strength and regulatory mode literatures.

One relevant finding from the regulatory strength literature is the act of choice draws upon regulatory resources. Baumeister et al. (1998, Study 2) had participants give persuasive speeches on a proposed tuition increase for the following year.
Participants in a no-choice condition were told they would make a speech supporting the increase, a stance most students opposed. Participants in high-choice conditions were randomly assigned to give a speech either supporting the increase (counterattitudinal) or opposing the increase (proattitudinal). Participants were told which condition they were in and given the opportunity to make a speech on the other attitude, but were told that it would be helpful to make the speech specific to their assigned condition. Baumeister et al. hypothesized that the act of choice, whether consistent or inconsistent with their current attitude, would lead to decreased persistence on a subsequent unsolvable puzzle-tracing task. Consistent with their hypothesis, participants in both high-choice conditions stopped working quicker than participants in the no-choice condition. Participants in the no-choice condition persisted just as long as a no-speech control group. Thus, the act of choice, be it supporting or opposing one’s beliefs, relies on finite regulatory resources (see also Rawn et al., 2005).

Kruglanski et al. (2000) define assessment as “the comparative aspect of self-regulation concerned with critically evaluating entities or states…in relation to alternatives in order to judge relative quality” (p. 794, emphasis added). A particularly relevant finding from the regulatory strength literature is that successful performance at complex thinking tasks rely on finite regulatory resources. Schmeichel, Vohs, and Baumeister (2003, Study 1) had participants view a video of an interview where, at the bottom of the screen, one-syllable words appeared. The experimenter either made no mention of the words or instructed the participant to ignore the words (cf. Gilbert, Krull, & Pelham, 1988). Participants were then given 13 problems from the Analytical section of the Graduate Record Exam (GRE). Consistent with their hypothesis, participants
who were told to ignore the words (high regulatory demand) got fewer problems correct than participants who were given no instruction (low regulatory demand). Subsequent studies found decrements in performance on the Cognitive Estimation Task (CET; Study 2) as well as problems from the Verbal portion of the GRE (Study 3). These decrements, however, did not apply to performance on the General Mental Abilities Test (GMAT; Study 2) or the recall of nonsense syllables (Study 3). Thus, the ability to apply logic, use cognitive extrapolation, and engage in thoughtful reading comprehension, relies on finite regulatory resources.

Based on the findings of Baumeister et al. (1998) and Schmeichel et al. (2003), it can be hypothesized that the assessment mode itself requires finite regulatory resources, based on its emphasis on measurement, evaluation, and consideration of alternatives. These results, however, do not directly lead to the hypothesis that assessment is more depleting than locomotion. This possibility comes from the regulatory mode literature.

Taylor and Higgins (2002, cited in Higgins, Kruglanski & Pierro, 2003) examined how various activities may emphasize a locomotion mode, an assessment mode, or a combination of both. Participants were given a list of common activities and the formal definitions of locomotion and of assessment. They were then asked what mode was the preferred reason for engaging in that particular activity. Participants rated activities such as exercise, dancing, partying, and playing sports as locomotion-oriented. They rated activities such as academic duties, financial duties, thinking, and meditation as assessment-oriented. The tasks participants rated as assessment-oriented (academic duties) would seem to map onto tasks that require the higher mental
functioning (verbal GRE, GMAT) that requires regulatory resources for successful completion (Schmeichel et al., 2003).

In a similar study, Bianco et al. (2003, Study 1) had participants rate a list of tasks as something they would do for fun and enjoyment or something they would do because it was important to complete. Activities that participants in Taylor and Higgins’ study (2002, as cited in Higgins, Kruglanski, & Pierro, 2003) rated as assessment-oriented (e.g., financial duties) were rated as being important and those rated as locomotion-oriented (e.g., partying) were rated as being fun. In a review of work on regulatory depletion during the coping process, Baumeister, Faber, and Wallace (1999) stated that one way to help replenish resources is to distract oneself by engaging in activities that engender positive affect. The link between locomotion tasks and fun could lead to the hypothesis that a locomotion mode could lead to increased persistent on a subsequent task, but the more conservative interpretation is that locomotion could temper or inhibit the depletion process.

As outlined in the previous section, Avnet and Higgins (2003) had participants use either a progressive-elimination strategy or a full-evaluation strategy. A progressive-elimination strategy was hypothesized as a more locomotion-oriented strategy and a full-evaluation strategy a more assessment-oriented strategy. In terms of raw numbers, the progressive elimination strategy involves 20 choices to come to the final decision. The full evaluation strategy, on the other hand, involves 50 choices to come to the final decision (see Figure 2). There is evidence in the regulatory depletion literature that the number of choices one makes is directly linked to regulatory depletion. Rawn et al. (2005, Study 2) had participants either make preference
judgments across many domains (high-choice) or rate magazine advertisements without making preference judgments (no-choice). Thus, the only difference between groups was the number of choices made. Consistent with their hypothesis, participants who had the greater number of choices were more depleted than those who made no choices. Based on Avnet and Higgins’s (2003) conceptualization of locomotion and assessment, and Rawn et al.’s (2005) findings on the influence of the sheer number of choices one makes, the greater number of choices made in the assessment mode would seem to lead to the hypothesis that the assessment mode is more depleting than the locomotion mode.

Study 1 examined this prediction with the situational priming of a preference for a locomotion mode or an assessment mode. The general prediction was that the situational priming of an assessment mode will lead to decreased persistence on a subsequent task than the priming of a locomotion mode. Study 2 also examined this prediction in terms of one’s dispositional preference for a locomotion mode or an assessment mode. The general prediction was that the dispositional preference for an assessment mode will lead to decreased persistence on a subsequent task than a dispositional preference for a locomotion mode.

Regulatory Fit and Regulatory Depletion

The effects of regulatory fit (Higgins, 2005) have been shown to impact many aspects of goal-directed behavior (e.g., Idson et al., 2004; Freitas et al., 2002). Avnet and Higgins (2003) were the first to examine the interaction of regulatory mode with regulatory fit. Participants were willing to pay 40% more for a book light when the primed mode matched the decision strategy (e.g., locomotion prime, progressive-
elimination strategy) than when there was a mismatch between the primed mode and the decision strategy (e.g., locomotion prime, full-evaluation).

Recent work has also examined how regulatory fit influences the amount of effort one decides to put into a task. Participants reported that they would put more effort into an activity when the reason for engaging in the activity (“locomotion”) fit with the mode the activity was most associated with (“exercise”) than when there was a mismatch (Taylor & Higgins, 2002, as cited in Higgins, Kruglanski, & Pierro, 2003). Also, participants reported that they would put forth the most effort in an activity that fit with their preferred regulatory orientation than when it did not fit. That is, participant high in locomotion, as assessed by the RMQ, would put forth the most effort in tasks that were associated with locomotion (exercise) than tasks that were associated with assessment (Taylor & Higgins, 2002, as cited in Higgins, Kruglanski, & Pierro, 2003).

Consistent with prior work (e.g., Freitas et al., 2002), the present studies define regulatory fit as when the situationally primed mode matches the dispositional orientation. The general hypothesis is that participants will feel better about the act of self-regulation when there is regulatory fit than when there is non-fit. The manipulation of regulatory depletion, a cross-out task, is designed to have participants get as far as they can into the task while keeping errors to a minimum. Although this particular task may be novel to the participant, the prime would either match or not match the orientation one would normally use for such a task. Therefore, it is hypothesized that regulatory fit would influence task appraisal. Study 2 specifically examined how the fit between one’s dispositional regulatory mode and a situationally primed regulatory mode affect how one feels during the process of regulatory depletion. One interesting
outcome of this is that a person who is depleted but has achieved regulatory fit can feel better about their goal pursuit than a person who is not depleted but does not have regulatory fit.

*Alternative Hypotheses*

It is important to note that the predictions detailed above are not the only ones that can be derived from regulatory mode theory. Kruglanski et al. (2000) theorized that one of the advantages of regulatory mode theory is that the independence of locomotion and assessment allows for various effects of one on the other.

One possibility is that the impact of one mode may not be felt unless the other mode is adequately present, or what Kruglanski et al. (2000) term a “threshold effect”. Kruglanski et al. (2000, Study 8) found evidence for this in that locomotion predicted successful completion of a training program for an elite combat unit in the U.S. Army, but only for those high in assessment; assessment alone had a negligible impact on predicting success. The present studies were not designed to test concrete hypotheses for a possible threshold effect; it is simply to state that such hypotheses can be explored with the present data.

One possibility is that assessment will be more depleting when locomotion is high. That is, the impact of assessment on regulatory depletion will be greatest when one is high in locomotion than when one is low in locomotion. This comes from the possibility that locomotion engages the process of assessment. That is, if locomotion is low, then the assessment process is not as active as it would be if locomotion was high. Based on this idea, locomotion can be thought of as a regulatory process that contributes to depletion. This will be referred to this as the *contribution hypothesis.*
Another possibility is that assessment will be more depleting when locomotion is low. That is, the impact of assessment on regulatory depletion will be greatest when one is low in locomotion than when one is high in locomotion. This comes from the possibility that locomotion engages the process of regulation. That is, if locomotion is low, then one is not regulating to compensate for the impact of depletion. Based on this idea, locomotion can be thought of as the regulatory process that counteracts depletion. This will be referred to as the *counteraction hypothesis*. 
Chapter Five

Study 1: The Situational Priming of Regulatory Mode and its Impact on the Feelings and Outcomes of Self-Regulation

Hypotheses

Study 1 is the initial examination of the effects of regulatory mode on regulatory depletion. The study follows the basic procedure for studies testing the regulatory strength hypothesis (Muraven et al., 1998; Weiland et al., 2005). That is, participants worked on a first task that either requires self-regulation or does not, and then move on to a second task that served as the dependent measure of regulatory depletion. Before working on the first task, regulatory mode was situationally primed using the behavior-listing task developed by Avnet and Higgins (2003). The statistical analyses used to test the following hypotheses are explained in detail in later sections. The first hypothesis for the present study is directly from the regulatory strength hypothesis and predicts the regulatory depletion effect.

Hypothesis 1.1: Participants who previously engaged in self-regulation will stop persisting on a subsequent task requiring self-regulation faster than participants who did not previously engage in self-regulation.
The second hypothesis focuses specifically on the impact of the situational priming of a particular regulatory mode on persistence. The general prediction is that assessment is more depleting than locomotion.

**Hypothesis 1.2a:** Participants who are primed with an assessment mode will stop persisting on a task requiring self-regulation faster than participants who are primed with a locomotion mode.

**Hypothesis 1.2b:** Participants who are primed with an assessment mode will stop persisting on a task requiring self-regulation faster than participants who are not primed with a particular mode.

The third hypothesis focuses specifically on how the situational priming of a particular regulatory mode interacts with self-regulatory demands to impact persistence. The general prediction follows from the hypothesis that assessment is more depleting than locomotion.

**Hypothesis 1.3:** Participants who previously engaged in self-regulation and are primed with an assessment mode will stop persisting on a subsequent task requiring self-regulation faster than participants in the other groups.

The fourth hypothesis focuses on the fit between the situational priming of a particular mode (regulatory strategy) and the dispositional preference for a particular mode (regulatory orientation). The general prediction is that one feels better about a task when the strategy fits the orientation than when it does not.

**Hypothesis 1.4a:** Participants who are high in dispositional assessment and are primed with an assessment mode will report feeling more positively about a
subsequent task than participants high in dispositional assessment who are primed with a locomotion mode.

Hypothesis 1.4b: Participants who are high in dispositional locomotion and are primed with a locomotion mode will report feeling more positively about a subsequent task than participants high in dispositional locomotion who are primed with an assessment mode.

A common finding in the regulatory fit literature (e.g., Avnet & Higgins, 2003; Bianco et al., 2003) is that there is no difference between the regulatory fit groups. That is, there is no difference between participants who achieved regulatory fit on assessment and those who achieved regulatory fit on locomotion. Similarly, no differences have been found between the non-fit groups. Thus, no differences between these groups are predicted.

Method

Participants

One-hundred thirty eight undergraduate students (101 female, 37 male) from the University of Toledo participated in the study in return for partial course credit. Participants were tested individually in one 30-minute session and were told that the current study will look at “new ways to measure particular personality traits”. No participants in the present study will participate in the other study proposed here.

Procedure

Preliminary assessment of regulatory mode. Participants first completed the RMQ (see Appendix A) in a mass testing session along with other scales. Each
participant will have a locomotion score and an assessment score. The locomotion and assessment scores from the RMQ will be left to freely vary among the participants.

*Experimenter preparation.* In all of the studies in this proposal, the experimenter was provided with pre-prepared scripts to read to participants to ensure that the instructions were identical for all participants. The experimenter informed the participant that they would be reading directly from the scripts during the study to keep all instructions the same. The experimenter also asked if the participant has any questions before proceeding with any portion of the study and did not proceed until questions have been answered to the participant’s satisfaction.

*Initial assessment of dependent variable.* Upon entering the lab, the experimenter obtained the participant’s informed consent to participate (see Appendix D). Next, participants were told that the first task they will work on is holding a small piece of paper by squeezing the handles of a standard handgrip. Prior research has concluded that maintaining a grip to hold a small object is almost entirely a measure of self-regulation as the length of time one maintains the grip is not a linear function of overall bodily strength (Rethlingshafer, 1942). Specifically, any individual differences in the length of time one maintains the handgrip are not a reflection of strength but a reflection of one’s willingness to persist maintaining the grip to hold the object. Also, handgrip persistence has been used successfully as a dependent variable in prior regulatory strength studies (e.g., Ciarocco et al., 2001; Muraven et al., 1998; Seeley & Gardner, 2003) as well as in pilot data collected for the purpose of this proposal. Thus, holding a small object by squeezing a handgrip is a well-established measure of self-regulation. Performance on the handgrip was measured both before and after the
depletion manipulation, as to control for any within-subjects variations in persistence. The participant was not told that this initial measure was the first of two assessments, but simply that it is the first task they will complete.

Participants were told to hold the handgrip in their dominant hand and to extend their arm so that the handles point toward the floor. The experimenter then told the participant that they will be putting a small piece of paper between the two handles and that they should keep the paper held with the handgrip for as long as they can. The experimenter gave no feedback to the participant about their performance; they will simply tell the participant that the first task is complete and to fill out a brief questionnaire (based on Muraven et al., 1998, see Appendix E). The questionnaire will contain items on how difficult they thought the handgrip task was as well as how interesting they thought the task was. These items will be used as the dependent variable for examining the impact of regulatory fit on regulatory depletion. The experimenter will put the handgrip out of sight as the participant is working on the questionnaire as to imply that there will not be a second assessment.

*Manipulation of situational regulatory mode.* Participants were then told that the next task is what is known as a behavior-listing task. For this task, they were given a paper with the title “Behavior Over Time.” The paper had three statements and the instructions asked them to read each statement and recall one behavior from the past that is true for each statement. The instructions clarified that the behaviors should be “the kinds of behaviors that you would do in everyday life” and that only a short example was needed. The three statements for each experimental condition were the same ones used by Avnet and Higgins (2003) to situationally prime a particular
regulatory mode. In the **locomotion prime condition**, the three statements were made from items on the RMQ that examined locomotion (see Appendix B). In the **assessment prime condition**, the three statements were from items on the RMQ that examined assessment (see Appendix C). Under each statement was a box for them to write their answer. The purpose of using the box was to limit the participant’s description of the behavior as much as possible, as the purpose of the task is to merely prime the regulatory mode. That is, it is not necessary that the participant write out the full statement of the behavior because it should be sufficiently primed in the participant’s mind (Avnet & Higgins, 2003). Once the participant completed the task, the experimenter had them fill out a questionnaire similar to the one they filled out following the handgrip task, but directed toward the behavior listing task (see Appendix F). Participants in the **control condition** did not complete a behavior listing task and went straight to the next task after the handgrip task.

**Manipulation of self-regulatory demand.** Participants were then told that the next task is what is known as a search task. They were given a page from an upper-level statistics book (see Baumeister et al., 1998; Weiland et al., 2006), although the participant is not told where it is from and all headings have been removed. Participants in the **high demand condition** were told to cross out every “e” they see on the page. Participants in the **low demand condition**, however, were told to only cross out “e”s not adjacent to or one letter away from another vowel. Participants were shown a paper with two example words: “the experimenter”. This example page is in large font and all “e”s are in color as to help the participant remember the rule. The participant was allowed to keep the example page as they worked on the task. It is unclear from the
previous work that participants were allowed access to an example throughout the task. The rationale for allowing the participant to keep the example on hand in the present study is that the point of the manipulation is to deplete self-regulatory resources and that any accuracy gained from having the example present should not provide a great relief from depletion, especially not a theoretically significant difference from the nondepletion participants.

Participants were given 8 minutes to work on the search task. This length was chosen for two reasons. First, studies using the search task as a depletion manipulation set their time limits at 6 min or above. Second, recent research has found that regulatory depletion seems to follow a nonlinear pattern, with steeper drops in performance as time working on the depleting task increases (Weiland, Okdie, Geers, Podracky, & Sharkey, 2006). Thus, a time limit of 8 min gives us confidence that our findings will reflect differences in regulatory depletion. After 8 min, the experimenter stopped the participant from working. In the event that the participant completed the task before 8 min had elapsed, the experimenter recorded the length of time the participant worked on the task. The experimenter then gave the participant another short questionnaire (see Appendix G) as well as the Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988, see Appendix H), to rule out mood as an explanation for any differences between groups (Muraven et al., 1998). The BMIS is a 16-item adjective listing where participants rate the adjectives on a 4-point scale (from definitely do not feel to definitely do feel) as to how the adjective describes their current mood. The BMIS generates a mood arousal factor and a mood valence factor.
Dependent measure of regulatory depletion. After completing the BMIS, the experimenter told the participant that they will complete a second handgrip measure. The experimenter did not specifically mention a connection between the two measures. The participant was given similar instructions to the first handgrip task. The experimenter gave no feedback to the participant about their performance; they simply told the participant to fill out a short questionnaire identical to the initial handgrip questionnaire (see Appendix E).

The experimenter then read the participant a standardized debriefing form (see Appendix I) and asked the participant to explain any suspicious responses. After this, the experiment debriefed the participant as to the purpose of the study, thanked them for their participation, and dismissed them.

Results

Persistence

The length of time participants held the paper between the handles of the handgrip was measured by two independent coders who were blind to the depletion condition of the participant. The two coders were virtually identical in their ratings: Time 1: \( r(138) = .99, p < .001; \) Time 2: \( r(138) = .99, p < .001. \) The estimates of the two coders were averaged together to come up with the value of both times the participant held the handgrip (see Table 1 for values for Time 1 and Time 2).

Difference scores analyses. The amount of time participants held the paper between the handles of the handgrip after the depleting event was subtracted from the time it was held before the depleting event to come up with a persistence change score. A 2 x 3 analysis of variance (ANOVA) was conducted on the handgrip difference score
using the demand condition (Demand: high, low) and the situationally primed regulatory mode (Prime: locomotion, assessment, no-prime control) as independent variables (see Table 2 for individual cell means).

The first prediction, based on Hypothesis 1.1, is that there will be a main effect of Demand. Specifically, participants in the high demand (depletion) condition will stop holding the handgrip significantly faster than participants in the low demand (nondepletion) condition. This prediction was not supported: there was no difference in persistence between the high demand and low demand conditions, $F(1, 132) = 1.16, p = .32$.

The second prediction, based on Hypothesis 1.2, is that there will be a main effect of Prime. Specifically, participants in the assessment prime condition will stop holding the handgrip significantly faster than participants in the locomotion prime condition or in the control condition. This prediction was not supported: there was no difference in persistence between the three prime groups: $F < 1$.

The third prediction is that there will be a Demand x Prime interaction. Planned contrast analyses were conducted to determine how the groups differ from one another. The specific third prediction, based on Hypothesis 1.3, is that high assessment participants who were depleted will stop holding the handgrip significantly faster than the other groups. This prediction was not supported: there was no Demand x Prime interaction, $F(2, 132) = 1.69, p = .19$.

Repeated measures analyses. All of the predictions outlined above were also tested using a 2 x 3 repeated measures ANOVA with Demand and Prime as between-subjects factors and the time of assessment (Time: pre-task, post-task) as a within-
This analysis yielded a main effect of Prime, $F(2,132) = 5.65, p = .004$. Focused contrast analyses revealed, however, that there was no difference between the locomotion ($M = 37.22$) and assessment prime ($M = 37.51$) groups. Both groups were found to be significantly different than the no-prime condition ($M = 53.96$), both $p$s = .012. Consistent with the difference score analyses and the repeated measures ANOVA, there was no main effect of Demand ($F[1, 132] = 1.06, p = .31$) and no Demand x Prime interaction ($F < 1$).

*Analysis of covariance (ANCOVA).* All of the predictions outlined above were also tested using the Time 2 persistence as the dependent variable in place of the difference score. A 2 x 3 ANCOVA will be conducted, with Demand and Prime as between-subjects factors and the Time 1 persistence as a covariate (see Table 3 for marginal means). The results of these analyses were consistent with the difference score analyses: there was no main effect of Demand ($F < 1$), no main effect of Prime ($F < 1$), and no Demand x Prime interaction ($F[2,131] = 1.35, p = .26$).

*Regulatory Fit*

Regulatory fit is defined in the present study as when the situationally primed regulatory mode matches one’s dispositional orientation. The general hypothesis is that participants will feel better about the act of self-regulation when there is regulatory fit than when there is non-fit. Scores on the items in the questionnaires given after each task that related to how interesting the participant found the tasks were combined to create a fit-index for each task, higher numbers indicating more positive ratings of the task. That is, scores on the items from the behavior listing task were combined to create a fit-index for the listing task.
A 2 X 2 ANOVA was conducted on the fit-index scores for the search task using the situationally primed regulatory mode (Prime: locomotion, assessment) and the preferred regulatory mode (Mode: locomotion, assessment) as the independent variables (see Table 4 for individual cell means). No main effect of Prime ($F < 1$) or Mode ($F < 1$) was found. A Prime x Mode interaction was found, $F(1, 87) = 10.41, p = .002$.

Specifically, participants who had a dispositional preference for locomotion reported feeling better about the search task than those who had a dispositional preference for assessment, regardless of regulatory fit or non-fit. The fourth prediction, however, was not supported: planned contrasts analyses found no significant difference between those who experienced regulatory fit and those who did not, $t < 1$.

**Mood**

The next analyses looked into the possible influence of mood arousal or mood valence in the present study. A 2 x 3 ANOVA was conducted on the scores from the BMIS to examine if mood arousal or mood valence differed across conditions (see Table 5 for individual cell means). Consistent with prior studies on regulatory depletion (e.g., Weiland et al., 2006), neither mood arousal nor mood valence yielded any effects between groups, all $Fs < 1.10$.

**Search Task Analyses**

*Last line completed.* One possible reason for the lack of results for persistence could be that participants did not take the search task seriously. The next set of analyses examined differences in performance on the search task. A main effect of Demand for these analyses would seem to rule out such an explanation for the lack of results. Based on past research (e.g., Weiland et al., 2006), this main effect of Demand
is expected across all analyses. A 2 x 3 ANOVA was conducted on the number of lines fully completed³ on the search task (see Table 6 for individual cell means). There was the expected main effect of Demand, such that participants who were given the complex decision rule completed fewer lines than those who were given the simple decision rule, $F(1,127) = 102.04, p < .001$. Thus, participants presumably took the decision rule they were given seriously.

These analyses can also test for the influence of regulatory mode on performance on the search task. The general hypothesis of differential impact of regulatory mode would predict that participants would complete fewer lines when primed with an assessment mode than when primed with a locomotion mode. No main effect of Prime or Demand x Prime interaction was found, both $F$s < 1. Thus, the primed regulatory mode did not impact how participants performed on the task.

*Proportion of errors.* The number of lines completed, however, does not provide a complete picture of whether participants took the task seriously. The number of lines completed does not take into consideration whether or not participants applied the decision rule correctly. Thus, a test of the proportion of errors participants committed would also examine whether participants took the decision rule itself seriously. A 2 x 3 ANOVA was conducted on the proportion of errors of omission on the search task (see Table 7 for individual cell means). There was a main effect of Demand, such that participants who were given the complex decision rule ($M = 0.36$) committed fewer errors of omission than those who were given the simple decision rule ($M = .09$), $F(1,126) = 113.27, p < .001$. 
This ANOVA also allowed for an examination of the influence of regulatory mode on the proportion of errors committed. Based on the hypotheses presented regarding regulatory mode, participants would commit fewer errors of omission when primed with an assessment mode than when primed with a locomotion mode. No main effect of Prime, $F(2, 126) = 1.26, p = .29$, or Demand x Prime interaction, $Fs < 1$, was found.

One important point is that the high demand participants can have errors of commission as well as errors of omission, whereas low demand participants can have only errors of omission. That is, low demand participants are told to cross out every “e”, and therefore the only wrong answer is one they did not cross out. The high demand participants, on the other hand, can violate the rule by both not crossing out “e”s they should (error of omission) and by crossing out “e”s they should not (error of commission). Thus, a one-way ANOVA was conducted on the proportion of errors of commission (see Table 7 for individual cell means). The ANOVA revealed no effect of prime on the errors of commission, $F(2, 63) = 1.97, p = .15$.

The error analyses suggest that participants were applying the search task decision rule correctly. In fact, participants who were given the complex decision rule has fewer errors of omission than participants who were given the simple rule. This clearly speaks to the scrutiny participants given the complex decision rule were applying to the task. Regulatory mode did not impact either errors of omission or errors of commission.
Exploratory Analyses: Threshold Effects

As previously mentioned, participants’ locomotion and assessment scores on the RMQ were left to freely vary across conditions. This allows for the examination of the influence of dispositional differences in regulatory mode across conditions. One possibility mentioned earlier was that of a “threshold effect” of regulatory mode on regulatory depletion. That is, the impact of one mode may not be felt unless the other mode is adequately present. The initial demonstration of a threshold effect was when Kruglanski et al. (2000, Study 8) found that locomotion predicted successful completion of a training program only for those high in assessment. The present study makes no specific predictions of a particular threshold effect; it is merely to explore the possibility.

The difference scores on persistence were subjected to a hierarchical regression analysis. In this regression, dispositional locomotion scores (centered around the mean) and dispositional assessment scores (consisting of two dummy-coded variables) were included in the first step of the equation as predictor variables. The interaction term (Locomotion x Assessment) was entered as a predictor variable in the second step of the equation. First, there was a main effect of Locomotion such that participants high in locomotion stopped working faster than those low in locomotion, $F(1, 129) = 6.86, p = .01$ ($\beta = .34$). There was also a marginally significant interaction of Locomotion and Assessment, $F(1, 129) = 3.22, p = .075$ ($\beta = .23$). Specifically, higher dispositional locomotion scores predicted decreased persistence only when one is low in dispositional assessment. Higher dispositional locomotion scores do not predict persistence when
one is high in assessment. There were no significant effects of assessment, $F(1, 129) = 1.09, p = .30$.

A second hierarchical regression analysis was conducted, this time using the centered assessment scores and the dummy-coded locomotion scores at the first level, and their interaction at the second level. No significant effects were found for locomotion, $F < 1$, assessment, $F < 1$, or the interaction term, $F < 1$.

Discussion

The present study examined the impact of priming regulatory mode on self-regulatory outcomes. These results will be explained more thoroughly in the General Discussion section. The regulatory strength hypothesis was not supported in the present study. Specifically, participants who were given high self-regulatory demand persisted just as long on a subsequent task as participants who were given minimal self-regulatory demand.

The predicted impact of regulatory mode on regulatory outcomes was not supported. Specifically, participants persisted the same amount of time whether they were primed with a locomotion mode, primed with an assessment mode, or were not primed at all.

The predicted impact of regulatory fit was not supported. Specifically, participants felt the same way about a task whether they were primed with a regulatory mode that fit with their own dispositional regulatory mode (regulatory fit) or primed with a regulatory mode that did not fit with their own dispositional regulatory mode (regulatory non-fit).
The results from the search task suggest that participants took the task seriously and that the lack of findings are not because participants simply did not apply the decision rule in a meaningful sense. Consistent with prior studies on regulatory depletion (e.g., Weiland et al., 2006), neither mood arousal nor mood valence yielded any effects between groups.

Exploratory analyses for some evidence for a “threshold effect”. Specifically, an increased level of dispositional locomotion predicts decreased persistence on the handgrip task when one is low in dispositional assessment. Dispositional locomotion does not predict persistence when one is high in dispositional assessment. This result is similar to the contribution hypothesis outlined previously in that locomotion would engage the process of assessment. That is, if locomotion is low, then the assessment process is not as active as it would be if locomotion was high. Based on this idea, locomotion can be thought of as a regulatory process that contributes to depletion. No formal hypotheses were made concerning these results, so this is purely speculation.

A second study was conducted to further examine the impact of regulatory mode on regulatory depletion patterns as well as the impact of regulatory fit on regulatory depletion patterns.
Chapter Six

Study 2: Dispositional Differences in Regulatory Mode and its Impact on the Feelings and Outcomes of Self-Regulation

Hypotheses

Study 2 continued to examine the effects of regulatory mode on regulatory depletion. Whereas Study 1 focused on the impact of situational regulatory mode (see Avnet & Higgins, 2003), Study 2 focused on the impact of dispositional differences (see Kruglanski et al., 2000). The independence of locomotion and assessment allow for a person to be high in both locomotion and assessment, low in both, or high in one and low in the other. Study 2 focused on these different groupings and how they differ in terms of regulatory depletion patterns.

Study 2 also continued to examine the impact of the situational priming of regulatory mode. Study 2, however, also examined the influence of the fit between the situationally primed mode and the dispositional differences in regulatory mode, and how that fit impacts the feelings one has about the process of completing a task requiring self-regulatory resources.
The present study followed the same basic procedure as Study 1. One important difference is that all participants were given a depletion task for the initial task. The statistical analyses used to test the following hypotheses are explained in detail in later sections. The first hypothesis for the present study is a further empirical test of the prediction that assessment is more depleting than locomotion. This hypothesis focuses specifically on the situational priming of a particular regulatory mode.

**Hypothesis 2.1:** Participants who are primed with an assessment mode will stop persisting on a task requiring self-regulation faster than participants who are primed with a locomotion mode.

The second hypothesis is a further empirical test of the prediction that assessment is more depleting than locomotion. This hypothesis focuses on the independent modes of locomotion and assessment at the dispositional level.

**Hypothesis 2.2a:** Higher dispositional assessment scores will be a reliable predictor of decreased persistence on a subsequent task requiring self-regulation.

**Hypothesis 2.2b:** Dispositional locomotion scores will not reliably predict decreased persistence on a subsequent task requiring self-regulation.

The third hypothesis focuses on the fit between the dispositional preference for a particular mode and the situational priming of a particular mode. The general prediction is that of regulatory fit.

**Hypothesis 2.3a:** Participants who are high in dispositional assessment and are primed with an assessment mode will report feeling more positively about a
subsequent task than participants high in dispositional assessment who are primed with a locomotion mode.

Hypothesis 2.3b: Participants who are high in dispositional locomotion and are primed with a locomotion mode will report feeling more positively about a subsequent task than participants high in dispositional locomotion who are primed with an assessment mode.

Consistent with Study 1, no difference between fit groups are predicted.

Method

Participants

One-hundred seventy six undergraduate students (108 female, 68 male) from the University of Toledo participated in the study in return for partial course credit. Participants were tested individually in one 30-minute session and were told that the current study will look at “new ways to measure particular personality traits”.

Preliminary assessment of regulatory mode. Participants first completed the RMQ (see Appendix A) in a mass testing session along with other scales. Each participant will have a locomotion score and an assessment score. A median split was conducted on both the locomotion scores and the assessment scores. Each participant will thus be above or below the median on locomotion and above or below the median on assessment.

A person whose locomotion and assessment are both above the median will be considered high in both locomotion and assessment (high locomotion-high assessment; HL-HA). Similarly, a person whose scores are below the median on both will be considered low on both (low locomotion-low assessment; LL-LA). A person who is
above the median in one score but below the median in the other will be defined as high on one and low on the other (high locomotion-low assessment; HL-LA or low locomotion-high assessment; LL-HA).

All possible participants will be assigned to a particular quadrant prior to participation in the study. The distribution of participants among quadrants was not equal, but the distribution of participants among quadrants was consistent with prior studies looking into the distribution of locomotion and assessment among American college students (Higgins, Pierro, & Kruglanski, 2002, as cited in Higgins, Kruglanski, & Pierro, 2003; Kruglanski et al., 2000). Participants were randomly assigned to priming conditions within these quadrants.

Procedure

Initial assessment. Upon entering the lab, the experimenter obtained the participant’s informed consent to participate (see Appendix D). Next, participants were told that the first task they will have is holding a small piece of paper by squeezing the handles of a standard handgrip. Consistent with Study 1, the participant was told to hold the handgrip in their dominant hand and to keep a piece of paper held by the two handles for as long as they can. The experimenter gave no feedback to the participant about their performance; they simply told the participant that the first task was complete and to fill out a brief questionnaire (see Appendix E). The experimenter put the handgrip out of sight as an extra step to imply that there will not be a second assessment.

Manipulation of situational regulatory mode. Participants were then told that the next task is what is known as a behavior-listing task. For this task, they completed
the same behavior-listing task as Study 1. In the *locomotion prime condition*, the three statements were made from items on the RMQ that examined locomotion (see Appendix B). In the *assessment prime condition*, the three statements were from items on the RMQ that examined assessment (see Appendix C). Once the participant completed the task, the experimenter gave them another short questionnaire (see Appendix F).

*Self-regulatory demand.* Participants were then told that the next task is what is known as a search task, which was the same search task from Study 1. In this study, however, all participants received the depletion instructions: to only cross out “e”s not adjacent to or one letter away from another vowel. Participants were given 8 minutes to work on the search task. After 8 min, the experimenter stopped participants from working. In the event that the participant completed the task before 8 minutes had elapsed, the experimenter recorded the length of time they worked on the task. The experimenter then gave them another short questionnaire (see Appendix G) and the BMIS (see Appendix H).

*Dependent measure of regulatory depletion.* After completing the BMIS, the participant was given the second handgrip measure. Consistent with Study 1, the experimenter did not specifically mention a connection between the two measures. The experimenter gave no feedback to the participant about their performance; they simply told the participant to fill out a short questionnaire identical to the initial handgrip questionnaire (see Appendix D).
The experimenter then read the same debriefing form used in Study 1 (see Appendix I). After this, the experiment debriefed the participant as to the purpose of the study, thanked them for their participation, and dismissed them.

Results

Persistence

The length of time participants held the paper between the handles of the handgrip was measured by two independent coders who were blind to the depletion condition of the participant. The two coders were virtually identical in their ratings: Time 1: \( r(176) = .99, p < .001 \); Time 2: \( r(176) = .99, p < .001 \). The estimates of the two coders were averaged together to come up with the value of both times the participant held the handgrip (see Table 8 for values for Time 1 and Time 2).

Difference score analyses. Consistent with Study 1, the amount of time participants held the handgrip after the depleting event was subtracted from the amount of time participants held the handgrip before the depleting event (see Table 9 for individual cell means). The first prediction, based on Hypothesis 2.1, is that there will be an effect of Prime. Specifically, participants in the assessment prime condition will stop holding the handgrip significantly faster than participants in the locomotion prime condition. An independent-samples \( t \)-test was conducted on the difference scores using the locomotion prime and assessment prime conditions as independent variables. No effect of prime was found, \( t < 1 \).

The second prediction, based on Hypothesis 2.2, is that dispositional assessment scores will be a reliable predictor of decreased persistence whereas dispositional locomotion scores will not reliably predict decreased persistence. To test
this prediction, the difference scores on persistence were subjected to a hierarchical regression analysis. In this regression, centered dispositional locomotion scores and centered dispositional assessment scores were included in the first step of the equation as predictor variables. The interaction term (Locomotion x Assessment) was entered as a predictor variable in the second step of the equation. This prediction was not confirmed: assessment scores did not reliably predict persistence, \( F(1, 173) = 1.32, p = .25 \).

**Regulatory Fit**

The general hypothesis is that participants will feel better about the act of self-regulation when there is a match between the primed regulatory mode and one’s dispositional regulatory preference (regulatory fit) than when there is a mismatch between the prime and one’s dispositional preference (regulatory non-fit). Consistent with Study 1, scores on the items related to how interesting the participant found the tasks will be combined to create a fit-index for each task, higher numbers indicating more positive ratings of the task. (see Table 10 for individual cell means) A 2 X 2 ANOVA was conducted on the fit-index scores for the search task using the situationally primed regulatory mode (Prime: locomotion, assessment) and the preferred regulatory mode (Mode: locomotion, assessment) as independent variables. There was no main effect of Prime, \( F(1,172) = 1.93, p = .17 \); no main effect of Mode, \( F(1, 172) = 2.30, p = .13 \); and no Prime x Mode interaction, \( F > 1 \). Further, planned contrasts analyses found no significant difference between those who experienced regulatory fit and those who did not, \( t < 1 \). Thus, the third prediction was not supported.
Mood

The next analyses looked into the possible influence of mood in the present study. A 2 x 4 ANOVA was conducted on the scores from the BMIS for mood arousal and mood valence (see Table 11 for individual cell means). Consistent with Study 1, neither mood arousal nor mood valence yielded any effects between groups, all $F$s < 1.

Secondary Analyses

*Last line completed.* Similar to Study 1, the differential impact of regulatory mode can also be considered in terms of the search task itself. The general hypothesis for the number of lines completed is that participants would complete fewer lines when primed with an assessment mode than when primed with a locomotion mode. An independent-samples $t$–test using the locomotion prime and assessment prime conditions as independent variables was conducted on the number of lines completed on the search task. No effect of prime was found, $t < 1$.

*Errors of omission.* The general hypothesis for errors of omission would be that participants would commit fewer errors of omission when primed with an assessment mode than when primed with a locomotion mode. An independent-samples $t$–test using the locomotion prime and assessment prime conditions as independent variables was conducted on the proportion of errors of omission on the search task. No effect of prime was found, $t < 1$.

*Errors of commission.* The general hypothesis for errors of commission would predict that participants would commit fewer errors of commission when primed with an assessment mode than when primed with a locomotion mode. An independent-samples $t$–test using the locomotion prime and assessment prime conditions as
independent variables was conducted on the proportion of errors of omission on the search task. No effect of prime was found, $t < 1$. Thus, regulatory mode does not seem to impact performance on the search task.

*Exploratory Analyses: Threshold Effects*

One possibility mentioned in Study 1 was that of a “threshold effect” of regulatory mode on regulatory depletion. That is, the impact of one mode may not be felt unless the other mode is adequately present. The difference scores on persistence were subjected to a hierarchical regression analysis. First, centered dispositional locomotion scores and dummy-coded dispositional assessment scores were included in the first step of the equation as predictor variables. The interaction term (Locomotion x Assessment) was entered as a predictor variable in the second step of the equation. No significant effects were found for locomotion, $F < 1$; assessment, $F < 1$; or the interaction term, $F > 1$.

Second, centered dispositional assessment scores and dummy coded locomotion scores were included in the first step of the equation and the interaction term in the second step. No significant effects were found for locomotion, $F(1, 173) = 1.07, p = .30$; assessment, $F(1, 173) = 1.32, p = .25$; or the interaction term, $F(1, 173) = 1.48, p = .23$.

*Discussion*

The present study examined the impact of one’s dispositional regulatory mode on self-regulatory outcomes. These results will be explained more thoroughly in the General Discussion section. The predicted impact of regulatory mode on regulatory outcomes was not supported. Specifically, participants persisted the same amount of
time whether they were primed with a locomotion mode or primed with an assessment mode.

The predicted impact of the independent effects of regulatory mode was not supported. Specifically, dispositional assessment and dispositional locomotion were not reliable predictors of persistence.

The predicted impact of regulatory fit was not supported. Specifically, participants felt the same way about a task whether they were primed with a regulatory mode that fit with their own dispositional regulatory mode (regulatory fit) or primed with a regulatory mode that did not fit with their own dispositional regulatory mode (regulatory non-fit).

Consistent with Study 1, neither mood arousal nor mood valence yielded any effects between groups. Also, regulatory mode does not seem to impact performance on the search task itself.

The “threshold effect” found in Study 1, however, was not replicated in the present study. Thus, there was no evidence that one’s level of disposition locomotion or dispositional assessment predict persistence.
Chapter Seven

General Discussion

The present research examined differences in regulatory depletion between regulatory modes at the situational level and the dispositional level, respectively. The general prediction was that those in an assessment mode will experience depletion to a greater degree than those in a locomotion mode. This prediction was not supported in either study. Specifically, neither study found a difference between regulatory mode and subsequent persistence whether that mode was situationally primed (Study 1) or whether regulatory mode was assessed at the dispositional level (Study 2).

The studies also examined how the fit between dispositional and situational regulatory mode impact the experience of self-regulation. The general hypothesis was that those with a match between dispositional and situational regulatory mode feel better about the process of self-regulation than those with a mismatch. This prediction was not supported in either study. Specifically, neither study found a difference in feelings about the task requiring self-regulation whether one was primed with a regulatory mode that matched their primary dispositional more (regulatory fit) or with a regulatory mode that did not match their dispositional preference (regulatory non-fit).
Study 1 provided some preliminary evidence for a “threshold effect”. Specifically, an increased level of dispositional locomotion predicted decreased persistence on the handgrip task when one is low in dispositional assessment. Dispositional locomotion did not predict persistence when one is high in dispositional assessment. This result is similar to the contribution hypothesis outlined previously in that locomotion would engage the process of assessment. That is, if locomotion is low, then the assessment process is not as active as it would be if locomotion was high. Based on this idea, locomotion can be thought of as a regulatory process that contributes to depletion. This finding, however, was not replicated in Study 2.

Although the present findings did not replicate many of the findings from the prior research, it important to note that the simple lack of replication does not invalidate all information gleaned from the present work. The general lack of adequate replication work (e.g., Hunter, 2001) makes even a lack of replication have some impact. Further, the present studies were the first to integrate the regulatory strength hypothesis and regulatory mode theory. Thus, the present studies at the very least allow for adjustment and refinement of future research design.

Present Findings vs. Past Research

Regulatory Strength. One notable aspect of Study 1 was that the regulatory strength hypothesis was not supported. Specifically, no difference in persistence was found between participants who were given high self-regulatory demand on a prior task and those who were given minimal self-regulatory demand. Participants in Study 2 were only given high self-regulatory demand, so it is unclear whether the lack of support in Study 1 was also manifest in Study 2.
It is unclear why the regulatory strength hypothesis was not supported in Study 1. The manipulation of regulatory demand (the search task) has been previously shown to yield differences in subsequent regulatory outcomes (e.g., Baumeister et al., 1998; Weiland et al., 2006) and the dependent measure of persistence (the handgrip task) has been used in a variety of studies to measure the impact of regulatory demand (e.g., Muraven et al., 1998; Seeley & Gardner, 2003; Vohs et al., 2005).

It is possible that the regulatory strength hypothesis was not supported due to straightforward design problem. For example, perhaps the design allowed for gender effects to overwhelm the regulatory strength effect. Prior research using the handgrip as a dependent measure has been inconclusive in terms of the impact of gender. Muraven et al. (1998) found a main effect of gender when examining the time participants held the handgrip at Time 1 and at Time 2, but these effects did not manifest in any interactions or in the subsequent difference score analyses. The majority of studies using the handgrip measure (e.g., Seeley & Gardner, 2003) have found no evidence of a gender effect at any level. To rule out this possibility, analyses were conducted using gender of participant as an independent variable. No main effects or interactions involving gender were found in either the difference score analyses (all $p < .25$) or the time participants held the handgrip at Times 1 and 2 (all $p < .25$). Thus, gender does not account for the lack of replication of the regulatory strength hypothesis.

Another possible reason is that the use of two experimenters for each of the studies (the same two experimenters for both studies) may have influenced responses. To rule out this possibility, analyses were conducted using experimenter as an independent variable. No main effects or interactions involving experimenter were
found in either the difference score analyses (all $p$s < .30) or the time participants held the handgrip at Times 1 and 2 (all $F$s < 1). Thus, experimenter does not account for the lack of replication of the regulatory strength hypothesis.

One interesting fact from looking at the studies involving the regulatory strength hypothesis is that the search task, as a manipulation of regulatory demand, and the handgrip task, as a measure of regulatory depletion, has never been used in the same study together. The search task has been used as a manipulation of regulatory demand to examine how long one watches a video clip of an unchanging scene (Baumeister et al., 1998) and how long one works on unsolvable tracing puzzles (Weiland et al., 2006). The handgrip task has been widely used to measure subsequent regulatory strength. Some examples of manipulations of regulatory demand the handgrip task has been paired with are thought suppression (Muraven et al., 1998), the violation of gender norms (Vohs et al., 2005), stereotype threat (Inzlicht, McKay, & Aronson, 2006), and the independence versus the interdependence of self (Seeley & Gardner, 2003).

The idea behind the use of such a wide range of variables is obviously to increase the generalizability of the regulatory strength hypothesis. That is, if tasks as varied as thought suppression (Muraven et al., 1998), resisting tempting food (Vohs & Heatherton, 2000), and engaging in logical reasoning (Schmeichel et al., 2003) show similar depletion effects, it would speak to a finite resource that is general in nature.

Despite the consistent findings across such a wide range of variables, the task pairing may indeed matter. The regulatory strength model is based on the concept of a limited resource governing the general task of self-regulation. Successful regulation is therefore based on the resources one has available to exert. If particular tasks differ in
the amount of regulation they require even at their most basic level, the impact on subsequent regulation would vary at some level. That is, the search task at low demand may in fact require greater resources than another task at low demand or even at high demand. It may also require fewer resources than another task at low or high demand. These differences may be negligible, but no research to date has been done to truly rule out this possibility. In the present research, the search task could be tapping into a different resource than could be measured by the length of time holding a handgrip together. If this is the case, persistence on the handgrip task would not give any insight into the regulatory resources demanded by the search task.

The above reasoning is a good example of how much research has been devoted to the breadth of the hypothesis and how little research has examined the depth of the hypothesis. For example, no research to date has compared depletion tasks as to examine similarities and differences among tasks. Also, no research to date has taken a multimethod approach to examine depletion for a particular task. This lack of research does little to address the valid criticisms some have about the regulatory strength hypothesis. Several theorists (e.g., Bandura, 1996; Logue, 1996; Shapiro, 1996) have criticized the regulatory strength hypothesis because it relies on a hypothetical construct that cannot be observed (at least by today’s technology). The hypothesis has also been criticized because it does not adequately separate genuine self-regulatory failure from acts of disengagement or shifting goals. Although how many things are influences by regulatory strength leads to a greater understanding in its own right, it provides little understanding as to the ideas behind the hypothesis itself.
It is important to emphasize that the prior discussion is purely speculation; none of these ideas were directly tested in the present set of studies. Future research must focus on these criticisms of the regulatory strength hypothesis if it is to reach broad acceptance.

*Regulatory Mode.* The hypotheses involving regulatory mode and regulatory depletion were not supported in either study. Specifically, it was predicted that participants who were primarily in an assessment mode would stop persisting on a task that required self-regulation faster than participants who were primarily in a locomotion mode. These modes were either situationally primed (Study 1) or shown to be a dispositional preference (Study 2). These predictions were not supported: Participants persisted the same amount of time whether they were primed with a locomotion mode or primed with an assessment mode. These hypotheses were based on prior work that did not explicitly test these hypotheses (Avnet & Higgins, 2003; Rawn et al., 2005) as no previous study has explicitly examined the impact of regulatory mode on persistence within the regulatory strength hypothesis. Prior research has shown effects of regulatory mode both at the dispositional level (e.g., Kruglanski et al, 2000) and situational level (Avnet & Higgins, 2003; Benjamin & Flynn, 2006). There was some evidence that the priming procedure was having some impact. In Study 1, participants who had a dispositional preference for locomotion reported feeling better about the search task than those who had a dispositional preference for assessment, regardless of the regulatory mode prime they received. This finding, however, was not replicated in Study 2. The present results are complicated by the fact that the standard regulatory strength hypothesis was not supported.
Regulatory Fit. The hypotheses concerning regulatory fit and the feelings of self-regulation were not supported. This finding is complicated by two issues. First, one must take into consideration the lack of support for the regulatory strength hypothesis. Although the direct impact of regulatory fit on regulatory strength was not tested in the present study, one must consider the fact that the feelings one has about self-regulation assumes that there is indeed self-regulation occurring. If there is no self-regulation occurring, it is likely that the task, no matter what decision rule was used, engendered the same feelings across conditions.

The second issue involves the conceptualization of regulatory fit used in the present studies. Prior work has operationalized regulatory fit concerning regulatory mode as the match between one’s dispositional standing and a task itself (Kruglanski et al., 2000) and the match between the situational priming of regulatory mode and a task (Avnet & Higgins, 2003; Benjamin & Flynn, 2006). The present studies operationalized regulatory fit as the match between one’s dispositional standing and the particular mode that is situationally primed, which has not been done in any prior work on regulatory fit. Although this conceptualization of “regulatory fit” is consistent with the definition of regulatory fit, it may not work in practice.

One possibility is that the situational prime and dispositional preference have a differential impact where one may overwhelm the other if they are considered in the same experiment. On the one hand, the situational prime may overwhelm the dispositional preference. That is, the priming of a regulatory mode would mute the dispositional preference and would not show regulatory fit by pairing the situation with the disposition. If this is the case, the pairing between the prime and a task and between
the disposition and a task may not be a clear test of regulatory fit. For example, it is unclear whether the task acts as a “prime” as no research to date has examined independent effects within regulatory mode, either experimentally or statistically. Kay, Wheeler, Bargh, and Ross (2004) examined the impact of “material priming”, or the nonconscious priming of particular constructs based on mundane physical objects in the environment. The placement of a briefcase and an executive pen in one’s environment (without specific attention drawn to their presence) was enough to prime the construct of competition, as opposed to a backpack and a wooden pencil. If, for example, a full-evaluation strategy is consistent with an assessment mode, the use of a full-evaluation could “prime” an assessment mode and have its own impact on judgments and behaviors. Future research should include no-task prime conditions as well as no-prime task conditions as a way to examine their impact. Also, future research should measure dispositional regulatory mode prior to tasks or primes and conduct covariate analyses to examine disposition, task, and prime together. These methods should allow for a clearer look at regulatory fit as well as regulatory mode in general.

On the other hand, the dispositional preference may overwhelm, or at least obscure, the situational prime. That is, the dispositional preference may weaken the situational priming and would not show regulatory fit by pairing the disposition and the situation. One reason for this is that the priming of a particular regulatory mode may have different thresholds to overcome. For example, the distribution of dispositional locomotion and dispositional assessment scores across both studies (N = 308) revealed that locomotion raw scores ($M = 4.44$, $SD = 0.65$, median = 4.50) were higher than assessment raw scores ($M = 3.77$, $SD = 0.71$, median = 3.75). This could mean that, for
example, priming a locomotion mode may have a greater impact on those with a dispositional preference for assessment (regulatory non-fit) than those with a dispositional preference for locomotion (regulatory fit) simply because assessment has a lower threshold based on its median score being lower than the locomotion median score. Priming an assessment mode, however, could also have a greater impact on assessment (regulatory fit) than on locomotion (regulatory non-fit) for the same reason.

Again, it is important to emphasize that the prior discussion is purely speculation; none of these ideas were directly tested in the present set of studies.

Summary

A wide variety of research, across many disciplines, has documented the benefits of successful self-regulation as well as the negatives of failed self-regulation (e.g., Baumeister et al., 1994). These benefits and drawbacks can manifest themselves in personal, interpersonal, and societal consequences (e.g., Finkel & Campbell, 2001; Richeson & Trawalter, 2005; Vohs & Heatherton, 2000). These consequences make research in the area of self-regulation especially important.

Research on self-regulation has allowed us to move from a view of what willpower does to what willpower actually is (Mischel, 1996). This reconceptualization of willpower is the backbone of the regulatory strength hypothesis (e.g., Muraven et al., 1998). This hypothesis has provided a great deal of insight into the process of regulation and how that process may break down.

The current research was designed to examine the regulatory strength hypothesis in terms of a larger model of self-regulation in the hopes of clarifying its function, specifically the regulatory mode model (e.g., Higgins, Kruglanski, & Pierro,
2003). Although the results of the current work did not support the hypotheses, it is important that future research look at the regulatory strength hypothesis with other models of self-regulation. Such work will clarify issues surrounding the regulatory strength hypothesis as well as further our understanding of the self-regulatory process.
Footnotes

1: The expression condition was included to show that the artificial nature of the instructions (see Grice, 1975) would not deplete regulatory resources, as the expression of specific thoughts would not require the level of self-regulation that the suppression of specific thought would. The results confirmed the hypothesis.

2: Participants were given a verbal “funneled debriefing” (see Bargh & Chartrand, 2000, Appendix B), where participants were probed for suspicions concerning the priming task. Specifically, participants were asked questions that progressed from vague questions of the purpose of the study to specific queries into any goal or strategy the participant used in the subsequent task. Consistent with previous studies using similar techniques (e.g., Chartrand & Bargh, 1996), none of the participants indicated any awareness that a particular goal influenced their subsequent performance.

3: Independent coders were told to judge when a line was fully completed and when it was partially completed. Although this is a vague definition, it was applied across
conditions and would simply reflect a difference of one line (above or below). Thus,
the impact of such a definition should be nil.
References


**Table 1**

Means and standard deviations of the change scores in handgrip persistence at Time 1 (T1) and Time 2 (T2) as a function of regulatory demand and prime condition

<table>
<thead>
<tr>
<th></th>
<th>Locomotion prime</th>
<th>Assessment Prime</th>
<th>No Prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Demand T1</td>
<td>55.39 (33.36)</td>
<td>50.12 (35.29)</td>
<td>66.84 (37.64)</td>
</tr>
<tr>
<td>Low Demand T2</td>
<td>44.91 (29.61)</td>
<td>36.84 (26.03)</td>
<td>55.91 (42.71)</td>
</tr>
<tr>
<td>High Demand T1</td>
<td>38.36 (26.42)</td>
<td>43.77 (38.06)</td>
<td>73.57 (50.97)</td>
</tr>
<tr>
<td>High Demand T2</td>
<td>29.54 (24.21)</td>
<td>38.17 (35.58)</td>
<td>52.01 (31.50)</td>
</tr>
</tbody>
</table>
Table 2

Means and standard deviations of the change scores in handgrip persistence as a function of regulatory demand and prime

<table>
<thead>
<tr>
<th></th>
<th>Locomotion prime</th>
<th>Assessment Prime</th>
<th>No Prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Demand</td>
<td>-10.48 (19.05)</td>
<td>-13.28 (24.88)</td>
<td>-10.93 (32.31)</td>
</tr>
<tr>
<td>High Demand</td>
<td>-8.82 (16.53)</td>
<td>-5.62 (14.87)</td>
<td>-21.56 (32.10)</td>
</tr>
</tbody>
</table>
Table 3

Estimated marginal means of the change scores in handgrip persistence at Time 2 as a function of regulatory demand and prime

<table>
<thead>
<tr>
<th>Locomotion prime</th>
<th>Assessment Prime</th>
<th>No Prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Demand</td>
<td>44.44 (4.31)</td>
<td>39.83 (4.32)</td>
</tr>
<tr>
<td>High Demand</td>
<td>40.26 (4.38)</td>
<td>45.33 (4.34)</td>
</tr>
</tbody>
</table>

NOTE: Data includes Time 1 change scores as a covariate
Table 4

Mean fit-index rating for search task as a function of regulatory fit and prime (Study 1)

<table>
<thead>
<tr>
<th></th>
<th>Locomotion prime</th>
<th>Assessment prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulatory Fit</td>
<td>2.57 (1.41)</td>
<td>1.40 (.66)</td>
</tr>
<tr>
<td>Regulatory Non-Fit</td>
<td>1.61 (.80)</td>
<td>2.60 (1.09)</td>
</tr>
</tbody>
</table>
Table 5

Mood arousal (MA) and mood valence (MV) across conditions (Study 1)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Locomotion prime</th>
<th>Assessment Prime</th>
<th>No Prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Demand MA</td>
<td>1.57 (0.51)</td>
<td>1.57 (0.51)</td>
<td>1.48 (0.51)</td>
</tr>
<tr>
<td>High Demand MA</td>
<td>1.57 (0.51)</td>
<td>1.39 (0.50)</td>
<td>1.43 (0.51)</td>
</tr>
<tr>
<td>Low Demand MV</td>
<td>1.52 (0.51)</td>
<td>1.55 (0.51)</td>
<td>1.39 (0.50)</td>
</tr>
<tr>
<td>High Demand MV</td>
<td>1.48 (0.51)</td>
<td>1.48 (0.51)</td>
<td>1.52 (0.52)</td>
</tr>
</tbody>
</table>
Table 6

Number of lines completed as a function of regulatory demand and prime

<table>
<thead>
<tr>
<th></th>
<th>Locomotion prime</th>
<th>Assessment Prime</th>
<th>No Prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Demand</td>
<td>38.13 (4.61)</td>
<td>38.00 (5.70)</td>
<td>38.30 (5.11)</td>
</tr>
<tr>
<td>High Demand</td>
<td>26.70 (7.25)</td>
<td>25.48 (8.81)</td>
<td>27.25 (7.80)</td>
</tr>
</tbody>
</table>
Table 7

Errors of omission (EO) and errors of commission (EC) as a function of regulatory demand and prime

<table>
<thead>
<tr>
<th></th>
<th>Locomotion prime</th>
<th>Assessment Prime</th>
<th>No Prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Demand EO</td>
<td>0.09 (0.08)</td>
<td>0.07 (0.05)</td>
<td>0.11 (0.16)</td>
</tr>
<tr>
<td>High Demand EO</td>
<td>0.38 (0.19)</td>
<td>0.32 (0.18)</td>
<td>0.38 (0.21)</td>
</tr>
<tr>
<td>Low Demand EC</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>High Demand EC</td>
<td>0.07 (0.08)</td>
<td>0.08 (0.10)</td>
<td>0.14 (0.16)</td>
</tr>
</tbody>
</table>
Table 8
Means and standard deviations of the change scores in handgrip persistence at Time 1 (T1) and Time 2 (T2) as a function of regulatory orientation and prime

<table>
<thead>
<tr>
<th>Regulatory Orientation</th>
<th>Locomotion prime</th>
<th>Assessment prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Locomotion/Low Assessment T1</td>
<td>53.02 (38.79)</td>
<td>62.80 (44.58)</td>
</tr>
<tr>
<td>Low Locomotion/Low Assessment T2</td>
<td>45.90 (30.79)</td>
<td>46.97 (31.36)</td>
</tr>
<tr>
<td>Low Locomotion/High Assessment T1</td>
<td>69.68 (48.66)</td>
<td>72.52 (37.96)</td>
</tr>
<tr>
<td>Low Locomotion/High Assessment T2</td>
<td>52.29 (32.50)</td>
<td>52.84 (27.85)</td>
</tr>
<tr>
<td>High Locomotion/Low Assessment T1</td>
<td>64.31 (31.68)</td>
<td>43.49 (28.19)</td>
</tr>
<tr>
<td>High Locomotion/Low Assessment T2</td>
<td>44.06 (22.48)</td>
<td>36.22 (17.92)</td>
</tr>
<tr>
<td>High Locomotion/High Assessment T1</td>
<td>74.39 (60.07)</td>
<td>50.31 (42.49)</td>
</tr>
<tr>
<td>High Locomotion/High Assessment T2</td>
<td>59.38 (53.93)</td>
<td>35.67 (24.86)</td>
</tr>
</tbody>
</table>
Table 9

Means and standard deviations of the change scores in handgrip persistence as a function of regulatory orientation and prime

<table>
<thead>
<tr>
<th>Locomotion prime / Assessment prime</th>
<th>Locomotion prime</th>
<th>Assessment prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Locomotion / Low Assessment</td>
<td>-7.11 (18.65)</td>
<td>-15.83 (26.40)</td>
</tr>
<tr>
<td>Low Locomotion / High Assessment</td>
<td>-17.39 (23.18)</td>
<td>-19.68 (25.06)</td>
</tr>
<tr>
<td>High Locomotion / Low Assessment</td>
<td>-20.25 (25.31)</td>
<td>-7.27 (21.48)</td>
</tr>
<tr>
<td>High Locomotion / High Assessment</td>
<td>-15.01 (20.94)</td>
<td>-14.64 (22.47)</td>
</tr>
</tbody>
</table>
Table 10

Mean fit-index rating for search task as a function of regulatory fit and prime (Study 2)

<table>
<thead>
<tr>
<th></th>
<th>Locomotion prime</th>
<th>Assessment prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulatory Fit</td>
<td>2.83 (1.34)</td>
<td>2.38 (1.07)</td>
</tr>
<tr>
<td>Regulatory Non-Fit</td>
<td>3.07 (1.84)</td>
<td>2.81 (1.28)</td>
</tr>
</tbody>
</table>
Table 11

Mood arousal (MA) and mood valence (MV) across conditions (Study 2)

<table>
<thead>
<tr>
<th>Locomotion condition</th>
<th>MA Mean (SD)</th>
<th>MV Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Locomotion / Low Assessment</td>
<td>1.96 (0.30)</td>
<td>2.33 (0.49)</td>
</tr>
<tr>
<td>Low Locomotion / High Assessment</td>
<td>2.15 (0.32)</td>
<td>2.47 (0.49)</td>
</tr>
<tr>
<td>High Locomotion / Low Assessment</td>
<td>2.18 (0.43)</td>
<td>2.57 (0.56)</td>
</tr>
<tr>
<td>High Locomotion / High Assessment</td>
<td>2.08 (0.39)</td>
<td>2.29 (0.53)</td>
</tr>
</tbody>
</table>
Table 12

Number of lines completed as a function of regulatory orientation and prime

<table>
<thead>
<tr>
<th></th>
<th>Locomotion prime</th>
<th>Assessment prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Locomotion / Low Assessment</td>
<td>27.86 (6.74)</td>
<td>27.23 (6.14)</td>
</tr>
<tr>
<td>Low Locomotion / High Assessment</td>
<td>25.55 (4.89)</td>
<td>26.14 (6.43)</td>
</tr>
<tr>
<td>High Locomotion / Low Assessment</td>
<td>25.41 (5.89)</td>
<td>24.75 (6.46)</td>
</tr>
<tr>
<td>High Locomotion / High Assessment</td>
<td>24.18 (6.33)</td>
<td>25.30 (7.62)</td>
</tr>
</tbody>
</table>
Table 13

Errors of omission (EO) and errors of commission (EC) as a function of regulatory orientation and prime

<table>
<thead>
<tr>
<th>Locomotion prime / Assessment prime</th>
<th>Locomotion prime</th>
<th>Assessment prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Locomotion / Low Assessment EO</td>
<td>0.32 (0.16)</td>
<td>0.35 (0.17)</td>
</tr>
<tr>
<td>Low Locomotion / High Assessment EO</td>
<td>0.33 (0.16)</td>
<td>0.32 (0.14)</td>
</tr>
<tr>
<td>High Locomotion / Low Assessment EO</td>
<td>0.30 (0.14)</td>
<td>0.34 (0.21)</td>
</tr>
<tr>
<td>High Locomotion / High Assessment EO</td>
<td>0.28 (0.15)</td>
<td>0.30 (0.14)</td>
</tr>
<tr>
<td>Low Locomotion / Low Assessment EC</td>
<td>0.07 (0.09)</td>
<td>0.13 (0.13)</td>
</tr>
<tr>
<td>Low Locomotion / High Assessment EC</td>
<td>0.04 (0.07)</td>
<td>0.04 (0.07)</td>
</tr>
<tr>
<td>High Locomotion / Low Assessment EC</td>
<td>0.11 (0.15)</td>
<td>0.12 (0.16)</td>
</tr>
<tr>
<td>High Locomotion / High Assessment EC</td>
<td>0.05 (0.08)</td>
<td>0.12 (0.13)</td>
</tr>
</tbody>
</table>
Figure 1

Schematic depiction of a feedback loop
Figure 2

Number of comparisons between brands of book lights for each decision strategy

**Progressive Elimination Strategy**

<table>
<thead>
<tr>
<th></th>
<th>Brand 1</th>
<th>Brand 2</th>
<th>Brand 3</th>
<th>Brand 4</th>
<th>Brand 5</th>
<th>Choices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attribute A</td>
<td>1v2, 1v3, 1v4, 1v5</td>
<td>2v3, 2v4, 2v5</td>
<td>3v4, 3v5</td>
<td>4v5</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Attribute B</td>
<td>1v2, 1v3, 1v4</td>
<td>2v3, 2v4</td>
<td>3v4</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Attribute C</td>
<td>1v2, 1v3</td>
<td>2v3</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Attribute D</td>
<td>1v2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Attribute E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

**Full Evaluation Strategy**

<table>
<thead>
<tr>
<th></th>
<th>Brand 1</th>
<th>Brand 2</th>
<th>Brand 3</th>
<th>Brand 4</th>
<th>Brand 5</th>
<th>Choices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attribute A</td>
<td>1v2, 1v3, 1v4, 1v5</td>
<td>2v3, 2v4, 2v5</td>
<td>3v4, 3v5</td>
<td>4v5</td>
<td>x</td>
<td>10</td>
</tr>
<tr>
<td>Attribute B</td>
<td>1v2, 1v3, 1v4, 1v5</td>
<td>2v3, 2v4, 2v5</td>
<td>3v4, 3v5</td>
<td>4v5</td>
<td>x</td>
<td>10</td>
</tr>
<tr>
<td>Attribute C</td>
<td>1v2, 1v3, 1v4, 1v5</td>
<td>2v3, 2v4, 2v5</td>
<td>3v4, 3v5</td>
<td>4v5</td>
<td>x</td>
<td>10</td>
</tr>
<tr>
<td>Attribute D</td>
<td>1v2, 1v3, 1v4, 1v5</td>
<td>2v3, 2v4, 2v5</td>
<td>3v4, 3v5</td>
<td>4v5</td>
<td>x</td>
<td>10</td>
</tr>
<tr>
<td>Attribute E</td>
<td>1v2, 1v3, 1v4, 1v5</td>
<td>2v3, 2v4, 2v5</td>
<td>3v4, 3v5</td>
<td>4v5</td>
<td>x</td>
<td>10</td>
</tr>
</tbody>
</table>
Appendix A

Regulatory Mode Questionnaire

Please rate on the following scale how much you agree or disagree with the following items:

1 2 3 4 5 6
strongly disagree strongly agree

_____ I don’t mind doing things even if they involve extra effort.
_____ I feel excited just before I am about to reach a goal.
_____ I don’t spend much time thinking about ways others could improve themselves.
_____ I never evaluate my social interactions with others after they occur.
_____ I spend a great deal of time taking inventory of my positive and negative characteristics.
_____ I like evaluating other’s people’s plans.
_____ When I decide to do something, I can’t wait to get started.
_____ By the time I accomplish a task, I already have the next one in mind.
_____ I am a “low energy” person.
_____ When I meet a new person, I usually evaluate how well he or she is doing on various dimensions (e.g., looks, achievements, social status, clothes).
_____ I am a critical person.
_____ I am very self-critical and self-conscious about what I am saying.
_____ I often compare myself with other people.
_____ I am a “workaholic”.
_____ I often critique work done by myself or others.
_____ I enjoy actively doing things, more than just watching and observing.
_____ I am a “doer”.
_____ I often feel that I am being evaluated by others.
_____ When I finish one project, I often wait a while before getting started on a new one.
_____ I often think that other people’s choices and decisions are wrong.
_____ I rarely analyze the conversations I have had with others after they occur.
_____ Most of the time my thoughts are occupied with the task I wish to accomplish.
_____ When I get started on something, I usually persevere until I finish it.
_____ I am a “go-getter”.
Appendix B

Locomotion Prime

Behavior Over Time

For this portion of the study, we would like you to read the statements below and recall one behavior you have used in the past that is true for each statement. These would be the kinds of behaviors that you would do in everyday life. We do not need you to fully explain the behavior - you only need to provide a short example for each. Do not use more space than the box provided.

Think back to a time when you spent extra effort working on something.

Think back to a time when you finished one thing and did not wait long before you started something new.

Think back to a time when you decided to do something and you could not wait to get started.
Appendix C

Assessment Prime

Behavior Over Time

For this portion of the study, we would like you to read the statements below and recall one behavior you have used in the past that is true for each statement. These would be the kinds of behaviors that you would do in everyday life. We do not need you to fully explain the behavior - you only need to provide a short example for each. Do not use more space than the box provided.

Think back to a time when you compared yourself with other people.

[Blank Box]

Think back to a time when you were self-conscious of what you were saying to someone.

[Blank Box]

Think back to a time when you critiqued work done by yourself or others.

[Blank Box]
Appendix D

Consent form

UNIVERSITY OF TOLEDO CONSENT FORM

TITLE OF RESEARCH: Personality Measures

PRINCIPAL INVESTIGATOR: Paul Weiland, M.S.

DEPARTMENT: Department of Psychology

I voluntarily agree to participate in this research project with Mr. Weiland as the principal investigator. I understand that the experiment will require approximately 25 minutes and involve pretesting materials for use in future studies.

I understand the nature of this project and that a decision to participate in this study will not affect my relationship with the University of Toledo in any way. I understand that all of my responses in this study will remain confidential and anonymous such that there is no way to tie my name to any of my responses and that I may withdraw at any time without penalty.

I agree that I will give my full effort while participating and will refrain from talking about this study with others. I understand that I may ask the experimenter to provide the results to this study at such a time that the results can be disseminated.

I certify that I am at least 18 years of age and have read the above and give my consent to participate.

Signature ___________________________ Print Name ________________

Date ____________________________

Thank you for participating
Appendix E

Handgrip Questionnaire

These questions pertain to the handgrip task you just completed. Please answer the questions below as best you can.

How difficult was the handgrip task?
1 2 3 4 5 6 7
extremely easy extremely hard

How interesting was the handgrip task?
1 2 3 4 5 6 7
not at all interesting extremely interesting

How demanding was the handgrip task?
1 2 3 4 5 6 7
not at all demanding extremely demanding

How enjoyable was the handgrip task?
1 2 3 4 5 6 7
not at all enjoyable extremely enjoyable

How exciting was the handgrip task?
1 2 3 4 5 6 7
not at all exciting extremely exciting

How tired were you after holding the handgrip?
1 2 3 4 5 6 7
not at all tired extremely tired
Appendix F

Regulatory Mode Priming Questionnaire

These questions pertain to the behavior-listing task you just completed. Please answer the questions below as best you can.

<table>
<thead>
<tr>
<th>Question</th>
<th>Rating Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>How difficult was the behavior-listing task?</td>
<td>extremely easy 1 2 3 4 5 6 7 extremely hard</td>
</tr>
<tr>
<td>How interesting was the behavior-listing task?</td>
<td>not at all interesting 1 2 3 4 5 6 extremely interesting</td>
</tr>
<tr>
<td>How demanding was the behavior-listing task?</td>
<td>not at all demanding 1 2 3 4 5 6 extremely demanding</td>
</tr>
<tr>
<td>How enjoyable was the behavior-listing task?</td>
<td>not at all enjoyable 1 2 3 4 5 6 extremely enjoyable</td>
</tr>
<tr>
<td>How exciting was the behavior-listing task?</td>
<td>not at all exciting 1 2 3 4 5 6 extremely exciting</td>
</tr>
<tr>
<td>How tired were you after the behavior-listing task?</td>
<td>not at all tired 1 2 3 4 5 6 extremely tired</td>
</tr>
</tbody>
</table>
Appendix G

Search Task Questionnaire

These questions pertain to the search task you just completed.
Please answer the questions below as best you can.

How difficult was the search task?

1 2 3 4 5 6 7
extremely easy extremely hard

How interesting was the search task?

1 2 3 4 5 6 7
not at all interesting extremely interesting

How demanding was the search task?

1 2 3 4 5 6 7
not at all demanding extremely demanding

How enjoyable was the search task?

1 2 3 4 5 6 7
not at all enjoyable extremely enjoyable

How exciting was the search task?

1 2 3 4 5 6 7
not at all exciting extremely exciting

How tired were you after the search task?

1 2 3 4 5 6 7
not at all tired extremely tired
Appendix H

Brief Mood Introspection Scale (BMIS)

Please circle the response on the scale below that indicates how well each adjective or phrase describes your present mood.

<table>
<thead>
<tr>
<th></th>
<th>definitely do not feel</th>
<th>do not feel</th>
<th>slightly do feel</th>
<th>definitely do feel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>calm</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>fed up</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>sad</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>active</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>loving</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>tired</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7.</td>
<td>jittery</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8.</td>
<td>grouchy</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9.</td>
<td>nervous</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>10.</td>
<td>happy</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>11.</td>
<td>peppy</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>12.</td>
<td>content</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>13.</td>
<td>drowsy</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>14.</td>
<td>gloomy</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>15.</td>
<td>caring</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>16.</td>
<td>lively</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Appendix I

Debriefing Form

The experiment is now officially over. What I am going to do now is debrief you, or tell you a little about the experiment. But before I do this, I need to ask you a few questions. You will get credit for the study no matter how you respond, so we appreciate your truthful responses to these questions.

Were all the directions clear and easy to understand? Did you ever get lost or confused during the experiment?

NO      Yes.  Explain: ________________________________

Did you know anything about this study before it began? Did a friend or classmate tell you about this experiment?

NO      Yes.  Explain: ________________________________

Was there anything that happened in the study that you think might have altered your performance in any way?

NO      Yes.  Explain: ________________________________

The purpose of this study is to examine what factors influence how people control their behavior. Specifically, this study is looking at whether previous tasks influence how people control their behavior. To do this, we are looking at how long participants hold the paper with the handgrip together based on how they perform on the tasks they work on prior to the handgrip task. The dependent variable in this study is how long you held the handgrip.

In order to accurately record the length of time you held the paper, we videotaped your hand as you held the handgrip and the length of time you held the paper will be recorded after the study. I had you stand in the specific spot by the desk because we wanted to be absolutely sure we only recorded your hand and not your face or upper body. The camera cannot record audio from the next room, so nothing you or I said during the handgrip task is recorded either. If you have any questions or concerns about the procedures, you can send an email to Andrew Geers at psychresearch@utoledo.edu (the email address listed on the page where you signed up for the study).