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Implicit Theories of Weight Management: A Social Cognitive Approach to Motivation

A dissertation proposal submitted in partial fulfillment of the requirements for the degree
of Doctor of Philosophy at Virginia Commonwealth University

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Abstract

IMPLICIT THEORIES OF WEIGHT MANAGEMENT: A SOCIAL COGNITIVE APPROACH TO MOTIVATION

By Jeni L. Burnette, M.S.

A dissertation proposal submitted in partial fulfillment of the requirements for the degree
of Doctor of Philosophy at Virginia Commonwealth University

Virginia Commonwealth University, 2006

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Just as scientists develop general conceptual explanations of the phenomena they investigate, individuals also develop intuitive theories about such human characteristics as intelligence, personality, and athletic ability. These theories, unlike scientist's theories, are not explicitly articulated or documented, and so they are termed implicit theories. Implicit theories, in achievement motivation, distinguish between the belief that human attributes are fixed (entity theory) or malleable (incremental theory) and have been shown to have far-reaching consequences for motivation, goal-orientations, and regulatory strategies in an array of domains.

This dissertation extended implicit theories research to the domain of body-weight management. Drawing from an elaborate theoretical framework on implicit theories and health behavior research, the present work predicted that (a) individuals differ systematically in their beliefs about the malleability of body weight and (b) these implicit beliefs are related to coping and self-regulation strategies following dieting setbacks. To

test these hypotheses, I first developed the Implicit Theories of Weight Management Scale and examined its psychometric properties. Results revealed internal reliability and convergent and discriminant validity. Implicit theories of weight management were moderately related to health and dieting locus of control but were distinct from personality dimensions such as the Big Five and trait optimism. Psychometric properties of the scale are presented and discussed.

Next, I tested the hypothesis that implicit theories of weight management would be related to adaptive regulatory strategies (e.g., increased motivation) and to maladaptive coping (e.g., avoidance) following dieting setbacks and that this relation would be mediated by feelings of helplessness and optimism, and by attributions. Results largely supported these conjectures, revealing that even after controlling for constructs related to successful dieting (e.g., dieting self-confidence, trait self-control), believing more strongly that weight is changeable was related to lower reported use of avoidance when coping with setbacks and more effort. Additionally, feelings of helplessness and optimism mediated the implicit theories-self-regulatory relations.

Results are discussed in terms of how implicit theories create the structure in which meaning is assigned to events and are therefore important for achievement and motivation. Implications and avenues for future research are presented.

Introduction

Body weight management is a serious concern in the United States as the number of people who are obese or overweight continues to increase at a rapid pace. The World Health Organization (WHO) states, “obesity is a complex condition, one with serious social and psychological dimensions that affects virtually all age and socioeconomic groups and threatens to overwhelm both developed and developing countries.” WHO’s statistics suggest that 54% of adults in the United States are overweight (a body mass index > 25) and 22% are obese (a body mass index > 30; Hill & Peters, 1998). Other sources report that as many as 25% of the children in the United States are either overweight or obese (Flega, Carrol, Kjczmarak, & Johnson, 1998). In light of the distressing increase in the percentage of overweight Americans and increasing obesity worldwide, what can be done to help curb the obesity epidemic?

The answer to this question is consequential because achieving a healthy weight can help reduce the risk of developing many chronic diseases including diabetes and cardiovascular disease (Jung, 1997). People who are overweight are more likely to suffer both physical and mental health problems, and experts rank obesity as a key factor in the rise in health care costs (Doll, Petersen, & Stewart-Brown, 2000; Seidell, 1995). Yet, despite the personal and societal benefits associated with a healthy weight, people frequently fail to effectively manage their weight. Why? Weight management, similar to

other health behavior, is not easy and requires a great deal of persistence and motivation in the face of obstacles. There are a variety of theoretical approaches that could be used to understand successful weight-loss maintenance. For example, personality traits, social-cognitive beliefs, and health models that combine social, environmental, and behavioral predictors have all been used to predict related health outcomes. Examples of personality variables that influence health behaviors include trait self control (Ferguson & Spitzer, 1995; Schroder & Schwarzer, 2005), cognitive restraint (Westerterp-Plantenga, Kempen, & Saris, 1998), and self-efficacy (Bandura, 1997). Individuals with greater self-regulation ability, restraint, and efficacy have improved performance on health outcomes. Various psychosocial theories of health behavior have also contributed to understanding health-related behaviors including the health belief model (Becker, 1974), social-cognitive theory (Bandura, 1986) and theory of planned behavior (Ajzen, 1991). These models explain behavior as a consequence of processes such as perceived threat, cost-benefit analysis, and formation of behavioral intention. The attributions a person makes for health outcomes such as dieting lapses also influences ability to reach and maintain a successful weight (Dohn, Beattie, Aibel, & Striegel-Moore, 2001; Rothman, Salovey, Turvey, & Fishkin, 2003). Social cognitive beliefs such as health locus of control and dieting beliefs influence health attitudes and behaviors as well (Stotland & Zuroff, 1990; Wallston, 2005).

Although the above models and perspectives provide insight into health behaviors, there is limited research on the role of implicit theories in predicting patterns of motivation in the domain of weight-management. Therefore, the goal of the

dissertation is to use the implicit theoretical framework to understand motivation to maintain a healthy weight. A focus on social-cognitive theories has revealed that knowledge structures can be important predictors of health behaviors (e.g., Bandura, 1998), but one type of social-cognitive belief that has received limited attention in health domains especially weight management is the construct of implicit theories (Dweck, 2000; Dweck & Molden, 2006). Implicit theories have been shown to be important for goal setting, achievement, and persistence in array of domains and could also prove useful in understanding weight management strategies.

In the current dissertation, taking a social-cognitive approach, I extended the implicit theoretical framework to the domain of weight management, suggesting that success in managing one's weight depends, in part, on people's *beliefs* about whether body weight is a fixed entity due to genetics or a malleable trait that can change with effort. For example, some people might believe "*trying to change your natural body weight is like trying to change your natural eye and hair color. You can't do it because your natural weight is genetic,*" whereas other people may believe "*exercise, hard work, effort, and persistence can change my body weight.*" The purpose of the current paper was to examine how these different implicit theories of weight management influenced regulatory strategies and motivation to control one's body-weight.

Implicit theories have commonly been defined as schematic knowledge structures that incorporate beliefs about the stability of an attribute and organize the way people ascribe meaning to events (Ross, 1989). Implicit theories vary in the degree to which characteristics are conceptualized as stable (an entity theorist) versus changeable (an

incremental theorist) in specific domains and have been shown to have far-reaching consequences for motivation (Dweck & Leggett, 1988; Dweck & Molden, 2005). They are termed implicit in that they are not directly articulated or documented.

Individuals hold implicit theories of diverse human characteristics such as intelligence and personality, and these meaning systems establish the framework in which motivation ensues. For example, in an achievement domain holding an entity theory about intelligence (believing intelligence is a fixed trait) leads to ability-focused goal structures, uncontrollable attributions, and helpless regulation strategies in the face of failure. In contrast, holding an incremental theory (believing intelligence is malleable) leads to learning-focused goals, effort attributions, and mastery-oriented regulatory strategies (Dweck & Elliot, 1983; Hong, Chiu, Dweck, Lin, & Wan, 1999; also see Dweck, 2000; Dweck & Leggett, 1988).

The (scientific) theory of implicit theories has been extended to understanding motivation in social perception, relationships, leadership, and exercise. For example, in the personality domain, those who believe that personality is fixed draw global social judgments from small samples of behavior and are more likely to be punitive in cases of undesirable behavior (Erdley & Dweck, 1993; Gervy, Chiu, Hong, & Dweck, 1999). Recently, the implicit theories research has also been extended to understanding students' achievement and motivation in exercise. In physical education classes, believing that ability is a fixed trait leads to lower satisfaction, less effective regulatory strategies, and greater anxiety (Ommundsen, 2001). The Implicit Theory Approach (ITA) has received very limited attention in health domains but has revealed similar results. For example,

holding an entity theory about the malleability of substance abuse makes patients vulnerable to early treatment dropout (Morgenthau, 2001). In another study examining persistence on an exercise program revealed that individuals induced to hold an incremental theory as opposed to an entity theory reported greater motivation and self-efficacy and less negative affect following a failure. In brief summary, across domains in times of distress, entity theorists are especially vulnerable.

The extension of the Implicit Theory Approach (ITA) to diverse domains illustrates the generalizability and predictive utility of the model. Implicit theories are an integral part of people's motivational systems influencing goal pursuits, attributions, and persistence. This dissertation extended the implicit theories framework to weight management to foster a more complete understanding of the processes underlying motivation to effectively control one's body-weight. Extending implicit theories to the domain of weight management could help answer some of the questions regarding how people set goals and respond to inevitable setbacks.

In extending implicit theories to the domain of weight management, there were two main aims in the current study. The first goal was to develop the Implicit Theories of Weight Management Scale and to examine construct, convergent, and discriminant validity and test re-test reliability. The second aim was to examine how implicit theories of weight management—the belief that weight is malleable (incremental theory) versus a fixed trait (entity theory)—affect regulatory strategies and attributions following dieting setbacks. Research on implicit theories of intelligence suggests that individuals are especially likely to struggle with motivation within the entity framework due to the

attributions they make and the helplessness they feel in the face of obstacles. In contrast, holding an incremental view leads to attributions that encourage persistence and mastery-oriented responses in times of adversity (Hong et al., 1999). The current paper examined the conjecture that similar patterns of maladaptive motivation would emerge for individuals who hold more strongly that body-weight is a fixed trait.

In the following sections, I review relevant literature proposing that the Implicit Theory Approach (ITA) extends past theoretical perspectives to motivation in health domains and can be used to offer insight into the processes underlying body weight management. I start with a chronological review of the development of the ITA. Dweck and her colleagues, who developed the ITA, first investigated whether students had different strategies for dealing with setbacks using learned helplessness theory to guide their research. Next, Dweck and her colleagues explored *why* students use different strategies when facing challenges. They proposed that the goals individuals pursued led to divergent responses to failures but later extended this research by incorporating the notion of implicit theories. After reviewing learned helplessness theory and achievement goal-theory, I extensively review the ITA focusing on how implicit theories influence goals, attributions, and regulatory strategies. Additionally, I review how the ITA has been applied and extended to social perception, leadership, interpersonal relationships, and athletic ability. After reviewing an array of evidence for the overall ITA, I briefly discuss control constructs related to engagement in health behaviors to highlight the underlying notion of perceptions of control and offer evidence for the uniqueness of using implicit theories to understand dieting motivation.

The History of the Implicit Theory Approach

Why are some individuals able to self-regulate and stay motivated even in the face of obstacles? For example, when runners first attempted to break the four-minute mile, what made some men continue to persist even though they were consistently advised that breaking the barrier was not physiologically possible? Or, what makes people continue to persist on their weight loss goals in the face of so many environmental constraints? In the face of goal obstruction, Dweck and her colleagues propose that an important predictor of persistence is people's implicit theories or intuitive conceptions about the stability of human traits (Molden & Dweck, 2006). That is, they propose that incremental theorists who believe more strongly that reaching their goal (e.g., breaking the four-minute mile barrier, losing weight) is a matter of effort are more likely to persist than entity theorists who believe that ability is an innate trait.

Dweck and her colleagues developed the Implicit Theoretical Approach (ITA) from their work on when failing inspires versus undermines motivation and have used the theoretical framework for understanding motivation in academic achievement. Dweck and her colleagues work started with delineating different responses to failures and moved towards trying to understand *why* some students react with mastery-oriented responses and others with helpless responses to challenging situations. The following sections chronologically examine the progress of the ITA, beginning with a review of studies on learned helplessness, achievement goal-theory, and attribution theory before continuing with a review of research on the underlying implicit theories about human

attributes and their impact on attributions, regulatory strategies, and motivational patterns.

Learned Helplessness and Performance

Early learned helplessness researchers investigated motivation and learning patterns of animals and humans following uncontrollable events. Seligman and colleagues initiated much of the early learned helplessness research giving animals either escapable (could be terminated by a response) or inescapable shocks and later tested the animals for differences in learning patterns (Overmier & Seligman, 1967; Seligman & Maier, 1967). Animals in the escapable shock condition demonstrated adaptive learning patterns, whereas those in the inescapable shock condition failed to learn. The learned helplessness model was extended from animals to understanding how humans would respond to challenging situations that seem uncontrollable. Would humans respond to “hopeless” situations with the same helpless response as animals or would some individuals surmount the obstacles?

Researchers investigating learned helplessness in humans conducted studies analogous to animal studies. Typically, researchers exposed people to aversive stimuli that were inescapable and then tested their performance on tasks that could be mastered. As with animals, humans who had been in an uncontrollable condition, relative to participants who had experienced controllable events, often showed debilitated performance such as slower problem solving and lower achievement (Abramson, Seligman, & Teasdale, 1978). In support of the theoretical underpinnings of learned helplessness, researchers demonstrated an interesting extension of the model: cross-

modal learned helplessness. That is, they found that participants transferred their sense of helplessness from one type of pretreatment (i.e., cognitive task) to a different type of task (i.e., instrumental--moving a lever to escape a noise; Hiroto & Seligman, 1975). The learned helplessness approach paved the way for understanding if some individuals persist in challenging academic settings and others readily resign to helplessness.

Researchers extended the helplessness model to understanding how students respond to failure in academic achievement. In an early study, Dweck and Reppucci (1973) discovered that even though students had equal ability and motivation to succeed, after continued failure the performance and persistence of some students deteriorated. However, some students moved beyond the helpless response and rose to the challenge responding with a more mastery-oriented strategy. Dweck and her colleagues identified the maladaptive pattern as helpless and the adaptive response as mastery-oriented (Deiner & Dweck, 1978, 1980; Dweck, 1975; Dweck & Repucci, 1973). A helpless approach involved negative regulatory strategies such as avoiding challenges, negative affect, decreased self-esteem and a deterioration of performance. In contrast, a mastery approach was characterized by maintaining effective performance following setbacks, continuing to seek challenging tasks, and being optimistic about future performance.

Deiner and Dweck (1978, 1980) conducted much of the research distinguishing reactions between mastery-oriented and helpless-oriented students. Participants were usually children of middle school age who worked on a task, successfully solving the first eight problems and then failing to solve the next four. Numerous measurements were used to capture the exact nature of the regulatory strategies with a focus on affect,

cognition, and behavior. First, students were asked to verbalize aloud what they were thinking and feeling. Second, students' problem solving strategies were monitored to detect any changes in sophistication. Third, Diener and Dweck (1980) asked students how well they would do on these kinds of problems if they completed them in the future.

Results suggest, unsurprisingly, as long as students were successful, they used effective problem solving strategies with no differences between mastery-oriented and helpless-oriented students in their ability or interest. However, once the students faced failure, some responded as if they were helpless, whereas others responded positively to the challenge. Those who responded helplessly attributed failures to personal inability and took a pessimistic outlook on potential for future success. As for affect, helpless students became bored with the task and anxious about performance. Additionally, two-thirds of the helpless students compared to nearly none of the mastery-oriented students engaged in self-aggrandizing statements unrelated to the task at hand. For example, some students began to talk about talents in other domains rather than focusing their attention on succeeding on the current task. In addition to negative cognition and affect, future performance of the helpless children actually started to deteriorate. In summary, the helpless children viewed the challenging four tasks on which they did not succeed as indicative of their inadequacy and as insurmountable. Subsequent deterioration in problem-solving strategies followed from these feelings of helplessness (Dweck & Leggett, 1988).

Mastery-oriented children, in contrast, viewed the more difficult problems as challenges to be mastered through extra effort. Their oral comments were oriented much

more towards the task at hand rather than self-aggrandizing. Mastery-oriented students also had a more optimistic attitude saying such things as, “I did it before, I can do it again.” Not only did many of the mastery-oriented students give a more positive prognosis, some even seemed to be excited about the challenge. For example, one boy pulled up a chair and rubbing his hands together exclaimed, “I love a challenge!” (Dweck & Leggett, 1988). Mastery students were much more likely to focus their energy on remedies for failures, whereas helpless students focused on the cause—usually attributing the failure to lack of ability.

Dweck’s early research on different reactions to challenges was conducted in a laboratory setting with younger children, which brought to question generalizability. Thus, research examined if the differences in the helplessness and mastery-oriented approaches were also seen in adults and in classrooms outside of the lab. Results from more natural settings and with varying age ranges consistently demonstrated that helpless individuals more readily attributed failure to a lack of ability and felt less optimistic about future performance than mastery-oriented individuals who focused more on ways to overcome obstacles (e.g., Brunson & Matthews, 1981; Licht & Dweck, 1984).

In summary, researchers consistently found distinct reactions to failures and categorized them as adaptive and mastery-oriented or maladaptive and helpless. Two important aspects of the work on mastery and helpless-oriented responses were the generalizability of the model and the finding that individuals who adopt helpless regulatory strategies are equal in ability to individuals who adopt mastery-oriented approaches (see Dweck 2000 for a review). These provocative findings led researchers to

question *why*. Why do individuals respond so differently to setbacks? Why are some individuals able to regulate effectively and persist?

Achievement Goal Theory

Dweck and her colleagues turned to a new phase of research focusing on goal-orientations to explain *why* students with equivalent ability have divergent reactions to failures. Dweck and her colleagues extended learned helplessness theory by demonstrating that the goals people pursue greatly influence motivational patterns and responses to obstacles. Generally, they found that students who adopt helpless learning strategies were striving to demonstrate their ability. In contrast, mastery-oriented children wanted to learn, and for them failure provided information about ways to do so more effectively (Dweck, 1986; Dweck & Elliot, 1983). Dweck and her colleagues termed the two different types of goals performance and learning goals respectively. The performance goal is one in which individuals strive to prove their ability, usually as compared to others. In contrast, the learning goal is one in which individuals are oriented towards increasing their competence. Dweck and her colleagues, in a number of studies, discovered that the two goal orientations could be used to predict mastery versus helpless responses following setbacks.

Elliot and Dweck (1988) experimentally manipulated performance versus learning-oriented goals to illustrate the causal relation between goals and subsequent patterns of behavior. They hypothesized that individuals induced to hold a learning goal, regardless of ability, would be more likely to respond with mastery-oriented strategies, but individuals induced to hold performance goals would fall into a helpless pattern

following setbacks. Results from the study were consistent with predictions. Students in the low ability performance goal condition showed the same maladaptive coping patterns as helpless children. Inducing goals in these studies demonstrated that giving students certain goal orientations creates the helpless or mastery responses following setbacks. Dweck and her colleagues replicated this effect in a study of eighth-grade students in science classes (Farrell and Dweck, 1984). Additional studies confirmed that students with learning goals tend to use more adaptive strategies and apply what they have learned more effectively (Ames & Archer, 1988, Graham & Golan, 1991). For example, students with mastery goals demonstrated considerably more engagement and efficacy and continued with a lifelong interest in academia (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004).

In summary, learning goals lead to greater persistence and engagement than performance goals. But, how do these goals influence achievement prior to outcomes? Are performance goals detrimental for achievement or just persistence? Studies trying to answer this question led to more ambiguous results with performance goals often leading to lower achievement than learning goals but, at times, also leading to equal achievement (Barron & Harackiewicz, 2001; Elliot & Church, 1997; Grant & Dweck, 2003). The unclear pattern of results regarding performance goals and achievement led Harackiewicz and others to explore under what conditions performance goals might be maladaptive (Harackiewicz & Elliot, 1993).

In trying to understand discrepant results, researchers made an important distinction between performance approach goals (focus on success) and performance

avoidant goals (focus on avoiding failure). Performance-avoidant goals were detrimental for performance and motivation, but performance-approach goals led to successful outcomes. The utility of the approach-avoidant distinction led Elliot and colleagues to replace the original dichotomous goal framework with a trichotomous perspective (see Elliot 2005; Elliot & Harackiewicz, 1996). The three posited goal structures were (a) mastery goals, similar to Dweck's learning goal, focused on the development of competence and mastery of tasks, (b) performance-approach goals focused on success and proving one's competence, and (c) performance-avoidance goals focused on avoiding signs of incompetence. Generally, the trichotomous perspective has been adopted for understanding goals, revealing that mastery goals typically lead to positive outcomes, performance-approach goals to a reduced set of positive outcomes, and performance-avoidant goals lead to detrimental performance and motivation (Elliot & Harackiewicz, 1996).

Achievement goal theory focused on distinguishing between goal-orientations and predicting subsequent motivation is one of the most prominent theories within motivational research that continues to generate new studies (Pintrich & Schunk, 2002). For example, Grant and Dweck (2003) designed five studies to help shed light on unresolved issues in goal and motivation research. Consistent with past research, learning goals predicted mastery-oriented responses to hypothetical failure scenarios, greater intrinsic motivation, and a history of using more adaptive regulatory strategies in response to past setbacks (Study 4; Grant & Dweck, 2003). Additionally, in a difficult college course, learning goals predicted greater achievement, improvement over time,

and better processing of course information (Study 5, Grant & Dweck, 2003).

Performance goals, in contrast, oriented towards validating one's ability were found in both Study 4 and 5 to be detrimental to achievement, motivation, affect, and cognition but only when ability was low.

In summary, research supports the principle that goals are influential for achievement, subsequent persistence, and motivational patterns (Kasser & Ryan, 1996; Ryan & Deci, 2000). In an academic achievement domain, vulnerability often ensues within a performance goal-orientation especially if it is avoidant in nature or ability is low and the goal is orientated towards proving ability. In contrast, learning goals promote greater achievement and motivation. Recent research distinguishing between the performance approach and performance-avoidance goal framework demonstrates the importance of clearly defining goal structures especially when assessing links to achievement. Although goal-orientations continue to be explored as an important predictor of achievement and motivation, Dweck, and colleagues turned their attention to understanding *why* some students' goals are focused on proving ability and others are focused on the learning process. They proposed that underlying implicit theories, which distinguish between the belief that attributes are fixed (entity beliefs) versus the belief that attributes are malleable (incremental theories), establish the general framework in which goals are adopted and directly and indirectly influence not only achievement but also affect, cognition, and behaviors.

Beyond Helplessness and Goals

Learned helplessness and achievement goal theory provided insight into students' responses to failures. Specifically, the pursuit of different goals influenced achievement, reactions following failures, and subsequent motivation (see Dweck, 2000; Molden & Dweck, 2006). If performance goals oriented towards proving ability are not adaptive, why then do some students adopt these types of goals? Why are some students more likely to adopt learning goals? Results suggest that differences in goal orientations are not due to actual ability or interest. What, then, is the driving force behind goal orientations? Researchers extending goal theory proposed a social cognitive Implicit Theory Approach (ITA) to foster a more complete understanding of motivational patterns. The ITA focused on how an individual's thoughts and beliefs play a key role in goal orientations, engagement, achievement, and subsequent regulatory strategies. The beliefs were termed entity or incremental theories, and distinguish between human attributes as fixed or malleable.

The Implicit Theory Approach: Entity and Incremental Implicit Theories

People form beliefs that organize their world and give structure and meaning to events in their lives. Although individuals hold beliefs about an array of phenomena, Dweck and her colleagues found in their investigation of achievement motivation that the beliefs often converge around two themes: entity and incremental beliefs. The entity framework holds that a human attribute within a specific domain is a fixed entity. For example, in the intelligence domain an entity theorist would hold that intelligence is a fixed trait and not much can be done to change it. In contrast, incremental theorists

believe in the malleability of human attributes and would agree more strongly that intelligence can be changed substantially through effort and hard work. The entity and incremental meaning systems lead people to think, feel, and act differently under similar situations. Dweck and her colleagues developed the Implicit Theory Approach to explain how the two meaning systems affect goals, achievement, motivation, and persistence following setbacks.

The fundamental assumption of the ITA—that individuals vary in their knowledge structures which in turn greatly influences attitudes and behavior—is common to several perspectives on human behavior (Ross, 1989). Piaget, for example, suggested that the development of meaning systems is just as important as logical thinking in shaping behavior (Piaget & Garcia, 1991). Similarly, Kelly (1955) suggested that, “man looks at his world through transparent templates which he creates and then attempts to fit over the realities of which the world is composed” (pp.8-9). Dweck and her colleagues built on the theoretical tradition that assumes people hold beliefs about the world, which in turn guide behavior. Specifically, they suggested that people hold self-theories about the nature of ability in specific domains and that these theories are used to navigate goals, motivation, and self-regulation following setbacks.

Dweck and her colleagues examined the implications of implicit beliefs in their studies of the relationship between conceptions of intelligence and motivational patterns in academic achievement. Dweck’s Implicit Theory Approach (ITA) suggests that differences in goals, attributions, and motivational strategies originate in people’s implicit theories about the nature of ability (Dweck & Leggett, 1988). In the following sections, I

review several programs of research that have revealed the importance of individuals' implicit theories in predicting motivational strategies in not only academics but also social perception, relationships, and sports. During the review, a number of points should be kept in mind. Across a range of studies and diverse populations, research repeatedly revealed that (a) entity and incremental theories were endorsed equally, (b) people can hold different theories depending on the domain (e.g., intelligence versus personality), (c) regardless of domain consistent predictions emerged and most importantly, (d) neither the entity nor incremental theory were linked to people's ability, education, or cognitive complexity (Molden & Dweck, 2006).

Implicit Theories and Intelligence

Dweck and her colleagues found clear differences in how students reacted to failures in an academic setting. Some students seemed helpless, others persevered. They also found that some students pursued goals focused on learning and others on performance outcomes. Why? Was it because of different perceptions about the nature of ability? To answer these questions, Dweck and her colleagues undertook an analysis of the psychological mechanisms that caused different reactions. Specifically, they proposed the ITA which identified students as either having an entity framework in which intelligence is considered to be a fixed trait or as having an incremental framework in which intelligence is considered a malleable trait. In a number of studies using diverse methods and participants, Dweck and her colleagues found consistent support for their model. Students who held incremental beliefs differed significantly from entity theorists on goal orientations and achievement (see Dweck, & Leggett 1988). Additionally,

implicit theories directly and indirectly influenced affect, cognition, and performance-regulation strategies under aversive circumstances.

Implicit theories and goals. In early work, Dweck and her colleagues assessed how entity and incremental frameworks influenced goal orientations and subsequent achievement. For example, students who more strongly agreed with the statement, “smartness is something you can increase as much as you want” were significantly more likely to adopt learning goals than students who endorsed more strongly the idea that how smart you are stays pretty much the same (Bandura & Dweck, 1985). Additionally, students who endorsed an incremental theory chose tasks that were challenging and presented opportunities for growth, whereas, entity theorists chose tasks that were not too hard so that errors could be avoided. Results consistently revealed that an incremental theory led to learning goals, whereas an entity theory led to performance goals. These results emerged in both elementary students and junior-high school students (Dweck, 2000).

In cross-cultural work with Hong Kong college students, researchers confirmed the link between implicit theories and goals. Researchers investigated if implicit theories about the malleability of ability influenced students’ engagement in an English proficiency class. Researchers chose this criteria variable because virtually all courses required proficient English to do well. Students who were already proficient in English did not choose to take the course, but how did students with low ability respond? Entity theory students with low ability were no more likely to take the English proficiency class than students who had high ability and did not need the class. However, incremental

theorists with low ability were interested in taking the course. The differences in patterns of behavior lend support to the idea that entity theorists with low ability avoid confronting their deficiencies.

Researchers also investigated the causal relation between goals and theories. Is it that goal orientations lead people to hold certain beliefs or do implicit theories cause students to adopt different goals? To test this question, researchers manipulated implicit theories by creating two passages for fifth grade students to read that emphasized either the entity or incremental theory (Dweck, Teeney, & Dinces, 1982). The passages used prominent figures with notable achievements to illustrate the theories. For example, one passage noted that Albert Einstein had not always done well in school. Additional neutral passages distracted students from the purpose of the study. Students then chose between a performance-oriented and a learning-oriented task. As predicted, students in the entity condition chose tasks that might make them look smart over learning tasks. In contrast, students in the incremental condition chose tasks that could help them master the subject.

Dweck and her colleagues also manipulated college students' theories of intelligence to show the causal link between implicit theories and goal orientations (Dweck, 2000). These studies used *Psychology Today* type articles to manipulate the students' theories. After reading the passages indicating that intelligence was either fixed or malleable, under the guise of a reading comprehension test, students took a nonverbal ability test. Half of the students were assigned to a failure condition and the other half to a successful condition before assessing the likelihood of signing up for a tutorial that could increase performance. The aim was to see if manipulated theories

interacted with performance feedback to predict task choice. Of the students who were given success feedback, 73% of those induced to hold an incremental theory and 60% of those induced to hold an entity theory were interested in taking the tutorial—a non-significant difference. However, students in the incremental condition who received failure feedback continued to be interested in the tutorial (73%) compared to students in the entity condition who received failure feedback (13%; Hong et al., 1999).

In summary, results from studies investigating implicit theories and goal-orientations suggested that students who most needed help within the entity framework were the ones mostly likely to avoid it. That is, students with low ability who thought intelligence was a fixed trait chose less challenging tasks and avoided remedial action. In contrast, an incremental belief led students to adopt more adaptive regulatory strategies. In summary, research on implicit theories of intelligence demonstrated relations between implicit theories, goals, and motivation to take remedial action.

Implicit theories, goals, and achievement. Dweck and her colleagues continued to explore the role of implicit theories in motivation proposing that holding an entity theory can also lead to decreases in performance during challenging times. Researchers conducted studies during the vulnerable time of transitioning into junior high school hypothesizing that entity theorists would start to show a helpless response, anxiety about performance, and decrements in achievement as obstacles arose (Henderson & Dweck, 1990). At the beginning of the seventh-grade school year, Henderson & Dweck (1990) measured students' confidence in their ability, their implicit theories, and their anticipated strategies for dealing with setbacks. The researchers then compared the grades

received on the students' seventh-grade report cards to their sixth-grade report cards. As predicted, students entering the more challenging seventh-grade with an entity framework demonstrated a marked decline in performance. In this study, entity theorists with high confidence also showed declines in performance. In contrast, incremental theorists improved their class standing regardless of their earlier reported confidence. The results reveal that students' theories about the controllability of intelligence are more strongly related to achievement than prior ability or confidence.

Leondari and Gialamas (2002) recently used path analysis to explore relations between implicit theories of intelligence, goal orientations, perceived competence, and school achievement. The research extended past implicit theories and goals research by including work avoidance goals in addition to performance and learning goals. The results revealed consistent findings: incremental theorists were more oriented towards learning goals than entity theorists. Additionally, implicit theories did not directly relate to achievement. However, as the underlying assumptions of the implicit theory model predicts, implicit theories were indirectly related to achievement via goal orientations. Learning and performance goals were positively related to achievement but avoidance goals were negatively related to achievement.

The results from Leondari and Gialamas' work (2002) differ slightly from Dweck and her colleagues' proposition that performance goals are always detrimental and point to the importance of clearly defining goals structures (see Elliot, 2005 for review). In certain contexts, both performance and learning goals can lead to higher achievement. Additionally, when examining the influence of implicit theories on achievement, it is

critical to note that implicit theories rarely directly impact performance but rather may do so indirectly through goal structures. In summary, research on the links between implicit theories of intelligence, goals, and achievement revealed provocative findings. An entity framework is both related to and causes students to orient themselves towards performance goals, which often leads to decrements in performance especially if the goal is avoidant in nature. In contrast, an incremental theory leads to mastery-oriented pursuits and greater achievement. Dweck and her colleagues, building on the research linking implicit theories, goals, and achievement continued to examine how implicit theories impact motivation processes. One area they examined was whether implicit theories influence the meaning assigned to effort in reaching goals.

Implicit theories and effort. Imagine working consistently to solve an anagram or crossword puzzle. You work diligently for hours finally solving the majority of the problems. Do you feel unintelligent because it required so much effort or do you feel smart because your hard work led to successfully solving the problems? According to the ITA, the answer to this question depends on your belief about the malleability of intelligence. Leggett and Dweck (1986) assessed implicit theories and then measured whether effort was viewed as positive or negative. As predicted, entity theorists agreed more strongly with statements that indicated that working hard on something means you are not good at it. Students within the incremental framework held the opposite belief of effort and agreed significantly more with statements indicating that effort is something that lets you realize potential.

The link between implicit theories and perceptions of effort was replicated with college-age students revealing consistent results (Mueller & Dweck, 1997). Additionally, to demonstrate the causal relation between theories and beliefs about effort, Hong and colleagues induced either an entity or incremental theory (Hong et al., 1999). Results suggest that an entity theory causes students to view effort as a measure of ability but an incremental belief causes students to see effort as something that can lead to reaching their goals. If every time effort is required, ability is called into question then tackling difficult tasks can be especially threatening for entity theorists. How do entity theorists handle these situations? Rhodewalt (1994) demonstrated that entity theorists withhold effort when they confront a difficult task by procrastinating or not studying very hard for a test (see also Midgley, Arunkumar, & Urdan, 1996). This self-handicapping strategy (Berglas & Jones, 1978) was most often used to preserve the belief that one could have done well if one had tried harder. However, this avoidant approach can be self-defeating and hinder long-term goals (Zuckerman, Kieffer, & Knee, 1998).

Dweck and her colleagues demonstrated that implicit theories influence not only goals and achievement but also impact the amount of effort expended in trying to reach goals. Although the original work of Dweck and Legget (1988) established implicit theories as predictors of goals and goals as important indicators of achievement and reactions to failures, recent research has modified this view a bit. Specifically in predicting performance regulatory strategies, research indicates that implicit theories more consistently predict attributions which in turn more strongly predict reactions to setbacks. For example, Erdley and colleagues found that students with an entity theory

made more ability attributions than did incremental theorists regardless of goal condition (Erdley, Cain, Loomis, Dumas-Hines, & Dweck, 1997). When predicting reactions following failures, merging the implicit theory framework with attribution theory has proved useful. Specifically, Dweck and her colleagues building on learned helplessness and attribution theory, proposed that implicit theories influence regulatory strategies and that this relation is due in part to the attributions entity and incremental theorists make following a failure situation.

Implicit theories, attributions, and regulatory strategies. In goal-setting domains, people inevitably face challenges and the explanations they make following setbacks sets the stage for future performance and motivation. After failing why do some people make ability attributions and others effort attributions? How do these different explanations affect persistence and self-regulation? The first question was one that the Implicit Theory Approach (ITA) tackled suggesting that different implicit beliefs lead to varying explanations following setbacks. The second question is one that attribution researchers had already answered. The long-standing literature on attribution theory had consistently demonstrated that attributions are important predictors of regulatory strategies (e.g., planning ways to be motivated, seeking advice, trying new strategies).

Attribution Theory

Attribution researchers have long recognized the explanations people make for performance as mediators of reactions to setbacks (Weiner, 1985). For example, people who tend to blame failure on stable and uncontrollable explanations are more at risk for helplessness and maladaptive regulatory strategies (Brown & Seigal, 1988; Peterson &

Seligman, 1984). Attributions to uncontrollable sources led to poor performance, reduced persistence, and helplessness. When individuals interpreted a setback as uncontrollable, depression and reduced effort often followed. In contrast, individuals who explained challenging events in optimistic more controllable ways reported better health and were more successful in school and in their careers (Dweck, 2000; Snyder, Irving, & Anderson, 1991). Additionally, attributions to more unstable and controllable sources such as effort led to increased motivation and more adaptive strategies for overcoming obstacles (Forsyth, 1986; Weiner, 1985).

The evidence, then, is unambiguous that attributions are central to motivation and play a key role in performance regulatory strategies. However, the attributional approach does not delineate why some individuals focus their explanations on more unstable controllable attributes and others focus on more uncontrollable stable attributes as the reason for declines in performance. An attribution framework also does not capture important individual differences in motivational processes such as what people are trying to achieve. Attribution theory, unlike the implicit theoretical framework, does not address the belief systems or cognitive frameworks that people hold that may influence explanations for events (Hong et al., 1999). To address these issues, Dweck and her colleagues proposed that implicit theories establish the meaning system that guides goals and motivation prior to outcomes and also influences attributions and subsequent regulatory strategies following performance feedback.

Beyond Goals and Attributions

The Implicit Theory Approach (ITA) suggests that it is people's underlying cognitive frameworks about what effort and ability mean that are important for predicting attributions and motivational patterns following setbacks. The ITA extends attribution research by going beyond merely asking which individuals are more or less inclined to make certain attributions and with what consequences (Molden & Dweck, 2006). That is, the implicit theories perspective is concerned with *why* individuals make controllable versus uncontrollable attributions, whether these attributions are focused on ability versus effort, and *how* motives are affected by the ways in which people give meaning to their experiences.

Additionally, the ITA is unique in that it articulates the meaning people assign to different attributions. Attribution theory delineates a causal variable like ability as stable and uncontrollable and others like effort as unstable controllable. However, the implicit theoretical perspective suggests that the crucial thing for understanding future behavior and regulatory strategies is what these explanations mean for the individual. If a person blames lack of ability for a failure but sees ability as something that can be developed, then this will lead to a different outcome than if the person holds an entity framework and thinks ability is fixed. For example, if an individual blames their ability for failing a test and believes that intelligence is an innate fixed trait, then their future attributions, affect, and motivation will be in accordance with this belief. The ITA suggests that some people see ability as acquirable and others see it as fixed. Implicit theories influence not only

which attributions a person is likely to make but also what these explanations *mean* for future behavior.

Extending attribution theory, the Implicit Theory Approach (ITA) offers an overall theory of motivation by articulating the underlying cognitive mechanisms that causally influence what goals are pursued, why they are pursued, and what explanations and subsequent behaviors ensue when individuals fail to reach their goals. I have already reviewed the causal links between implicit theories, goals, and achievement demonstrating that entity theorists pursue performance goals which often lead to decreases in performance. In contrast, incremental theorists pursue learning goals which often fosters achievement. Additional research has indicated the importance of implicit theories for predicting cognition and behavior following setbacks. Specifically, Dweck and her colleagues found links between implicit theories, regulatory strategies, and attributions. For example, in an early study by Henderson and Dweck (1990), students responded to questions about their attributions for poor grades in school. Entity theorists were much more likely to blame ability, to doubt their own competence, and to become anxious about school. On the other hand, incremental theorists were more likely to consider effort and situational determinants in explaining their poor performance. Implicit theories not only influence which attributions are used to explain failure but also directly and indirectly influence regulatory strategies.

In three studies, Hong and colleagues demonstrated that implicit theories led to different attributional styles which in turn predicted the likelihood of using effective regulatory strategies following setbacks (Hong et al., 1999). Study 1 demonstrated a

direct link between implicit theories and attributions. Students with an incremental theory took setbacks to mean, “I didn’t study hard enough” or as an indication that they had not adopted an effective studying strategy. In contrast, students with an entity framework interpreted setbacks using ability focused attributions such as, “I am not good at this subject.” Study 1 illustrated the importance of implicit theories in establishing the framework in which negative events are interpreted.

The second study tested the link between implicit theories and regulatory strategies following failures. An incremental framework led to more effective regulation. Specifically, compared to an entity framework, an incremental belief led to more remedial action. Study 3 tested whether attributions mediated the relation between implicit theories and remedial action. In Study 3, researchers manipulated implicit theories using *Psychology Today* type articles that presented compelling cases for either the entity or incremental belief of intelligence to demonstrate causal links with responses to setbacks (Bergen, 1991). Ability was also manipulated to test if implicit theories predicted different attributional tendencies and responses to success versus failure. Consistent with Study 2, students in the entity condition who needed remedial action were much less likely to take it than incremental theorists who also needed the tutorial. To test the effect on attributions, a Theory (entity versus incremental) X Feedback (positive versus negative) X Attribution (effort versus ability) analysis was conducted. The implicit theory main effect was significant for effort attributions and was qualified by an interaction of theory and feedback. Whether students were in the condition in which they needed the tutorial or in the condition where they had received positive

feedback, attributions did not differ. However, as in Study 1, when students were given failure feedback and induced to hold an incremental theory, they made stronger effort attributions than entity theorists. Differences in ability attributions were not significant. In support of the main tenet of Study 3, results suggested that effort attributions mediated the effects of implicit theories on mastery-oriented regulatory strategies when students face challenging or failure situations.

In summary, according to the Implicit Theory Approach, an entity versus an incremental belief of intelligence orients an individual to focus on different goals and different explanations and responses to failures. Dweck and her colleagues have established a model in which implicit theories create the motivational framework in two key areas: (a) an individuals' pursuits prior to outcomes and (b) explanations for failures and subsequent behavior (see Table 1).

Table 1

*Underlying Implicit Theory Predictions in the Academic Achievement Domain
Motivational Patterns as a Function of Theory*

<i>Theory</i>	<i>Goals</i>	<i>Effort</i>	<i>Attribution</i>	<i>Regulatory Strategy</i>
Entity	Performance	Negative View	Ability	Helpless
Incremental	Learning	Positive View	Effort	Mastery

Specifically, within the academic achievement domain, entity theorists more often choose goals and tasks oriented towards proving their ability which can lead to decreased performance. In contrast, incremental theorists are more likely to choose learning goals

oriented towards mastering a subject or gaining knowledge and skills which can lead to increased performance. Following negative outcomes, entity theorists are more likely to make ability attributions which often lead to less effective regulatory strategies. In contrast, incremental theorists make effort attributions which leads to mastery-oriented strategies for dealing with setbacks.

Researchers, considering the influential findings of implicit theories in an academic achievement domain, extended the Implicit Theory Approach (ITA) to a variety of novel areas. Dweck and her colleagues mostly extended the model to self and person perception and stereotypes. Knee extended the model to motivation in interpersonal relationships (Knee, 1998). Additionally, researchers have extended the ITA to other achievement domains such as leadership and sports.

Implicit Theories, Self-Judgment, and Social Perception

Dweck and her colleagues, building on research in the academic domain, demonstrated that implicit theories about self-attributes predicted judgments and subsequent affect and behavior. Holding an entity theory of one's own personality led individuals to focus on self-judgment and to attribute global, negative traits to oneself in the face of rejection. In contrast, holding an incremental theory led individuals to focus their attention on evaluating situational constructs as reasons for rejection and resulted in less stable attributions (Benenson & Dweck, 1986; Chiu, Hong, & Dweck, 1994; Erdley et al., 1997; Goetz & Dweck, 1980).

In one study, Goetz and Dweck (1980) had students try out for a pen-pal club. To become part of the club, students had to write a sample letter that was evaluated by a pen-

pal club representative. Children received “rejection” feedback by being told that the representative was not sure yet about them joining the club, but they should try again. The researchers compared the changes made from the first letter to the second letter (written after rejection feedback was received) to see how students responded to social rejection. Some students included new information and friendly overtures in their revised letters but others left their letter basically the same. Similar to patterns of results in an academic achievement domain, researchers found a link between the likelihood of tackling the challenge of a new letter and the attributions made for the social rejection. Students who blamed the rejection on personal inabilities took the more helpless response by not revising their letters. In summary, implicit theories about the malleability of one’s personality predicted attributions which in turn predicted strategies for handling negative feedback (Erdley et al., 1997).

Implicit theories and perception of others. Implicit theories create the framework for processing information and making inferences about not only the self but also impact perceptions of other people (Dweck, Chiu, & Hong, 1995a; Dweck, Hong, and Chiu, 1993; Murphy & Medin, 1985; Plaks, Grant, & Dweck, 2005; Ross, 1989; see also Heider, 1958; Kelly, 1955). For example, entity theorists who believe personality to be fixed, were more prone to judge personality attributes as important predictors of future behavior and more readily inferred global traits from limited behavior. Entity theorists also expected trait-consistent behavior over time and across situations (Hong, 1994). Incremental theorists who believe personality to be malleable, in contrast, perceived people based on the dynamics of the behavior rather than just the underlying personality

traits (for reviews, see Levy, Plaks, Hong, Chiu, & Dweck, 2001; Plaks, Levy, Dweck, & Stroessner, 2004).

Even when a situational attribution was readily available, entity theorists were more likely to make global trait inferences from behavior. For example, Erdley & Dweck (1993), showed elementary school children a film of a young boy, who was new to school and trying to make a good impression. After watching the young boy in a series of somewhat negative behaviors, the children evaluated the boy on a number of traits. The video continuously stressed the situational pressures on the boy, yet entity theorists made global attributions such as the boy is “bad or “nasty.” Another study demonstrated that entity theorists, compared to incremental theorists, were more likely to use trait or trait-relevant information to make predictions about future behavior (Erdley & Dweck (1993). In summary, entity theorists believed more strongly that even a single behavior was indicative of a person's character and expected a higher level of consistency in behavior across varying situations than incremental theorists.

In using implicit theories to predict person-perceptions, researchers also explored if the patterns of results emerged cross-culturally as well. Chiu and colleagues (Study 4) demonstrated that Chinese students did not differ from American students in the degree to which they endorsed an entity versus an incremental theory of personality (Chiu, Dweck, Tong, & Fu, 1997). Additionally, for both American and Chinese students, holding an entity theory was positively related to participants indicating that behaviors were representative of underlying personality. Researchers not only illustrated that implicit theories of personality influenced judgment cross-culturally but also revealed a

causal link between implicit theories and dispositional judgments (Chiu et al., 1997; Study 5). Participants induced to hold an entity theory made stronger predictions about behavior on the basis of personality traits compared to participants induced to hold an incremental theory.

Gervey and colleagues extended this research by examining how trait-relevant information influences the decision-making and social perception of entity and incremental theorists in jury cases (Gervey et al., 1999). Specifically, participants reviewed a fictitious murder case and made judgments about the defendant including guilt and innocence. Because entity theorists are more inclined to focus on traits in understanding social actions, whereas incremental theorists are more likely to incorporate mediating psychological or situational processes, Gervey and colleagues proposed that entity theorists would pay attention to different information in a transcript of a simulated murder trial. Results supported their proposition demonstrating that entity theorists focused more on dispositional information such as a person's interests, clothing, and appearance to make their verdict decisions than did incremental theorists. In summary, implicit theories of personality established a framework for individuals to make decisions about others.

Considering the research suggesting that entity theorists believe that traits are indicative of future behavior, it is not all that surprising that entity theorists also endorse more stereotypes (Levy & Dweck, 1999; Levy, Stroessner, & Dweck, 2001). Over a dozen studies conducted by Levy and her colleagues have shown that students at the college and grade-school age who hold an entity theory were more likely to stereotype.

This is true for novel groups, existing groups, and whether the stereotype is positive or negative (Dweck, 2000). For example, in one study, students holding an entity theory more strongly agreed that stereotypes about ethnic groups were truly representative. Entity theorists also tended to see groups as more homogeneous and extended information about groups to a variety of traits (Levy & Dweck, 1999).

Research on implicit theories and stereotyping continued to expand with a focus on whether theories affect only cognition or also lead to discriminating behaviors. Entity theorists were also more likely to act on their stereotypes. In one study, grade-school children were asked if they wanted to get to know novel groups after being given either mostly positively or mostly negative information. Not surprisingly students wanted to meet and get to know the children in the positive group and most did not want to meet the students in the negative groups. However, what was interesting is that entity theorists were especially eager to meet the positive students and especially reluctant to meet the negative group (Levy et al., 1998) in comparison to incremental theorists.

Although past research has established a link between implicit theories and stereotyping, the causal relation was unclear. To test if holding an entity theory causes stereotyping, students were induced to hold either an incremental or entity theory of personality and then after working on unrelated tasks, completed an assessment of stereotyping. Students were presented with a number of different ethnic groups and careers and asked to rate each group on a variety of traits. Students in the entity condition were significantly more likely to agree with stereotypical traits than students in the incremental condition (Levy et al., 1998). Research on students from diverse

backgrounds and ages suggests that within an entity framework stereotypes are more easily incorporated into judgments and behaviors than for incremental theorists who appear to see variability within groups.

In the achievement domain, implicit theories influence goals, performance, and cognition, affect, and behavior following setbacks. In social judgments, implicit theories greatly impact the degree to which dispositional inferences are drawn, whether an individual is punished or found to be guilty, and whether students endorse stereotypes and act accordingly. In summary, patterns of results that support the underlying implicit theoretical model emerge when implicit theories are applied to social perception. The ITA has been used to understand motivation in academic achievement, social perceptions, and stereotyping revealing the predictive utility of implicit theories. Research continues to expand the domains in which implicit theories can be applied.

Implicit Theories and Relationships

A new and rapidly expanding literature demonstrates the importance of individuals' implicit theories in the domain of romantic relationships (Franiuk, Cohen, & Pomerantz, 2002; Knee, 1998; Ruvolo & Rotondo, 1998). Individuals vary in the degree to which they subscribe to (a) *destiny beliefs*, which refer to the degree to which they believe that romantic relationships are or are not meant to be, and (b) *growth beliefs*, which refer to the degree to which they believe that relationships can benefit from the effortful resolution of challenges and obstacles (Knee, 1998; Knee, Patrick, & Lonsbary, 2003). (Franiuk and colleagues, 2002, refer to similar implicit theories, respectively, as “soulmate” beliefs and “work-it-out” beliefs.) Destiny beliefs and growth beliefs have

been shown to greatly impact motivation within interpersonal relationships (Knee, 1998; Knee, Nanayakkara, Vietor, Neighbors, & Patrick, 2001; Knee et al., 2003; Knee, Patrick, Vietor, & Neighbors, 2004). However, implicit theories of relationships often work through other relevant relationship variables in predicting outcomes. (for a review, see Knee & Canevello, in press).

Within romantic relationships, research suggests an individual's evaluation of their relationship (e.g., closeness to the partner) and of their partner (e.g., similarity to one's ideal partner) tends to interact with destiny beliefs but not growth beliefs in predicting relationship outcomes. For example, strong destiny theorists who positively evaluate the relationship or the partner exhibit especially positive outcomes (e.g., greater relationship persistence and satisfaction), whereas those who evaluate them negatively exhibit especially negative outcomes (Franiuk et al., 2002; Franiuk, Pomerantz, & Cohen, 2004; Knee, 1998; Knee et al., 2001, 2004; Ruvolo & Rotondo, 1998). Additionally, destiny theories when coupled with other vulnerable relationship situations (e.g., anxious attachment, partner perception) led to lower forgiveness and higher tendencies to break-up the relationship (Finkel & Burnette, 2005; Knee 1998).

Results from research on implicit theories of relationships are consistent with findings regarding implicit theories in achievement domains. Within an entity (destiny) framework when things are good (e.g., partner is ideal) satisfaction is likely. However, when conflict or obstacles arise (e.g., anxious attachment) the entity framework leads to vulnerability (e.g., decreased relationship satisfaction, lower forgiveness).

Implicit Theories, Leadership, and Management

Researchers also explored if implicit theories could be generalized to leadership and management in organizational behavior. In one study, Gorenflo-Gilbert (1999) proposed that implicit theories about what makes leaders successful would influence motivation and achievement in a leadership-training course. Cadets at a military academy completed measures of implicit theories of leadership, goals, attributions, and projections for future success as a leader. Additionally, the relation between implicit theories, goal orientations, and achievement were assessed. In contrast to Dweck and her colleagues' model (Dweck & Leggett, 1988), implicit theories of leadership did not influence goal orientations and did not interact with perceived ability to predict attributional patterns. The prediction that individuals with low ability would do better on achievement within the learning goal orientation was partially supported. However, both cadets with performance and learning goals did well in the leadership-training course (Gorenflo-Gilbert, 1999).

In a similar study on implicit theories of management skills, Tedesco (1999) assessed the relations among implicit theories, ability, goal-orientations, and achievement. As predicted, there was a significant relation between implicit theories and goal orientations. However, learning goals did not lead to greater task enjoyment or achievement compared to performance goals. This finding could be due to untested moderations such as perceived ability or to operationalizations of goal orientations. Wood and colleagues have also looked at implicit theories in organization behavior and management (Taberero & Wood, 1999; Wood & Bandura, 1989; Wood, Phillips, &

Tabernero, 2002). In one study, participants induced to hold an entity theory about the required managerial skills showed a progressive decrease in efficacy, adopted less challenging goals, and demonstrated a reduction in efficiency across trials. Participants in the incremental group were able to maintain efficiency and adopt adaptive strategies across trials resulting in a higher level of organizational performance (Wood & Bandura, 1989). In another study by Wood and colleagues, groups were established with either three entity or three incremental theorists and were given a managerial task to complete. As the task became more difficult, the entity group blamed their ability and luck, whereas the incremental group used reasoning to overcome obstacles (Wood et al., 2002). Researchers also recognized differences between the groups in terms of communication. The members of the incremental group were more likely to state openly their ideas and opinions and focused more easily on the task. The entity group, in contrast, focused on unnecessary information and was less likely to disagree (Wood et al., 2002).

These studies suggest that implicit theories often influence goal orientations, which in turn may predict achievement. Additionally, many of the same factors (e.g., attributions) that mediate the effects of implicit theories on performance in other achievement domains influence organizational behavior strategies as well.

Implicit Theories and Athletic Ability

In addition to applying implicit theories to business, researchers have also extended implicit theories to the athletic achievement domain. Individuals can hold implicit theories about whether athletic ability is a fixed entity or something that can be developed. To test how implicit theories of ability influence goals and achievement,

Buford (2004) used 89 professional golfers to assess relations among implicit beliefs about athletic ability, athletic goal orientations, and performance outcomes. Results revealed that implicit theories influenced goal orientation but did not actually impact achievement.

Implicit theories of athletic ability have also been shown to be important for motivation for students in physical education classes. Similar to the pattern of results found in the intelligence achievement domain, Ommundsen (2001) found that a fixed belief in ability was positively related to self-handicapping, whereas an incremental theory was negatively related to self-handicapping. Additionally, believing that athletic ability was a fixed trait was especially detrimental when ability was low. The implicit theory subsequent behavior link was mediated by goal orientations such that task or learning goals led incremental theorists to cope more effectively. Ommundsen (2001) extended this research by exploring how implicit theories influence affective responses to physical education. Holding an entity theory led to more anxiety and less satisfaction regardless of perceived ability.

Additionally, research revealed that implicit theories of ability influence self-regulatory behaviors in physical education. Self-regulatory strategies include measures of elaboration strategies, effort regulation, and adaptive help-seeking. Biddle and colleagues (Biddle, Wang, Chatzisarantis, & Spray, 2003) found that implicit theories influence goal orientations, affect, and self-regulatory behaviors. Consistent relationships emerged between implicit theories and regulation strategies demonstrating that

encouraging an incremental view of ability in physical education classes could be valuable due to its tendency to lead to adaptive regulatory strategies.

Does believing that some people are just natural athletes versus believing that others are not “cut-out” to exercise influence motivational strategies? Research with adults suggests that these beliefs about exercise ability cause subsequent persistence on an exercising task. Participants were induced to hold an entity or incremental belief about athletic coordination and then watched an exercise video, first experiencing success before being faced with a challenge. Consistent with the social-cognitive ITA, participants induced to hold an entity theory reported lower motivation, less efficacy, and more negative affect during the challenging portion of the video than incremental theorists (Kasimatis, Miller, & Marcussen, 1996).

In summary, implicit theories in the domain of athletic ability yielded patterns of results consistent with the implicit theory meaning systems approach. Students’ implicit theories of athletic ability predicted goals, affect, cognition, and behavior. Specifically, holding an incremental theory led to learning goals, more positive affect, and adaptive regulation compared to holding an entity theory.

Synthesis

Dweck and her colleagues propose using an Implicit Theory Approach (ITA) to explain motivational processes in achievement domains. Specifically, they suggest that implicit theories establish the framework that guides goals and performance and creates a meaning system in which explanations and regulatory strategies occur following setbacks. The ITA distinguishes between beliefs about human traits as malleable or fixed.

Within an academic achievement domain, individuals who hold an incremental belief (changeable) are more likely to pursue endeavors to learn or master a skill, attribute failure to effort, exhibit more adaptive regulatory strategies, and be more optimistic about future behavior. In contrast, individuals adopting the entity theory (fixed) are more likely to pursue performance goals, attribute failure to ability, use avoidant and maladaptive regulatory strategies, and to have negative future expectations. Extending the original research in the domain of academics, implicit theories have been successfully applied to understanding motivation and behavior in the domains of self and person perception, relationships, leadership, and athletics (see Table 2).

In summary, the Implicit Theories Approach demonstrates how beliefs about the malleability of personal attributes are strongly linked to people's motivational systems influencing goals prior to outcomes and affect, cognition, and behavior following setbacks in pursuing goals. Dweck and her colleagues have demonstrated that the distinct meaning created by different implicit theories can have profound effects in a variety of domains of psychological research. As Harackiewicz & Elliot (1995) proclaimed, "...Dweck et al.'s implicit theories model has the potential to make a major contribution to theory and research on social-cognitive processes. The model clearly possesses two attributes of a good theory: It is both parsimonious and broad in explanatory power. Furthermore, its applicability to social, personality, clinical, development, and educational psychology increases the probability that the formulation will lead to subsequent theoretical and empirical development" (p. 300).

Table 2

Underlying Implicit Theory Predictions in a Variety of Domains: Patterns of Behavior as a Function of Theory

<i>Theory</i>	<i>Self-Attributes</i>	<i>Person-Perception</i>	<i>Stereotyping</i>	<i>Relationships</i>	<i>Sports</i>
Entity Theory	Blame rejection on ability, exhibit maladaptive coping	Focus on global dispositional inferences	More easily incorporate stereotypes and discriminate	Interacts with partner perception and closeness to predict satisfaction	More anxious about PE class maladaptive coping
Incremental Theory	Effort attributions, mastery responses to rejection	Focus on situational determinants of behavior	Less likely to endorse stereotypes and discriminate	Less likely to terminate relationships early, works on relationship regardless of partner perception	Adaptive regulation, more positive affect and greater participation

One area in which implicit theories have not been explored, that is especially ripe for theoretical development, is weight management. Implicit theories have a long-standing history as predictors of motivational patterns and achievement and could offer insight into what leads to effective weight management strategies. Based on Dweck's seminal ITA work, in the current paper I extended the Implicit Theory Approach to understanding motivational patterns in the domain of body-weight management.

An Implicit Theory Analysis of Weight Management

Why do two people, equally devoted to the goal of losing excess weight, so often differ in their degree of success at this task—with one managing to reach his or her dietary goals and the other experiencing dieting setback after setback? Why does one person persist and still feel optimistic following the setbacks, whereas another person feels helpless and starts to avoid dieting all together?¹ The answer to these questions is important considering the increase in obesity and the links between reaching a healthy weight and physical and psychological health. The implicit theory analysis proposed in the current study is one that can help answer the question of why some people effectively manage their weight and others fail to do so. This dissertation suggests that the key to variations in motivation, goals, and persistence on diets can be found in each person's implicit theory of weight management.

Why extend the Implicit Theory Approach (ITA) to the domain of weight management? The implicit theory model has proven to be an important predictor of persistence and achievement in domains that range from academics to physical education

¹ Dieting in the current context is broadly considered as trying to manage weight through either restricting calories or exercising or both.

to leadership to relationships. I propose that dieting is an additional achievement domain with numerous parallels to previously studied areas and one that could benefit from the social cognitive perspective of implicit theories. As individuals try to manage their weight, they establish goals, experience setbacks, regulate their feelings of disappointment, and try to persist in the face of adversity. Although a number of important theories have been shown to be influential in predicting sustained motivation in health domains (e.g., health beliefs model, social cognitive theory, and theory of planned behavior), in the current paper I offer the ITA as a unique social-cognitive perspective that can illuminate why some individuals persist on diets and others give-up more readily. In summary, borrowing heavily from the existing theoretical and empirical framework of implicit theories in the achievement literature, the aim of this dissertation was to gain an understanding of implicit theories of weight management and to examine how these beliefs influence motivational strategies.

Based on Dweck's seminal work, I suggest that people vary in their beliefs about the extent to which body-weight is something that can be changed. Dweck and her colleagues have found that these beliefs in achievement domains often converge around two themes: entity and incremental beliefs. Entity theorists believe that attributes are fixed, whereas incremental theorists believe that attributes are developed. These two constructs are often merged to create one scale of implicit theory beliefs (see Dweck, 2000). The Implicit Theory Approach has generated a great deal of research in achievement and social-perception literatures, but little to no attention from researchers investigating weight management. I propose that people can ascribe more strongly or

weakly to an incremental view of weight management. That is, some people will believe more strongly that their body weight is something that can be changed through effortful dieting and exercise.

I also suggest that these variations in beliefs about weight management will be linked to individuals' weight control strategies following setbacks. Specifically, I suggest that implicit theories will be related to feelings of helplessness and optimism, attributions, and coping following setbacks. After failing, individuals experience a range of emotional reactions, try to explain the negative event, and decide on a course of action. Often individuals who fail feel negative, indicating feelings of distress, shame, and guilt (Forsyth, 1986). However, one question of interest in the current study and one that past implicit theories research has sought to answer is what makes some individuals especially prone to negative affect and others able to feel optimistic following setbacks. Dweck and her colleagues have assessed the role of implicit theories in predicting negative feelings following academic setbacks revealing that incremental theorists are better able to regulate their affect than entity theorists (Dweck, 2000). Dweck's work, having developed out of learned helplessness theory, especially focused on feelings of helplessness revealing that believing a trait is malleable leads to less helplessness. Ommundsen (2003) and Kasimatis and colleagues (1996) also found that incremental theorists report less negative affect than entity theorists; they often report feeling less anxious and upset by failures (Kasimatis, Miller, & Marcussen, 1996).

After failing, individuals not only assess their feelings, but also try to make explanations for the setback and cope with negative outcomes. In the current

conceptualization, I suggest that variations in implicit theories of weight management will be related to explanations for failures such that a stronger incremental belief will be positively associated with effort attributions and negatively related to ability attributions. I also suggest that implicit theories of weight management will be related to self-regulatory behaviors following setbacks such that the more an individual stresses entity-thinking in his or her explanation of weight the more maladaptive his or her coping. For example, Dweck's work suggests that entity theorists are likely to be more avoidant of the goal following a dieting setback than incremental theorists (Dweck & Legget, 1988). Additionally, building on Dweck's seminal work on the mediating role of attributions in the link between implicit theories and regulatory strategies, I propose that the cognitive interpretations surrounding setbacks will mediate the implicit theories-regulatory strategies link.

I also explored feelings of helplessness and optimism as potential mediators in the implicit theories-regulatory behaviors link. I developed this line of reasoning from the broad range of evidence revealing that emotional distress contributes to failures of self-regulation (see Baumeister, Heatherton, & Tice, 1993) and especially from Dweck's early work on learned helplessness (e.g., Dweck & Legget, 1998; Dweck & Reppucci, 1973). Additionally, building on Dweck (2000) and Ommendsen's (2001) work on the link between implicit theories and feelings of optimism following a setback, I also tested whether feeling more optimistic mediates the implicit theories-regulation link.

People's beliefs about the malleability of traits influence not only emotion, cognition, and regulation but are also related to motivational patterns prior to outcomes;

entity theorists tend to set performance-oriented goals, whereas incremental theorists tend to set learning-oriented goals (see Cury, Elliot, Fronseca, & Moller, 2006). Building on findings from implicit theories research in the domain of academic achievement, in the current application, I suggest that believing more strongly that weight is fixed will be positively linked to performance goals focused on pounds lost and negatively linked to learning goals focused on weight loss for health improvement.

In summary, the implicit theoretical approach establishes beliefs about the malleability of human attributes as important predictors of motivation. Specifically, in the context of this dissertation, implicit theories refer to beliefs about the malleability of body-weight. I propose that these implicit theories will be related to motivational patterns prior to outcomes and emotion, cognition, and behavior following setbacks.

Current Study

There were two primary goals in the current study. First, I developed a measure of implicit theories of weight management illustrating convergent and discriminant validity and test re-test reliability. Second, I tested a series of hypotheses derived from the Implicit Theory Approach to weight control. The current research extended past work by testing if implicit theories of weight management, similar to implicit theories in other domains, influence affect, attributions, and subsequent regulatory strategies.

Additionally, a secondary aim was to explore links between implicit theories, goal-orientations, and achievement.

Development of the Implicit Theories of Weight Management Scale

Using methods similar to Knee (1998) and theoretical guidance from Hong et al., (1999), the first goal of the dissertation was to test the idea that individuals, when they consider weight management, adopt one of two basic theories; an entity or incremental theory. I proposed developing a measure of entity and incremental theories of weight management which I call the Implicit Theories of Weight Management Scale (ITWMS). In the development of the scale, I examined the structure of implicit theories of weight management testing whether a two-factor model with entity and incremental facets is a better fit than a one factor model. I also examined discriminant and convergent validity. For discriminant validity, I suggested implicit theories would be independent of personality constructs. Prior research on implicit theories in domains such as academic achievement and interpersonal relationships indicates that implicit theories are distinct from other aspects of the individual such as general tendencies towards optimism and the Big Five personality dimensions. I tested this assumption by measuring several basic aspects of personality and then examining the relationship between these and implicit theories of weight management. I incorporated the Big Five personality dimensions and General Trait Optimism to verify that weight management implicit theories are not redundant with basic personality characteristics (e.g., Extraversion, Neuroticism, Agreeableness, Openness, Conscientiousness).

For convergent validity, I included locus of control constructs and measures of implicit theories in the personality and intelligence domains (Dweck, 2000). Locus of control has been shown to predict a variety of health behaviors, including dieting

(Lefcourt, 1976; Rotter, 1966). People with an internal locus of control believe that their own actions determine consequences, whereas individuals with an external locus of control feel that consequences in life are generally outside of their control. Although locus of control and implicit theories are similar constructs, the implicit theories approach articulates the underlying cognition that may enhance or restrict perceptions of control within specific domains (Dweck & Legget, 1988). Specifically, by manipulating implicit theories, researchers have established a direct causal relation between theories and perceptions about controllability (Hong et al., 1999). However, considering the link between locus of control and implicit theories, for convergent validity, the dieting beliefs scale which is a dieting locus of control measure (Stotland & Zuroff, 1990) and a more general health locus of control measure were assessed (Wallston & Wallston, 1978).

I also included personality predictors related to dieting outcomes in order to identify alternative assumptions and lend support for the uniqueness of the implicit theory model. Specifically, I included a measure of dieting self-confidence to demonstrate that implicit theories contribute variance in patterns of motivation above and beyond other constructs related to motivation including confidence in ability. Additionally, because dieting is such a self-regulated behavior, I included a measure of self-reported trait self-control. Trait self-control, which is the ability to enact control over the self, has been shown to be influential in the adoption and long-term maintenance of a healthy lifestyle. In one study, even after controlling for trait predictors of dispositional optimism, self-efficacy beliefs, and locus of control, trait self-control remained an important predictor of health behaviors (Schroder & Schwarzer, 2005). Therefore, for this dissertation, I

assessed trait self-control to demonstrate that the beliefs people hold about the malleability of weight can alter the psychological process of self-regulation above and beyond trait self-control.

In summary, in the first stage of this dissertation, I developed the implicit theories of weight management scale to assess beliefs of weight management. I expect these theories to be distinct from general personality traits including the Big Five and general optimism. I also suggest that implicit theories of weight management will be related to other control constructs such as health and dieting locus of control and to implicit theories in the domains of intelligence and personality. Finally, I predicted that implicit theories of weight management would be unique predictors of regulatory strategies following setbacks even after incorporating control constructs that have predicted health behaviors in past research (e.g., trait self-control).

Implicit Theories and Dieting Motivation

The second goal of the study was to test the relation between implicit theories, affect, attributions, and self-regulatory strategies in response to dieting setbacks and to explore some of the underlying assumptions of the implicit theoretical approach to motivation. Specifically, I predict that when individuals believe more strongly that weight is a fixed entity they will experience more negative affect and less optimism. They will also be oriented towards interpreting setbacks in their dieting goals as diagnostic of their inability to lose weight, rather than some malleable aspect of performance. These attributions and failures of affect regulation will in turn influence motivational strategies such that stronger incremental beliefs will be related more

strongly to mastery-oriented strategies and less strongly to avoidant types of responses. Additionally, I explored how implicit theories affect motivation prior to outcomes by examining the relations between implicit theories, goals, and achievement.

To reach the above aims, the current study employed two time periods. At Time 1, I assessed implicit theories and goal orientations before asking participants to read about a hypothetical unsuccessful dieting setback (see Appendix A). Specifically, participants came into the lab and were consented before filling out a battery of questionnaires. Participants first answered questions regarding their implicit theories of weight management before writing down one weight management goal to achieve in the next two weeks. Participants were informed that they would return in two weeks to report on this dieting goal. Additionally, participants were asked to indicate how likely they were to adopt performance or mastery-oriented/learning goals.

Participants, after setting a goal, were asked to imagine a situation in which after an eight-week dieting program they fail to lose weight, gaining weight instead (see Appendix B). After they described their thoughts with regards to this dieting setback, participants completed a survey that assessed affect, attributions, and regulatory strategies. Evidence indicates that Heider's (1958) classic foursome—ability, effort, luck, and task difficulty—are among the most frequently offered explanations for success or failure and these dimensions were included to assess explanations for the dieting setback. However, the main interest in the current study, based on Dweck and her colleagues work, was the dimensions of ability and effort as entity and incremental theorists differ in their adoption of these two specific attributions. Adapting Dweck's (2000) work and

Ommundsen's (2003) research on implicit theories in academics and physical education, regulatory strategies included measures that assessed adaptive help-seeking and effort regulation, including an assessment of avoidance. I also assessed additional personality constructs to distinguish the unique contribution of implicit theories and to test for convergent and discriminant validity.

At Time 2, implicit theories were re-assessed for test re-test reliability.

Participants were also asked to write down the goal they set at Time 1. Then participants rated how well they thought they did in reaching their goal. Because many of the participants' goals were likely to include weight loss, a behavioral measure of actual weight loss was included by assessing weight at time 1 and time 2. Additionally, measures of implicit theories in other domains were included at time 2 for validity purposes.

In review, I administered a newly developed index of implicit theories of weight at two different points in time, along with measures of other cognitive, affective, and motivational factors. I sought to (a) establish a reliable and valid measure of implicit theories of weight management, and (b) illustrate that implicit theories of weight management influence motivation prior to outcomes and regulatory strategies following setbacks. Specific hypotheses are summarized below.

Implicit Theories Psychometric Hypotheses

1. Structure of implicit beliefs: I tested two possible models for the structure of the scale; (a) a one-factor model with all 6 items loading on one latent construct (implicit theories of body-weight), and (b) a two-factor model with 3 items

loading on an entity facet and 3 items loading on an incremental facet. I propose that people will vary in their beliefs about the malleability of weight and these beliefs will be encompassed by two facets of implicit theories. I predict, if a two-factor model emerges, the entity and incremental factors will be strongly correlated (negatively) lending support for a uni-dimensional scale.

2. Reliability: The implicit theories weight management scale with the combined factors will be reliable, both internally and temporally.
3. Convergent Validity: Implicit theories will be related to health and dieting locus of control and to implicit beliefs in other achievement domains. Specifically, implicit theories of weight management (higher number mean more agreement with an incremental belief) will correlate positively with (a) general health locus of control (higher numbers mean more internal validity), (b) internal dieting beliefs (c) implicit theories of personality and intelligence and (d) negatively with external dieting beliefs.
4. Discriminant Validity: Negligible correlations will emerge between implicit theories of weight management and personality constructs including the Big Five personality dimensions (e.g., neuroticism) and general trait optimism.

Motivation Hypotheses

5. Implicit Theories and Affect: Believing more strongly that weight is malleable will be related to more optimism and lower feelings of helplessness.

6. **Implicit Theories and Attributions:** Implicit theories (higher numbers mean more agreement with an incremental belief) will be positively related to effort attributions and negatively related to ability attributions.
7. **Implicit Theories and Regulatory Strategies:** Believing more strongly in an incremental belief will be related positively to effective performance regulation (e.g., more effort).and negatively to maladaptive coping (e.g., avoidance).
8. **Mediation:** The relation between implicit theories and regulatory strategies will be mediated by attributions and feeling more positive (e.g., more optimistic, less helplessness).

The following auxiliary hypotheses will also be investigated:

9. **Goal Orientation:** Implicit theories will be positively related to learning-oriented goals and negatively related to performance-oriented goals.
10. **Achievement:** In accordance to Harackiewicz and Elliot's (1995) call for a more detailed analysis of the link between implicit theories, achievement, and goals, I explore the mediating role of goals in the implicit theories and achievement link.²

² Based on the review of predictors of health behaviors, the following variables will be included as control variables for all of the above motivation predictions: trait self-control and dieting self-confidence.

Method

Participants

Participants at time one ($N = 264$; men = 104, women = 160) were undergraduate students who volunteered to take part in the research. Most students were recruited from the introductory class Psychology 101. Only students 18 years of age or older could take part. Most participants were young adults ($M=19.87$ years old, $SD =3.46$) and the sample was of varying ethnicity (45.8 % White; 27.7% Black; 4.5% Hispanic; 15.5% Asian; and 6% Other).

From the time 1 data, 225 participants had the opportunity to participate at time 2. There were 151 returning participants at time 2 making the attrition rate rather high (33%). Additionally, only 131 participants had data that could be matched with time 1 (men =39, women =92). Three participants failed to report their identifying number and 17 participants reported unique identifiers that did not match time 1 data. Participants with data that could not be matched with time 1 data, were excluded from subsequent analyses leaving a sample size of 131 at time 2. As expected, the sample from time 2 was similar in age ($M=20.1$ $SD=4.45$) and ethnicity (51.1 % White; 28.2% Black; 4.6% Hispanic; 12.2% Asian; and 3.8% Other) to the time 1 sample.

Procedure

Participants underwent procedures adapted from Knee (1998) and completed measures adapted from work by Dweck and her colleagues (see Dweck, 2000). A group of 10-15 participants were tested per session. A single experimenter provided participants with a consent form to sign and a brief description of the experiment. At time 1, participants completed key predictor and potential confound measures including the implicit theories of weight management scale, the dieting beliefs scale, a dieting self-confidence scale, the trait self-control scale, and the general optimism measure. Next, participants were asked to set a dieting goal for the next two weeks to be reported on at time 2 and answered questions regarding goal orientations. Then, they read a hypothetical dieting setback scenario in which they imagined that they had failed to effectively manage their weight. After reading about the setback, participants answered a number of questions including their attributions for the setback, their feelings, and their regulatory strategies for handling the setback. Additionally, convergent and discriminant validity measures were assessed. To assess achievement with a behavioral measure, body-weight was assessed at time 1.

Upon completion of the study, participants were told again that they should return in two weeks and were informed that the researcher would email them in ten days to remind them that they had 3-4 days to sign-up for time 2. If participants had not signed-up after the first reminder they were emailed once more and asked to sign-up for time 2.

At time 2, participants again completed the implicit theories of weight management scale and a measure of their perceived success thus far on their dieting goal that they set

at time 1. Additionally, their actual weight was assessed again and used to create a change score from time 1 to time 2 as a behavioral measure of performance for weight change goals. Participants also completed measures of implicit theories in other domains (e.g., intelligence, personality).

Assessment of Implicit Theories of Weight Management

To assess beliefs about body-weight, I used a six-item questionnaire developed by adapting Dweck's (2000) implicit theories measure of intelligence to weight management (see Appendix A). Entity worded items included, "You have a certain body-weight, and you can't really do much to change it," "Your body weight is something about you that you can't change very much," "To be honest, you can't really change your body weight." Incremental items included, "No matter who you are, you can significantly change your body weight," "You can always substantially change your body weight," "You can change your body weight considerably." Participants indicated their agreement or disagreement with the items using a 6-point Likert-type scale ranging from 1 (strongly agree) to 6 (strongly disagree). For the first 3 items listed above, agreement indicated "entity thinking." For the other 3 items, agreement indicated "incremental thinking". Research suggests that disagreement with the entity theory statements can be taken to represent agreement with the incremental theory indicating that the construct is unidimensional (Dweck et al., 1995a, 1995b).

Assessment of Affect, Attributions, and Regulatory Strategies

Building on research by Dweck and her colleagues (Hong et al., 1999; Dweck, 2000; Dweck & Legget, 2000) and Ommundsen (2001), the primary outcomes variables

assessed were affect, attributions, and performance-regulatory strategies (adaptive advice-seeking, effort regulation, and avoidance; see Appendix B).

Helplessness, Optimism, and General Affect. To assess feeling of helplessness, I used a face-valid one-item measure where participants indicated on a 5-point scale that ranged from *not at all true* (1) to *very true* (5) expectations about feeling helpless following a setback. I used three items to assess optimism about future dieting that were adapted from Dweck's work in the academic achievement domain (Dweck, 2000). Items included, "I feel confident that, in the future, I can do well managing my body weight." Participants rated from *strongly agree* (1) to *strongly disagree* (6), how much they agreed that they would feel optimistic about the future. Scale reliability in the current study was .87. To assess general negative affect, participants rated on a 5-point scale that ranged from *not at all true* (1) to *very true* (5) expectations about experiencing a particular emotion following the dieting setback. Based on qualitative reports of students' emotions following setbacks in Dweck's (2000) work, examples of emotions that participants rated included, "sad" and "inadequate." Including the one-item helplessness measure, there were 5 negative emotions that participants rated. I averaged responses on the five emotions to create a general affect scale ($\alpha = .87$).

Attributions. Attributions were measured by means of a modified version of the Causes of Academic Performance Scale (CAPS) (Kelly & Forsyth, 1984). The revised attribution measure consisted of 11 possible causes for a dieting setback (e.g., lack of effort, ability, luck, task difficulty, control) and incorporated the key attributions used in the Hong et al., (1999) paper investigating implicit theories of intelligence, attributions,

and remedial action. The attributions of interest were ability and effort. Two items for each of these attributions were included. Participants indicated the extent to which they felt the cause contributed to the dieting setback on a seven-point scale ranging from *very strongly disagree* (1) to *very strongly agree* (7). Higher numbers indicated stronger agreement that the item was a causal influence in the dieting setback.

Self-Regulatory Strategies. I assessed regulatory strategies following setbacks with items that tapped adaptive self-regulation and maladaptive coping. In accordance with research by Dweck (1995) and Ommundsen, (2001), items assessed 2 aspects of adaptive regulatory strategies (i.e., advice-seeking, increased effort) and maladaptive coping (i.e., avoidance). Example items included, “tried an easier dieting plan” or “sought the advice of a physical trainer” and “gave up on dieting all together.” Participants rated from *strongly agree* (1) to *strongly disagree* (6), how much they agreed that they would have engaged in a particular behavior.

Assessment of Goals and Achievement

To test the theoretical assumptions of the implicit approach, I assessed participants’ goal-orientations and perceived achievement (see Appendix C) using an adapted version of Dweck’s inventories (Dweck, 2000). Participants responded on a 6-point Likert-type scale how likely they would be to set a performance goal and how likely they would be to set a learning goal. I adapted the learning and performance goal questions from Dweck’s (2000) work in the academic achievement domain to the weight management domain. The performance-oriented goal stated, “I diet to show that I can

lose weight.” In contrast, the learning-oriented goal stated “I diet to improve my health and knowledge of body-weight maintenance.”

Assessment of Convergent and Discriminant Validity

I used a 7-item Health Locus of Control measure adapted from the Wallston and Wallston (1978) multidimensional scale with a focus on the internal/external dimension to test for convergent validity (see Appendix D). It measures generalized expectancies for internal versus external control. People with an internal locus of control think that their own actions determine the rewards that they obtain, whereas those with an external locus of control believe that rewards and punishments are generally outside of their control. Research has demonstrated that the scale is reliable (e.g., $\alpha = 0.673$ to 0.767 ; Holmes, Frank, & Curtin, 1999). Cronbach’s α for the current study was $.72$.

I also used the Dieting Beliefs Scale (DBS) for convergent validity (see Appendix D; Stotland & Zuroff, 1990). Following Rotter’s (1966) definition of locus of control, four of the items on the dieting beliefs scale (DBS) were patterned after the Health Locus of Control Scale (HLC). Items were balanced to include equal numbers of external and internal items. The DBS has been shown to yield 3 factors: internal (IDBS; e.g., willpower, effort, responsibility), external (EDBS; e.g., luck, genes, fate), and external/others (EDBSO; e.g., encouragement from other people). I used these factors to initially create 3 subscales. Reliabilities for the subscales in the current study were $.67$, $.46$, and $.57$ respectively. Because there were no specific hypotheses regarding the different external subscales, the external items were combined to create one external subscale with a reliability of $.55$. The internal subscale remained separate ($\alpha = .67$).

Additionally, I included implicit theory measures of intelligence and personality at time 2 for convergent validity purposes (see Appendix D). Past research has demonstrated adequate reliability for these scales (e.g., intelligence, alpha ranges from .94 -.98; Hong et al., 1999; personality, alpha = .71; Erdley & Dweck, 1993). Reliabilities in the current study were alpha = .92 for intelligence and .91 for personality.

I assessed personality constructs for discriminant validity purposes. I incorporated an abridged version of the Big Five personality dimensions (Appendix D; see Saucier, 1994; Dwight, Cummings, & Glenar, 1998) to verify that entity and incremental beliefs about weight management are not redundant with the basic dimensions of personality. Each of the five dimensions (Extraversion, alpha = .88; Neuroticism, alpha = .75; Agreeableness, alpha = .76; Openness, alpha = .80; Conscientiousness alpha = .78;) were assessed by 5 trait descriptors on 7-point Likert-type scales. The alphas reported for the current study are consistent with alpha reliabilities from past studies (e.g., Sheldon, Ryan, Rawsthorne, & Illardi, 1997). Trait optimism was assessed to demonstrate that an incremental theory is not redundant with general optimism. Dispositional optimism was assessed with a shortened version of Scheier & Carver's (1985) dispositional optimism measure (Life Orientation Test, LOT). The LOT consists of eight items, rated on a scale ranging from 0 (strongly disagree) to 4 (strongly agree) with four filler items included to disguise the underlying purpose of the test. The shortened version in the current study used 2 positive, 2 negative, and 2 filler items. Example items included, "If something can go wrong for me, it will" and "I'm always optimistic about my future." Past research has

demonstrated adequate reliability, $\alpha = .78$ (Brissette, Scheier, & Carver, 2002).

Cronbach's α in the current study was .58.

Assessment of Dieting-Related Constructs

I measured an individual's ability to self-regulate using the 13-item trait measure of self-control (see Appendix D; Tangney, Baumeister, & Boone, 2004). Reliabilities in past studies have been high, $\alpha = .83$ (Tangney et al., 2004). Reliability in the current study was also .83. I used a face valid measure of dieting self-confidence consisting of three items rated on a 7-point Likert Scale where higher numbers represent more confidence. Example items included, "I usually feel confident in my ability to manage my weight, and "I feel positive about my ability to manage my weight." Reliability in the current study was .80.

Assessment of Dieting History and Demographics

I also assessed dieting history and general demographic information (see Appendix E). The dieting history is an adapted version of Blokstra and colleagues' weight loss practices scale (Blokstra, Burns, & Seidell, 1999). Example items include, "Are you trying to do something about your weight at the moment?" and "How many times did you start a weight reducing diet in the last year?" Additional items regarding weight history included questions about family history of obesity, whether they are currently dieting, current weight and height (which will be used to calculate a Body Mass Index BMI) and ideal weight. Demographic questions assessed race, age, gender, and socio-economic status.

Time 2 Measures

At time two, I assessed implicit theories of weight management again for test re-test reliability. In addition, a one-item self-report achievement measure was used to assess success on the goal set at time one. The item states, “How well do you think that you did in achieving this goal?” rated on a 6-point Likert-type scale with 1 “very poorly” to 6 “very well” (see Appendix F). Additionally, participants’ actual weight was used as a behavioral measure of achievement. Weight from time one was subtracted from weight at time two to get a measure of weight loss. Additionally, at time 2, I included implicit theories measures from additional domains for validity purposes.

Results

This dissertation tested hypotheses derived from the Implicit Theory Approach to motivation. I had two main goals in the proposed study. The first was to create the Implicit Theories of Weight Management Scale (ITWM) using past implicit theoretical work as the foundation for the development of the scale. Dweck's items were changed from the intelligence domain to correspond to a body weight management context (see Dweck, 2000). I posited hypotheses regarding the structure of the construct, discriminant and convergent validity, and reliability. My second aim was to extend the Implicit Theory Approach in academic achievement to a novel achievement domain—specifically, dieting motivation. I proposed hypotheses about the relation between implicit theories of weight management and regulatory strategies, attributions, goal-setting, and achievement.

Analysis Strategy

I conducted analyses to investigate psychometric properties of the scales as well as the theoretical underpinnings of the implicit theory approach. I used confirmatory factor analysis with structural equation modeling to test if entity and incremental items load on one factor or load on two highly negatively correlated factors. For convergent and discriminant validity, I reported correlations among constructs. I used hierarchical linear modeling to test relations between implicit theories of weight management and regulatory strategies, coping, attributions, goal-setting, and achievement. For each

regression analysis, unless otherwise noted, the first step of the model included dieting self-confidence and trait self-control and the second step included implicit theories of weight management. For mediational analyses, I employed the standard regression approach recommended by Kenny, Kashy, & Bolger (1998). For all analyses using linear regression, the standardized regression coefficient (β) was reported unless otherwise stated.

Participants' Weight Management Background

Prior to testing hypotheses, I explored the dieting status of participants and examined potential differences based on BMI. I assessed how often participants had dieted in the last year (41% of participants had not dieted, 28% had started a dieting program once in the last year, 26.5% had started a dieting program 2-3 times in the last year, and 5% had dieted 4 times or more) and participants' current dieting status (50% of participants indicated that they were trying to currently lose weight, 11% gain weight, 22% stay the same, and 17% indicated they were doing nothing about their weight).

I calculated individuals' BMI by converting height and weight from the original unit of measure into metric units. An individual's BMI is their weight in kilograms divided by their height in meters. Using a continuous measure of participants' BMI ($M = 24.35$, $SD = 5.25$), I explored relations between BMI, dieting status, race, and sex. To explore if individuals with higher BMIs dieted more often, I used a 4-way ANOVA (trying to lose weight, trying to gain weight, stay the same, and doing nothing) with Tukey post-hoc tests to examine if dieting status predicted BMI. Results revealed a significant effect of dieting status on BMI, $F(3,178) = 11.09$, $p < .001$. Post-hoc tests

revealed that individuals trying to lose weight had significantly higher BMIs ($M = 26.47$) than individuals trying to gain weight ($M = 21.73$), individuals trying to stay the same weight ($M = 22.02$), and individuals doing nothing about their weight ($M = 23.31$). The means for individuals trying to gain weight, stay the same weight, or do nothing about their weight fell intermediate to and did not differ from each other.

I also examined Blacks, Whites, and Other (this included Hispanics, Asians, and Others) racial groupings' BMI scores to determine if one race had higher or lower BMI scores than another. I used a 3-way ANOVA with the 3-category race variable [White ($N = 82$); Black ($N = 53$), and Other ($N = 35$)] as the predictor and the continuous measure of BMI as dependent variable. Results revealed no significant effect of race on BMI, $F(2, 167) = 1.87, p > .05$. To test for sex differences, I ran a 2-way ANOVA with sex as the predictor and BMI as the outcome; there was no significant effect of sex on BMI, $F(1, 181) = 1.03, p > .05$. After exploring dieting history and potential BMI differences, I examined hypotheses.

Hypothesis 1: Structure of Implicit Theories

Hypothesis 1 stated that individuals vary in their beliefs about the malleability of weight management and that these beliefs can be captured by two facets (entity versus incremental) that can be combined to create a single psychological construct. I postulated that although two factors may emerge, one core construct (implicit theories of weight management) would underlie the variance in the measure (see Snyder & Gangestad, 1986 for review of how two components can sum to create a valid single scale). Often a measure with items worded positively and items worded negatively converge around two

factors. However, these factors are often due to reverse wording rather than indicating a multidimensional scale. A measure with multiple subcomponents can be combined to create a single construct when the factors are highly correlated and theory dictates that one scale is appropriate. With regards to implicit beliefs about the malleability of traits, the entity and incremental frameworks are mutually exclusive alternatives. That is, believing that something can be changed is the logical opposite of believing that it cannot be changed. Dweck and colleagues have demonstrated empirically that individuals disagreeing with the entity belief do in fact hold an incremental theory and do not merely reject an entity view (Dweck, et al., 1995). Thus, I postulated that even though two factors might emerge because entity and incremental items are oppositely worded, these facets could be combined to create a valid and reliable unidimensional scale.

I tested these predictions in a confirmatory factor analysis using structural equation modeling of the Time 1 data. This analysis contrasted two alternative models. The one-factor model assumes that individuals' implicit theories of weight control include both entity thoughts and incremental thoughts, but that these two sets of items all load on a single, bipolar factor. The two-factor model, in contrast, assumes that entity thinking and incremental thinking are separate sub-factors of implicit theories of weight management. Of the available goodness of fit measures, the chi-square is reported as are the Comparative Fit Index (CFI) and the RMSEA. The CFI and RMSEA are scaled differently, with high values for the CFI indicating good fit (.95 has been offered as a threshold) and low values for the RMSEA indicating good fit (.08 and .05).

To compare competing nested models a chi-square difference test was used. I predicted that the two-factor model would best represent the data, and that the two factors would be highly negatively correlated. Results supported hypotheses, revealing that the two-factor structure, $X^2(8) = 28.79, p < .05$; RMSEA = .10.; CFI = .98, had better fit than the one-factor structure, $X^2(9) = 136.38, p < .05$; RMSEA = .88; CFI = .88, (see Table 3).

Table 3

Goodness-of-Fit Statistics for 2 Models of Implicit Theories of Weight Management

<u>Fit Statistic/Index</u>	<u>One Factor</u>	<u>Two Factor</u>
X^2	136.38	28.79
df	9	8
RMSEA	.23	.10
CFI	.88	.98
N	257	257

A chi-square difference test (X^2 difference = 107.59, $df = 1$) revealed that the two-factor model is preferred to a one-factor model, $p < .001$ (see Figure 1). The phi-coefficient for the latent constructs in the two-factor model = $-.63, p < .001$. The correlation between the entity and incremental scales was $r(257) = -.516, p < .05$.

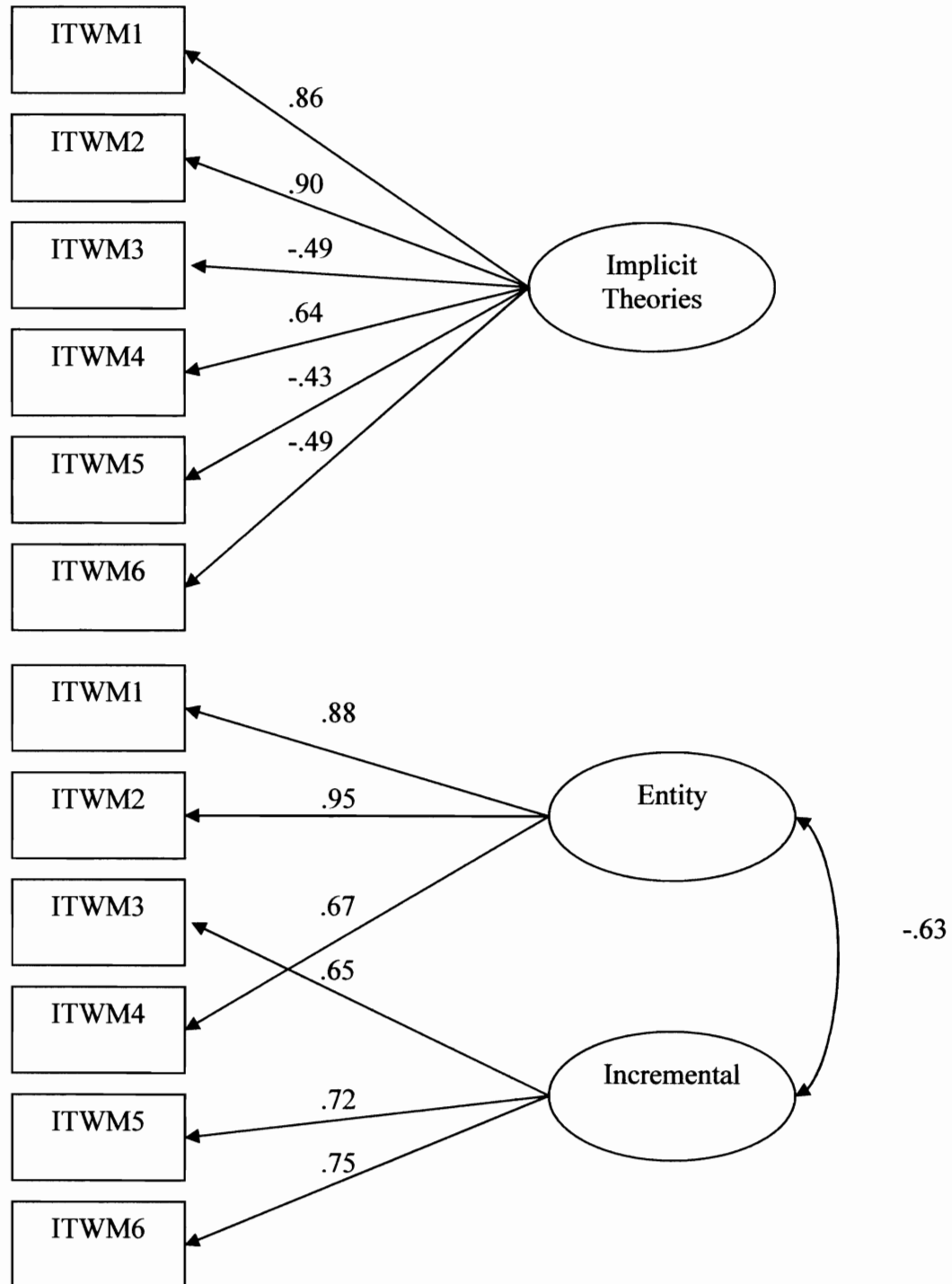
Although a two-factor model emerged, I suggest that this was more an artifact of negatively worded items and that the implicit theories of weight management scale constitutes a single coherent constellation of items that, similar to research on trait self-esteem (see Marsh, 1996), can be used to assess one underlying construct.

Hypotheses 2: Reliability

Based on theoretical predictions and Dweck's past work in the academic and personality domains, I created a unidimensional scale using the 3 items that loaded on the entity factor and the 3 items that loaded on the incremental factor. Incremental items

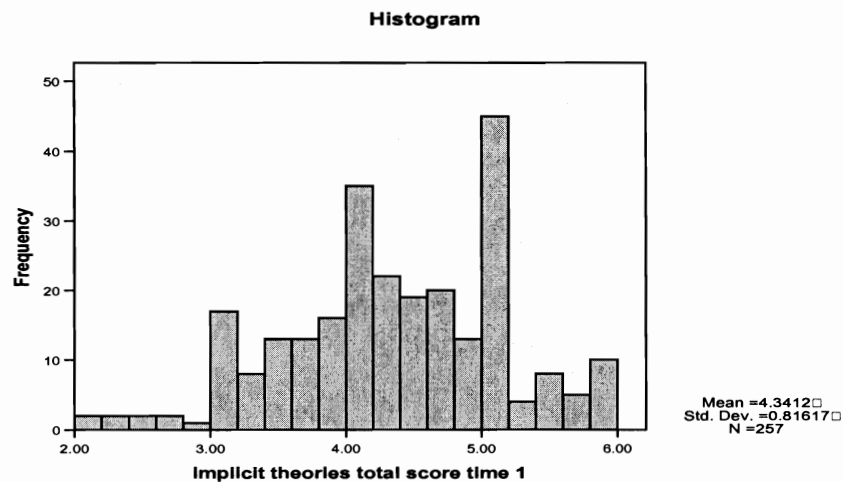
Figure 1

CFA for 1-Factor and 2-Factor Models



were reversed scored so that higher numbers indicated more incremental beliefs ($M = 4.34$, $SD = 0.82$). The Kolmogorov-Smirnov test of normality (257) = .070, $p < .01$ was significant indicating that the scale may not be normally distributed. However, because the Kolmogorov-Smirnov test is more likely to be significant with a larger sample size, I also used the ratio of kurtosis and skewness to its standard error as an additional test of normality (normality is rejected if the ratio is less than -2 or greater than +2; Cohen, Cohen, West, & Aiken, 2003). Using this method, the implicit theories scale did not have significant skewness, (ratio = -1.67) or significant kurtosis (ratio = -.44; see Figure 2).

Figure 2. *Examining the normality of the implicit theories of weight management scale.*



Hypothesis 2 maintained that the implicit theories weight management scale with the combined factors would be reliable, both internally and temporally. Results revealed good internal consistency using the 6 items derived from Dweck's work. The 6-item scale was internally consistent, as indicated by the Cronbach's alpha of .82. The psychometric

adequacy of the scale was further confirmed through subsequent analyses of the item-to-total correlations, and a review of the change in internal consistency when one of the 6 items was deleted from the scale. These analyses, which are summarized in Table 4, indicate that deleting any of the 6 items from the scale resulted in reduced reliability (see Table 5 for item correlations). Additionally, the item-to-total correlations for the 6 items ranged from .50 to .69 ($M = .58$). The measure was moderately temporally consistent, with a correlation between ITWMS score at time one and time 2 of .53 ($N = 128$).

Table 4

Reliability of Implicit Theories of Weight Management Scale with Dweck's 6 items

Item	Reliability if Item Dropped	Item-Total Correlation	M	SD
1. ITWM 1	.77	.66	4.16	1.30
2. ITWM 2	.76	.69	4.37	1.23
3. ITWM 3R	.80	.57	4.28	1.19
4. ITWM 4	.80	.52	4.93	.957
5. ITWM 5R	.80	.50	4.12	1.07
6. ITWM 6R	.80	.55	4.20	1.01

$N = 257$, overall reliability = .82; Note: Incremental items (3,5,6) are reverse scored.

Table 5

Inter-Item Correlation Matrix

Item	1	2	3	4	5	6
1. ITWM 1	--					
2. ITWM 2	.79	--				
3. ITWM 3R	.40	.38	--			
4. ITWM 4	.47	.57	.36	--		
5. ITWM 5R	.30	.34	.44	.31	--	
6. ITWM 6R	.40	.38	.41	.37	.51	--

$N = 257$, overall reliability = .82; Note: Incremental items (3,5,6) are reverse scored.

Hypotheses 3 and 4: Validity

Does the ITWMS actually measure people's implicit beliefs about their weight and its management? Hypothesis 3 suggests that, because individuals with high scores on the ITWMS tend to think that weight is changeable, scores on the ITWMS should be positively correlated with a general internal health locus of control and especially with an internal dieting locus of control but that higher scores on the ITWMS should be negatively correlated with external locus of control dieting beliefs. Additionally, individuals with higher scores in the domain of weight management are likely to have higher score on implicit theories in other achievement domains such as personality and intelligence. However, because Dweck and her colleagues have claimed that implicit theories are domain specific (see Dweck et al.,1995), implicit theories of body weight should be only mildly related to implicit theories in other domains. Hypothesis 4, in contrast, suggests that beliefs about the malleability of body-weight should not be related to general personality traits such as the Big Five or trait optimism.

Analyses supported hypotheses. Consistent with hypothesis 3, as shown in Table 6 and 7, moderately positive correlations were observed between ITWM and health internal locus of control (HLC), internal dieting beliefs (IDBS), and implicit theories of personality and intelligence. Believing more strongly that weight is malleable was related to (a) more internal locus of control beliefs about health and dieting and (b) believing more strongly that intelligence and personality are changeable traits. A negative correlation was observed between ITWM and the total external dieting beliefs subscale (TEDBS).

Table 6

Convergent Validity Correlation Matrix

Measure	1	2	3	4
1. ITWM	--			
2. HLC	.139*	--		
3. IDBS	.180**	.261***	--	
4. TEDBS	-.333***	-.081	.146*	--

$N = 257$, * $p < .05$, ** $p < .01$, *** $p < .001$

(ITWM = implicit theories of weight management; HLC = general health locus of control measure; IDBS = internal dieting beliefs scale; TEDBS = the total external dieting beliefs scale using both external subscales).

Table 7

Convergent Validity Correlation Matrix: Implicit Theories

Measure	1	2	3
1. ITWM	--		
2. Personality	.258**	--	
3. Intelligence	.224**	.119	

$N = 129$, * $p < .05$, ** $p < .01$, *** $p < .001$

Hypothesis 4 stated that there would be small to negligible correlations between implicit theories of weight management and personality constructs (i.e., trait optimism, Big Five). Consistent with the discriminant validity hypothesis, implicit theories of weight management were not related to the Big Five dimensions of personality or trait optimism (see Table 8).

Table 8

Discriminant Validity Correlation Matrix: Personality Traits (Big Five & Optimism)

Measure	1	2	3	4	5	6	7
1. ITWM	--						
2. Agreeableness	.004	--					
3. Consciousness	.079	.257***	--				
4. Neuroticism	-.014	-.389***	-.297***	--			
5. Extroversion	.108	.214**	.063	-.095	--		
6. Openness	-.063	.286***	.163*	-.114	.043	--	
7. Optimism	-.033	.280***	.215**	-.305***	.179**	.182*	--

$N = 257$, * $p < .05$, ** $p < .01$, *** $p < .001$

I also examined construct validity using 4 items added to the implicit theories of weight management scale (see Appendix A, items 7-10). These items were included for two reasons, (a) first, to provide additional items that could be used to lengthen the scale and thereby increase both its content generality and internal consistency and (b) to provide a means of corroborating the conceptual interpretation of the items offered by Dweck's implicit theories model. The correlations among these 4 items and ITWM, shown in Table 9, suggest that the implicit theories scale is minimally related to the items assessing beliefs about weight being based on genetics (item 7 and 8) and more strongly correlated to items assessing whether body-weight is malleable (item 9 and 10).

Table 9

Construct Validity Correlation Matrix

Measure	1	2	3	4	5
1. ITWM	--				
2. item 7	.189**	--			
3. item 8	-.132*	-.042	--		
4. item 9	.379***	.174*	-.032	--	
5. item 10	-.321***	-.083	.137*	-.155*	--

$N = 257$, * $p < .05$, ** $p < .01$, *** $p < .001$

Significantly, the 4 items did not add to the psychometric adequacy of the original 6-item scale. When the 4 items were added to the implicit theories of weight management scale, overall reliability of the scale dropped from $\alpha = .82$ to $\alpha = .77$. Additionally, the item-to-total correlations for the 4 items ranged from .14 to .38 with an average of .27 compared to the average item-to-total correlation of .58 for the original 6 items.

In scale construction, reliability and validity are especially critical to establish before drawing conclusions about relations with other variables (see Cronbach, Gleser, Nanda, & Rajaratnam, 1972; John & Benet Martinez, 2000). Thus, the first step of the dissertation was to establish a reliable and valid implicit theory of weight management scale. I created one scale for implicit theories of weight management that combined the two facets of entity and incremental beliefs. The scale had good internal reliability but rather low temporal reliability. Additionally, for convergent validity, in support of predictions, implicit theories of weight management were moderately related to locus of control and implicit theories in other domains in the expected direction with higher scores being positively related to internal control and incremental theories, and negatively to external control. For discriminant validity, results revealed that implicit theories are not related to the Big Five personality dimensions or trait optimism (see Table 10 for summary of all measures used for validity testing).

After development of the implicit theories of weight management scale, the second goal of the current study was to examine how implicit beliefs about body-weight influence motivation with a focus on emotions, attributions, and regulatory behaviors. Before examining how implicit theories influence key outcome variables, I explored if variations in BMI, race, or sex predicted different beliefs about body weight management. I first calculated individuals' BMI ($M=24.35$, $SD=5.2$) and using the National Institute of Mental Health recommendation, I then categorized individuals (18.499 or lower = underweight, $18.5-24.99$ = average weight, $25-29.99$ = overweight,

Table 10

Measures for Validity and Control Constructs

<u>Measure</u>	<u>N</u>	<u>Mean</u>	<u>SD</u>	<u># of Items</u>	<u>Range</u>	<u>Alpha</u>
1. Health LOC	257	3.81	.549	6	2-5 (3)	.72
2. Dieting Beliefs Internal	256	4.46	.791	5	2.2-7 (4.8)	.67
3. Dieting Beliefs External	256	2.98	.652	7	1.29-4.57 (3.29)	.55
4. Big Five: Openness	257	6.83	1.15	8	3-9 (6)	.80
5. Neuroticism	257	4.57	1.31	8	1.13-8.25 (7.13)	.75
6. Consciousness	257	6.24	1.21	8	3.25-9 (5.75)	.78
7. Extroversion	257	5.64	1.64	8	1.13-8.75 (7.63)	.88
8. Agreeableness	257	7.22	1.01	8	3.13-8.88 (5.75)	.76
9. Trait Optimism	256	3.60	.714	4	1.5-5 (3.50)	.58
10. Intelligence (IT)	129	4.62	1.10	3	2-6 (4)	.91
11. Personality (IT)	129	3.49	1.11	3	1-6 (5)	.92
12. Self-Confidence	257	4.79	1.32	3	1.5-5 (3)	.80
13. Trait Self-Control	257	2.95	.690	13	1.54-4.85 (3.31)	.83
14. Implicit Theories	257	4.34	.81	6	2-6 (4)	.82
Weight Management						

and 30 or higher = obese). Using this categorization process 2.7% of participants were underweight, 43.6% were average weight, 16.3% overweight, and 6.8% were categorized as obese; 30.7% were missing data. A one-way ANOVA indicated that ITWM scores differed across the weight categories; $F(2, 179) = 3.76, p < .05$. Individuals categorized as underweight differed significantly from individuals categorized as overweight and obese by LDS posthoc test; the means were 3.3, 4.3 and 4.5 respectively. The mean for individuals who were average weight ($M = 3.9$) fell intermediate to and did not differ from the other groups. The three groups (average, overweight, obese) did not differ significantly from each other. In summary, individuals who were underweight were more likely to believe that weight was a fixed entity. Due to the significant difference with individuals categorized as underweight ($N = 7$ at time 1 and $N = 2$ at time 2), these participants were excluded from subsequent analyses that explored hypotheses about implicit theories of weight management. The final sample size was thus 257 at time 1 and 129 at time 2.

I also tested the effects of sex and race on both implicit theories and key predictors. Neither sex nor race differences have been found to be related to endorsement of implicit theories in domains outside of dieting. However, research suggests that women compared to men have been shown to be more likely to be concerned with their weight and often express more body consciousness (Rolls, Fedoroff, & Guthrie, 1991; Tiggemann & Rothblum, 1988), and thus may differ in their implicit beliefs about weight. Because research on implicit theories of dieting is rather new, I explored differences for both sex and race. Neither sex nor race had an effect on endorsement of

implicit beliefs of weight management. A 2 (Male/Female) X 3 (White/Black/Other) ANOVA indicated that ITWM scores do not differ across the 3 race categories, $F(2, 236) = .69, p > .05$, or across sex, $F(1, 236) = .69, p > .05$. The interaction $F(2, 236) = .77, p > .05$ was also not significant. Additionally, sex and race had no significant effect on key outcome variables (e.g., regulation, coping, affect) when included in the full model. Sex and race were therefore excluded from subsequent analyses. The following analyses used hierarchical regression to explore how implicit theories of weight management influence affect, cognition, and behavior above and beyond constructs related to health behaviors (i.e., dieting self-confidence, trait self control).

Hypothesis 5: Implicit Theories, Helplessness, Optimism, and Negative Affect

Are people who consider their weight to be something that can be changed more optimistic? In contrast, do those who feel more strongly that their weight is fixed express greater helplessness and negative affect after a dieting setback? Hypothesis 5 stated that higher scores on the implicit theories scale (which indicates greater incremental beliefs) would be positively related to optimism but negatively related to negative affect, especially helplessness. To test this hypothesis, I created one scale of negative affect and additionally, based on past research indicating the link between implicit theories and helplessness, I analyzed a one-item measure of feelings of helplessness. I also included feelings of optimism about future dieting following a setback building on Dweck's work linking implicit theories to feelings of optimism (Dweck, 2000). I conducted three hierarchical regressions with the total affect scale, helplessness, and optimism as the criterion variables and implicit theories as the predictor variable controlling for dieting

self confidence and trait self-control in step 1. For the total affect scale, there was a significant effect at step 1, $F(2, 253) = 7.98$, $R^2 = .059$, $p < .05$, but implicit theories did not account for a significant proportion of variance at step 2, $R^2 \Delta = .001$, $F\text{-change}(1, 252) = .216$, $p > .05$. Trait self-control ($\beta = -.113$, $t(253) = 1.8$, $p = .073$) and dieting self-confidence ($\beta = -.185$, $t(253) = -2.92$, $p < .05$) influenced negative affect. Individuals with greater self-confidence and, to a marginal degree, more trait self-control reported less negative affect following a dieting setback.

Next, I regressed the feeling of helplessness item on implicit theories. There was a significant effect at step 1, $F(2, 253) = 5.88$, $R^2 = .044$, $p < .05$, and implicit theories contributed additional variance at step 2, $R^2 \Delta = .03$, $F\text{-change}(1, 252) = 7.16$, $p < .05$. Implicit theories were related to feelings of helplessness following a setback, $\beta = -.163$, $t(252) = -2.68$, $p < .05$ even with trait self-control, $\beta = -.125$, $t(252) = 1.97$, $p = .05$, and dieting self-confidence, $\beta = -.131$, $t(252) = -2.07$, $p < .05$ in the model. Individuals with greater self-confidence, greater trait self-control, and more incremental beliefs regarding weight management reported lower feelings of helplessness following a dieting setback.

Next, I used optimism about future dieting as the outcome variable. In Step 1, I simultaneously regressed optimism onto trait self-control and dieting self-confidence. In Step 2, I regressed optimism onto implicit theories of weight management. There was a significant effect at step 1, $F(2, 254) = 14.54$, $R^2 = .10$, $p < .05$, and implicit theories added additional variance at step 2, $R^2 \Delta = .026$, $F\text{-change}(1, 253) = 7.56$, $p < .05$. Implicit theories influenced optimism about future dieting following a setback, $\beta = .161$, $t(253) = 2.75$, $p < .05$ even with trait self-control, $\beta = .088$, $t(253) = 1.44$, $p > .05$, and

dieting self-confidence, $\beta = .280$, $t(253) = 4.59$, $p < .001$ in the model. Individuals who believe more strongly that weight is changeable and who have greater dieting self-confidence are more likely to express optimism about future dieting following a setback.

Hypothesis 6: Implicit Theories and Attributions

Do individuals who believe more strongly that weight is changeable explain setbacks by attributing them to lack of effort? Do individuals who believe that weight is fixed explain dieting setbacks with attributions that focus on lack of ability? Hypothesis 6 predicted that higher scores on the implicit theory measure (more incremental beliefs) would be negatively related to ability attributions and positively related to effort attributions. Two items in the attribution scale pertained to effort ($r = .45$) and were combined to create an effort scale. Two items from the attribution scale pertained to ability ($r = .52$) and were combined to create a scale for ability attributions. For effort attributions there was a significant effect at step 1, $F(2, 254) = 16.17$, $R^2 = .113$, $p < .01$ with trait self-control, $\beta = -.274$, $t(254) = -4.45$, $p < .001$ and dieting self-confidence, $\beta = -.131$, $t(254) = -2.12$, $p < .05$ as significant predictors. However, implicit theories failed to account for a significant proportion of variance at step 2, $R^2 \Delta = .001$, $F\text{-change}(1, 253) = .265$, $p > .05$. Having greater self-confidence in dieting and greater trait self-control was related to more disagreement with lack of effort as a reason for the dieting setback. For ability attributions, there was a significant effect at step 1, $F(2, 254) = 32.07$, $R^2 = .202$, $p < .01$ with trait self-control, $\beta = -.192$, $t(254) = -3.34$, $p < .01$ and dieting self-confidence, $\beta = -.353$, $t(253) = -6.07$, $p < .001$ as significant predictors. However, implicit theories failed to account for a significant proportion of variance at step 2, $R^2 \Delta =$

.004, F -change (1, 253) = 1.33, $p > .05$. Having greater self-confidence in dieting and greater trait self-control was negatively associated with ascribing a dieting setback to lack of ability. However, results revealed that implicit theories are not predictors of effort or ability attributions for dieting setbacks.

Hypothesis 7: Implicit Theories, Self-Regulatory Strategies, and Coping

Is believing more strongly that weight is fixed linked to more adaptive regulatory strategies and lower use of maladaptive coping? Hypothesis 7 stated that higher scores on the implicit theories scale (greater incremental beliefs) would be positively related to the use of mastery strategies that reflect attempts to solve the problem and grow from setbacks and would be negatively related to maladaptive coping such as avoidance. Adapting measures from Dweck (2000) and Ommundsen (2001), I assessed positive regulatory strategies such as advice-seeking and increased effort, as well as ineffective regulation (i.e., avoidance). I used exploratory factor analysis (EFA) to arrive at a more parsimonious conceptual understanding of the measures. That is, I used EFA to identify the latent variables which were contributing to the common variance in a set of measured variables (see Fabrigar, Wegener, MacCallum, & Strahan, 1999 for a review). EFA was used as opposed to confirmatory factor analysis because I had no a-priori predictions about the number of factors or patterns of loadings. After deciding on exploratory factor analysis, there were a number of decisions to make including the specific procedure to fit the model and a method for rotating the factor analytic solution (Finch & West, 1997). Based on Fabrigar's and colleagues (1999) recommendation, I used maximum likelihood

extraction with oblique rotations (see Fabrigar, Wegener, MacCallum, & Strahan, 1999 for a review)³.

A maximum likelihood factor analysis of participants' responses to the regulatory items, with oblique rotations, yielded a 3-factor solution that accounted for 56.3% of the total variance. The eigenvalues for factors 1, 2, and 3 were 2.5, 1.9, and 1.2 respectively. Inspection of the factor loadings suggests that the items loading on factor one pertain to *advice-seeking*. There were two items that loaded positively which included "I would seek the advice of a physical trainer" and "I would seek the advice of a nutritionist." In contrast, items that referred to *motivational strategies* loaded on the second factor: "I would have found different ways to be more motivated to exercise" and "I would have started planning how to improve motivation to adhere to a dieting program." Items loading on factor 3 pertained to *avoidance*. Example items included, "I would have tried an easier weight-management program," "I would have given up on dieting all together," and "I would have avoided weighing myself for sometime." Two questions did not load on a factor and were analyzed individually. These items included, "I would have exerted more effort to adhere to an exercising program," and "I would feel anxious about dieting."

Three summary scales were developed, one for advice, one for motivation, and one for avoidance, by averaging together the items with factor loadings of .4 or more on any given factor with Eigen values greater than 1. Higher scores indicate more agreement with increased motivational strategies and seeking advice and more

³ Note: Results were almost identical using a number of procedures including EFA with principle factors and oblique rotation, or principle components with varimax rotations.

disagreement with avoidance. In essence, higher numbers mean more effective self-regulation. The resulting *advice scale* included 2 items that were correlated at .79. The resulting *motivation scale* had 2 items correlated at .47. The resulting *avoidance scale* consisted of 4 items with a Cronbach alpha of .59. The low reliabilities and correlations for the measures are of concern considering the reliability of a measure constrains how strongly that measure can correlate with an external criterion (John & Benet-Martinez, 2000). For example, for a scale with a reliability of .60 the expected upper limit of a correlation is .77. Thus, the true correlation between regulation strategies and implicit beliefs may be attenuated and the following results may be underestimated.

I used 3 hierarchical linear regression analyses to assess the role of implicit theories of weight management in predicting self-regulation (i.e., advice-seeking, motivation, effort, and avoidance). To assess if implicit theories are related to self-regulation above and beyond trait self-control and dieting self-confidence these 2 constructs were entered in the first step of the model and ITWMS scores were entered in the second step.

I first tested whether implicit theories were related to advice-seeking following a setback. There was no significant effect at step 1, $F(2, 254) = .133$, $R^2 = .01$, $p > .05$, and implicit theories failed to add additional variance at step 2, $R^2 \Delta = -.001$, $F\text{-change}(1, 253) = .064$, $p > .05$. To test if implicit theories were related to motivational regulatory strategies, I regressed motivation strategies on implicit theories with trait self-control and dieting self-confidence in Step 1 and implicit theories of weight management in Step 2. There was no significant effect at step 1, $F(2, 254) = .540$, $R^2 = .004$, $p > .05$, and

implicit theories failed to account for a significant proportion of variance at step 2, $R^2 \Delta = .004$, $F\text{-change}(1, 253) = 1.01$, $p > .05$. Next, I tested avoidance as the criterion variable with dieting self-confidence and trait self-control in the first step of the model and implicit theories in the second step. Model 1 was significant $F(2, 254) = 10.45$, $R^2 = .076$, $p < .05$, and implicit theories added significant variance above and beyond the predictors in step 1, $F\text{-change}(1, 253) = 4.59$, $R^2 \Delta = .016$, $p < .05$. Implicit theories were related to the tendency to avoid weight-management situations, $\beta = .129$, $t(253) = 2.14$, $p < .05$, with trait self-control, $\beta = .185$, $t(253) = 2.97$, $p < .05$, and dieting self-confidence, $\beta = .153$, $t(253) = 2.46$, $p < .05$ in the model. Even after controlling for the significant effect of dieting self-confidence and trait self-control in predicting avoidance, individuals who believe more strongly that weight is changeable rather than fixed were less likely to respond to a dieting setback with avoidance.

I ran two auxiliary analyses that used the single item questions assessing effort and feeling anxious about dieting as the criterion variable. For the item, "I would have exerted more effort to adhere to an exercising program," Model 1 was not significant, $F(2, 254) = .964$, $R^2 = .000$, $p > .05$, but implicit theories added significant variance in Model 2 above and beyond the predictors in step 1, $F\text{-change}(1, 253) = 6.87$, $R^2 \Delta = .027$, $p < .05$. Implicit theories were related to the tendency to report increasing effort following a setback, $\beta = .163$, $t(253) = 2.62$, $p < .05$, with trait self-control, $\beta = -.023$, $p > .05$, and dieting self-confidence, $\beta = .005$, $p > .05$ in the model. For the item, "I would feel anxious about dieting" Model 1 was significant, $F(2, 253) = 3.41$, $R^2 = .026$, $p < .05$, but implicit theories failed to add significant variance above and beyond the

predictors in step 1. Dieting self-confidence $\beta = .146$, $t(252) = 2.25$, $p < .05$ predicted more disagreement with feeling anxious about future dieting.

Tests of hypotheses 5, 6, and 7 indicate that implicit theories of weight management, as measured by the ITWMS, are related to feelings of helplessness, optimism, regulatory strategies, and coping but not significantly related to attributions. Specifically, individuals with higher scores on the implicit theories of weight management scale reported less avoidant behaviors, increased effort, lower feelings of helplessness, and more optimism following a setback than individuals with lower scores on the implicit theories of weight management scale, even after considering the effect of dieting self-confidence and trait self-control.

Hypothesis 8: The Mediating Role of Attributions, Helplessness, and Optimism

Why do individuals who believe more strongly that weight is fixed exhibit maladaptive coping? Is it because they think that failures are due to lack of ability and ability is a fixed trait. Is it due to feelings of helplessness and lack of optimism about future success? Based on Hong and colleagues (Hong et al., 1999) research, I predicted that the relation between implicit theories and maladaptive regulation was due to individuals making more ability attributions and less effort attributions. I also examined feelings of helplessness and optimism as potential mediators in the implicit theories regulatory link.

I analyzed the proposed mediation predictions in hypothesis 8 using Kenny, Kashy, and Bolger's (1998) recommended approach to mediation in hierarchical regression (see also Barron & Kenny, 1986). Specifically, mediation can be established

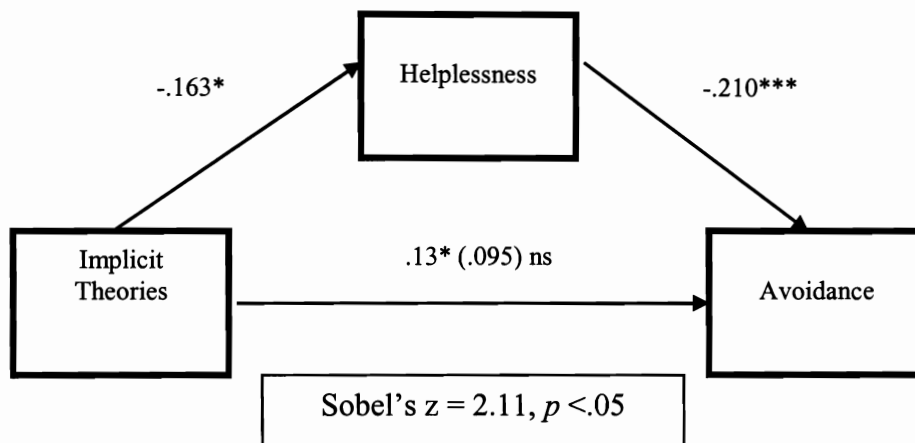
by demonstrating that (a) there is a direct effect of the predictor variable (implicit theories) on the criterion variable (regulatory strategies); (b) there is a significant effect of the predictor variable (implicit theories) on the proposed mediator (attributions); (c) the proposed mediator is related to the criterion variable even when controlling for the predictor variable; and (d) the magnitude of the relationship between the predictor variable and the criterion variable is reduced when the mediator is entered prior to the predictor variable in the regression analysis. In the above steps any control variables (e.g., trait self-control) were entered in the first step.

Contrary to the prediction that attributions mediate the implicit theories regulation link, step (b) establishing a relation between the predictor and the mediator was not significant and therefore mediation could not be established. Implicit theories failed to add variance to the second step of the model with effort attributions as the outcome variable, $R^2 \Delta = .001$, $F\text{-change}(1, 253) = .265$, $p > .05$, and with ability attributions as the criterion variable, $R^2 \Delta = .004$, $F\text{-change}(1, 253) = 1.33$, $p > .05$. Although implicit theories failed to predict effort or ability attributions for dieting setbacks, building on Dweck's (2000) work, I also explored the mediating role of feelings of helplessness and optimism in the implicit theories avoidance link.

Following the recommended steps for mediation, with helplessness as a mediator in the implicit theory avoidant relation, in step (a) I entered the two control variables of dieting self-confidence and trait self-control first, and then entered implicit theories in the second step of the regression equation with avoidance as the outcome variable. In the second step, implicit theories accounted for a significant proportion of variance in

avoidance behaviors; $\beta = .13$, $t(253) = 2.14$, $p < .05$. In step (b) of the mediation, to demonstrate that implicit theories were significantly related to helplessness, I entered the two control variables of dieting self-confidence and trait self-control first, and then entered implicit theories. The relation between implicit theories and helplessness was significant; $\beta = -.163$, $t(252) = -2.68$, $p < .05$. More incremental beliefs were related to lower feelings of helplessness. I then completed steps (c) and (d) in a single regression analysis that revealed that the mediator (helplessness) accounted for unique variance in avoidance above and beyond implicit theories, $\beta = -.210$, $t(251) = -3.44$, $p < .001$ (higher numbers mean more feelings of helplessness and more disagreement with using avoidance strategies). As feelings of helplessness increased, individuals were more likely to agree with using avoidance to cope with setbacks. That is, with implicit theories, dieting self-confidence, and trait self-control in the model greater feelings of helplessness predicted more avoidance. When the variance accounted for by helplessness (mediator) was partialled, the association between implicit theories and avoidance was significantly reduced, $\beta = .095$, ns; Sobel $z = 2.11$, $p < .05$ (see Figure 3; Sobel, 1982). The effects of trait self-control $\beta = .160$, $t(251) = 2.58$, $p < .05$, and dieting self-confidence $\beta = .125$, $t(251) = 2.00$, $p < .05$ remained significant. In summary, results from the mediation analysis revealed that increased feelings of helplessness predicted greater avoidance strategies which in turn mediated the link between implicit theories and avoidance.

Figure 3. Examining whether helplessness mediates the association of implicit theories and avoidance.

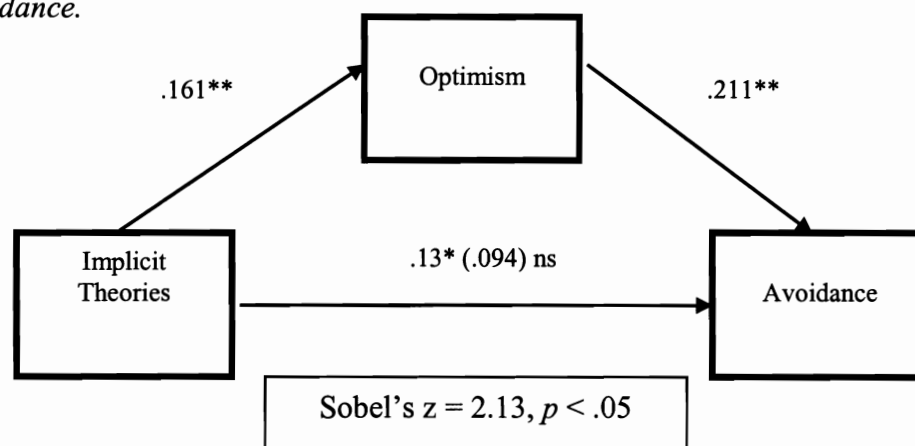


Note. The values in the figure represent standardized regression coefficients. The coefficient in parentheses represents the association of implicit theories with avoidance when the variance from helplessness is partialled.

To test feelings of optimism as an additional mediator in the implicit theories-regulation link, in step (a) I entered the two control variables of dieting self-confidence and trait self-control first, and then entered implicit theories in the second step of the regression equation. In the second step, implicit theories accounted for a significant proportion of variance in avoidance behaviors; $\beta = .13, t(253) = 2.14, p < .05$. In step (b) of the mediation, to demonstrate that implicit theories were significantly related to optimism, I entered the two control variables of dieting self-confidence and trait self-control first, and then entered implicit theories in step 2. Implicit theories influenced

optimism about future dieting following a setback, $\beta = .161$, $t(252) = 2.75$, $p < .05$. I then completed steps (c) and (d) in a single regression analysis that revealed that the mediator (optimism) $\beta = .211$, $t(252) = 3.36$, $p < .01$ accounted for unique variance in avoidance above and beyond implicit theories, dieting self-confidence, and trait self-control. Specifically, as feelings of optimism increased, disagreement with avoidance strategies increased. That is, greater feelings of optimism predicted less avoidant behaviors. When the variance accounted for by optimism (mediator) was partialled, the association between implicit theories and avoidance was significantly reduced and became non-significant, $\beta = .094$, ns; Sobel $z = 2.03$, $p < .05$ (see Figure 4). Trait self-control was significant, $p < .05$, and dieting self-confidence became non-significant, $p > .05$.

Figure 4. *Examining whether optimism mediates the association of implicit theories and avoidance.*



Note. The values in the figure represent standardized regression coefficients. The coefficient in parentheses represents the association of the implicit theories with avoidance when the variance from optimism is partialled.

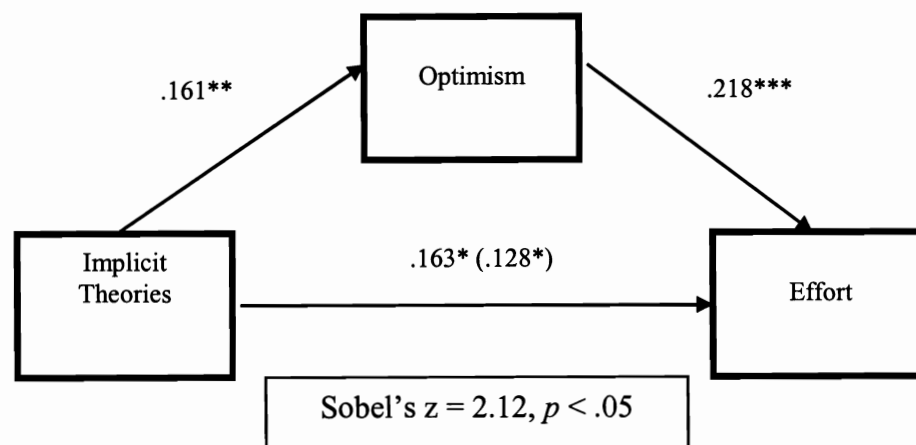
In summary, results from the mediation analysis revealed that optimism predicted less avoidance which mediated the link between implicit theories and avoidance.

Additionally, as an exploratory analysis, I also examined the mediating role of helplessness and optimism in the link between implicit theories and the one-item effort regulatory measure. Following the recommended steps for mediation with helplessness as the potential mediator, in step (a) I entered the two control variables of dieting self-confidence and trait self-control first, and then entered implicit theories in the second step of the regression equation with the one-item effort regulation measure as the outcome variable. In the second step, implicit theories accounted for a significant proportion of variance in increased effort $\beta = .163$, $t(253) = 2.62$, $p < .01$. In step (b) of the mediation, to demonstrate that implicit theories were significantly related to helplessness, I entered the two control variables of dieting self-confidence and trait self-control first, and then entered implicit theories. The relation between implicit theories and helplessness was significant; $\beta = -.163$, $t(252) = -2.68$, $p < .05$. I then completed steps (c) and (d) in a single regression analysis that revealed that the mediator (helplessness) was not related to effort strategies, $\beta = -.006$, $t(251) = -.099$, $p > .05$. Results revealed that helplessness does not mediate the implicit theories-effort relation.

To test feelings of optimism as an additional mediator in the implicit theories-effort regulation link, in step (a) I entered the two control variables of dieting self-confidence and trait self-control first, and then entered implicit theories in the second step of the regression equation. In the second step, implicit theories accounted for a significant proportion of variance in effort; $\beta = .163$, $t(253) = 2.62$, $p < .05$. In step (b) of the

mediation, to demonstrate that implicit theories were significantly related to optimism, I entered the two control variables of dieting self-confidence and trait self-control first, and then entered implicit theories in step 2. Implicit theories influenced optimism about future dieting following a setback, $\beta = .161$ $t(253) = 2.75$, $p < .01$. I then completed steps (c) and (d) in a single regression analysis that revealed that the mediator (optimism), $\beta = .218$ $t(252) = 3.35$, $p < .05$, accounted for unique variance in effort above and beyond implicit theories, dieting self-confidence, and trait self-control. As feelings of optimism increased, effort increased. When the variance accounted for by optimism (mediator) was partialled, the association between implicit theories and effort was significantly reduced but remained significant, $\beta = .128$; Sobel $z = 2.12$, $p < .05$ (see Figure 5). In summary, optimism partially mediated the implicit theories-effort regulations link.

Figure 5. *Examining whether optimism mediates the association of implicit theories and effort regulation.*



Note. The values in the figure represent standardized regression coefficients. The coefficient in parentheses represents the association of the implicit theories with effort when the variance from optimism is partialled.

Auxiliary Hypothesis 9: Implicit Theories and Goals

How do implicit theories of weight management affect motivation prior to outcomes? Are individuals who believe more strongly that weight is malleable more likely to set learning goals and less likely to set performance goals? Hypothesis 9 predicted that implicit theories would be related to goal-setting such that individuals with higher scores on implicit theories of weight management (more incremental beliefs) would indicate more agreement with setting a learning goal and lower agreement with setting a performance goal. Higher numbers indicate more agreement with that type of goal-orientation. Two hierarchical linear regressions were run with trait self-control and dieting self-confidence entered in the first step and implicit theories in the second step with either learning or performance goals as the criterion variable.

When a learning goal was regressed on implicit theories, Step 1 with dieting self-confidence and trait self control in the model was significant, $F(2, 252) = 3.28, p < .05$. Dieting self-confidence predicted more learning oriented goals $\beta = .158, t(252) = 2.44, p < .05$, but trait self control had no effect $p > .05$. Implicit theories, included in Step 2, did not account for a significant proportion of variance, $F\text{-change}(3, 251) = 1.56, p > .05$.

However, when the performance oriented goal item was regressed on implicit theories, there was a significant effect at step 1, $F(2, 251) = 10.97, R^2 = .080, p < .05$, and implicit theories added additional variance at step 2, $R^2 \Delta = .028, F\text{-change}(1, 250) = 7.91, p < .05$. Implicit theories influenced performance-oriented goals, $\beta = .168, t(250) = 2.81, p < .05$ even with trait self-control ($p > .05$) and dieting self-confidence, $\beta = -.246, t(250) = -3.95, p < .05$ in the model. Individuals with higher scores on the implicit

theories scale (indicating more incremental beliefs), in contrast to the hypothesis, were more likely to agree that they would set performance-oriented goals focused on proving ability in contrast to individuals who scored lower on the implicit theories scale (indicating more entity beliefs). Additionally, individuals high in dieting self-confidence were more likely to disagree with setting performance-oriented goals in comparison to individuals low in dieting self-confidence.

Auxiliary Hypothesis 10: Implicit Theories, Achievement, and Goals

What was the relation between beliefs about body weight and actual achievement? Prior to answering this question since achievement was assessed at time 2 and there was high attrition, an important question to answer was whether participants who returned at time 2 differed from those who did not. In order to examine this question, I ran a number of analyses. First, I explored differences in BMI using a one-way ANOVA to examine if those with missing data had higher or lower BMIs than those without. Results were not significant, $F(1, 174) = .475, p < .05$. Additionally, I explored differences in key outcome variables (e.g., performance goals, learning goals, regulatory strategies) using a multivariate ANOVA. Results were not significant; Pillais's trace approximation to the multivariate F-ratio (6, 246) was $.423, p > .05$. After looking at differences based on attrition and finding no significant effect, I examined hypothesis 10.

Does believing more strongly that weight is changeable help individuals feel successful in reaching their goals? Hypothesis 10 stated that implicit theories would influence achievement perceptions and that this relation would be mediated by goal orientation. Contrary to predictions implicit theories did not directly influence

achievement measures (weight change score and self-perceived success) Specifically, with the weight change measure (time 1 weight minus time 2 weight to obtain a “loss” score) as the criterion variable, Step 1 was non-significant $F(2, 79) = .380, R^2 = .010, p > .05$ and implicit theories failed to account for significant variance at step 2, $R^2 \Delta = .016, F\text{-change} (1, 78) = 1.32, p > .05$. With the continuous measure of self-reported achievement as the criterion variable, Step 1 was significant $F(2, 92) = 4.47, R^2 = .089, p < .01$. Dieting self-confidence predicted greater self-reported achievement, $\beta = .309, t(91) = 2.94, p < .01$. However, implicit theories failed to account for significant variance at step 2, $R^2 \Delta = .002, F\text{-change} (1, 91) = .218, p > .05$.

However, a question that remained was whether goals mediated the implicit theories achievement link. Based on Kenny and colleagues’ (1998) work and in the opinion of most though not all analysts, Step 1 (a relation between predictor and outcome) is not required to have mediation as a path from the initial variable to the outcome is implied if Steps 2 and 3 are met. To determine if mediation was present but was perhaps suppressed due to step c being opposite in sign to ab, and based on most analysts asserting that the essential steps in establishing mediation are Steps 2 and 3, I continued with the steps in the mediation analyses even though Step 1 was non-significant (recognizing that mediation was highly unlikely). In step b (regressing the mediator on the predictor), implicit theories significantly influenced the performance goal orientation, $\beta = .168, t(250) = 2.81, p < .01$. I completed steps (c) and (d) in a single regression analysis that revealed that the mediator (performance-oriented goals) accounted for unique variance in achievement, $\beta = .224, t(90) = 2.14, p < .05$. That is,

with implicit theories, dieting self-confidence, and trait self-control in the model greater orientation towards a performance goal predicted greater achievement. When the variance accounted for by performance-oriented goals (mediator) was partialled, the association between implicit theories and achievement was not significantly reduced, $\beta = -.090$ ns; Sobel $z = 1.53$, $p > .05$. The effects of dieting self-confidence $\beta = .379$ $t(90) = 3.38$, $p < .05$ remained significant. In summary, results from the mediational analysis revealed that performance-oriented goals predicted greater achievement but this effect did not serve a mediating function (see Table 11 for descriptives of outcome and control measures; see Table 12 and 13 for correlations among predictor and criterion variables).

Exploratory Analyses

Although not specified in the hypotheses, I explored an additional relevant question building on Dweck's (2000) work suggesting that an entity framework is especially detrimental when individuals are vulnerable (see Legget & Dweck, 1988). For example, in weight management, what happens to achievement for individuals classified as obese? Does weight (e.g., BMI category) moderate the relation between implicit theories and achievement? Obese individuals need to reach their weight-loss goals, yet holding an entity theory may make reaching these goals especially difficult. To test this question, I recoded individuals' BMI classification in order to compare the achievement of individuals classified as overweight or normal to those who were classified as obese. I then used this BMI classification (obese versus other) as a potential moderator of the implicit theories-achievement relation. In accordance with recommendations by Cohen and colleagues, I first centered my continuous predictor variable for interpretation

Table 11

Descriptive Information for Key Outcomes and Control Construct Measures

<u>Measure</u>	<u>N</u>	<u>Mean</u>	<u>SD</u>	<u># of Items</u>	<u>Range</u>	<u>Alpha</u>
1. Helplessness	257	4.02	1.31	1	1-7 (6)	n/a
2. Optimism Future Dieting	257	4.02	1.03	3	1-6 (5)	.87
3. General Negative Affect	256	2.82	1.10	5	1-5 (4)	.87
4. Effort Attributions	257	4.33	1.25	2	1-7 (6)	n/a
5. Ability Attributions	257	3.83	1.21	2	1-7 (6)	n/a
6. Motivation Regulation	257	4.77	.890	3	1-6 (5)	n/a
7. Advice Seeking	257	4.29	1.29	2	1-6 (5)	n/a
8. Effort Regulation	257	4.62	1.11	1	1-6 (5)	n/a
9. Avoidance Coping	257	3.91	.886	4	1-6 (5)	.57
10. Learning Goals	255	4.73	1.25	1	1-6 (5)	n/a
11. Performance Goals	254	3.04	1.53	1	1-6 (5)	n/a
12. Achievement	95	3.74	1.23	1	1-6 (5)	n/a
13. Weight-Change Score	82	-.922	3.13	n/a	-14 to 4 lbs	n/a
14. Self-Confidence	257	4.79	1.32	3	1.5-5 (3)	.80
15. Trait Self-Control	257	2.95	.690	13	1.54-4.85 (3.31)	.83

Table 12

Correlation Matrix: Implicit Theories, Control Constructs, & Key Significant Outcome Variables

Measure	1	2	3	4	5	6	7
1. ITWM	--						
2. Helplessness	-.170**	--					
3. Dieting Optimism	.169**	-.398***	--				
4. Avoidant Coping	.137*	-.273**	.285***	--			
5. Effort Regulation	.162**	-.032	.216**	.159**	--		
6. Dieting Confidence	.017	-.170**	.308***	.207**	.003	--	
7. Trait Self-Control	.034	-.167**	.171**	.232***	-.015	.276***	--

$p < .05$, ** $p < .01$, *** $p < .001$

Higher numbers indicate more incremental beliefs, more helplessness, more optimism, *less* avoidance, more effort, more dieting self- confidence, and more trait self-control

Table 13

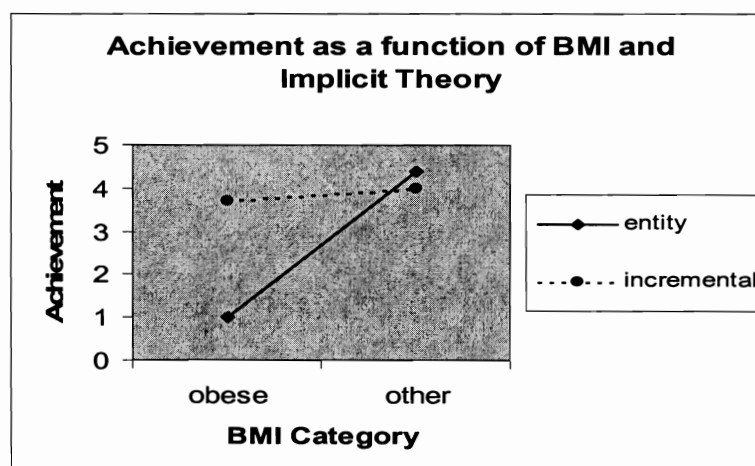
Correlation Matrix: Implicit Theories and Achievement Outcomes

Measure	1	2	3
1. ITWM	--		
2. Change Score Achievement	-.138	--	
3. Self-Reported Achievement	-.082	-.237*	--

* $p < .05$, ** $p < .01$, *** $p < .001$

purposes before creating an interaction term. Then, I regressed the self-reported achievement measure on implicit theories, BMI, and their interaction term with dieting self-confidence and trait self-control in step 1. In these analyses, for nominal or centered variables, I reported the unstandardized regression coefficients and indicate this with “b”. The results of the interaction of BMI with implicit theories are depicted in Figure 6. The implicit theories \times BMI interaction effect was significant $b = 1.15$, $t(70) = 2.71$ $p < .01$, even with dieting self-confidence, $\beta = .312$, $t(70) = 2.84$ $p < .01$, and trait self-control in the model $\beta = .038$, $p > .05$. This analysis also revealed a non-significant effect for BMI, $b = -.305$, $t(70) = -.523$, $p > .05$ but a significant main effect for implicit theories, $b = -1.49$ $t(70) = -2.99$, $p < .01$; individuals who believed more strongly that weight was changeable had lower self-reported achievement scores. Using the behavioral weight change variable as the achievement outcome revealed non-significant results.

Figure 6. *Examining whether BMI moderates the association of implicit theories and self-reported achievement.*



Discussion

The current paper extended implicit theories research to the domain of body-weight management. Drawing from an elaborate theoretical framework on implicit theories and health behavior research, I predicted that (a) individuals differ systematically in their beliefs about the malleability of body weight and (b) these implicit beliefs are related to emotion-regulation, coping, and regulatory strategies following dieting setbacks. To test these hypotheses, I first developed the Implicit Theories of Weight Management Scale and examined its psychometric properties. Results revealed both internal and temporal reliability. Additionally, convergent and discriminant validity tests supported hypotheses revealing that implicit theories of weight management were moderately related to health and dieting locus of control but were distinct from personality dimensions such as the Big Five and trait optimism. Marginal relations emerged between implicit theories of weight management and implicit theories in the domain of intelligence and personality. Once scale development analyses revealed adequate reliability and validity, I examined how implicit theories of weight management were related to dieting motivation. Specifically, I explored two key areas. First, I investigated how varying beliefs about the malleability of body-weight influenced affect, cognition, and behavior following setbacks. Then I examined the relations between implicit theories, goal-orientations, and achievement.

In accordance with past research on implicit theories in other achievement domains (e.g., intelligence; Dweck, 2000; Legget & Dweck, 1988; physical education; Ommundsen, 2001), results revealed that believing more strongly that weight is changeable was related to feeling less helpless and more optimistic about future dieting success following a setback. Additionally, implicit theories were related to regulatory behaviors. Specifically, I found that individuals holding a more incremental view of weight management were less avoidant in the face of adversity and more likely to increase their effort in the future. Additionally, results from the current research demonstrated feelings of helplessness and lower optimism as mechanisms by which believing more strongly that weight is fixed may lead to less adaptive motivational strategies.

In contrast to predictions, implicit theories of weight management were not related to ability or effort attributions following dieting setbacks. Based on the results from the current study, it appears that the implicit theories-regulation strategies link may be mediated by an affective rather than a cognitive process. However, due to the low correlations between the attribution items for ability and effort and because the failures were hypothetical in nature, results should be interpreted with caution. The low correlations for the measures could have attenuated results and the manipulation for failure may not have been strong enough to illicit variance in ability versus effort attributions based on implicit theories. Future research should continue to explore mechanisms by which implicit theories and regulation are related including continuing to look at attributions using more reliable measures and actual failures.

In the current study, implicit theories not only affected regulation but also influenced goal-setting and achievement. In contrast to predictions and past research on implicit theories in the academic achievement domain, results in the current study revealed that greater incremental beliefs led to more agreement with performance goal-orientations. However, the implicit theory-performance goal link could be due to the nature of the one-item measure in the current study that assessed participants' agreement with setting a performance type of goal. Future research should explore further the relation between implicit theories of weight management, goal-orientations, and performance before drawing any conclusions, especially in light of Cury and colleagues recent paper (Cury et al., 2006). They offered modifications to the social-cognitive approach to goal-orientations that uses Elliot's and colleagues' 2 X 2 achievement goal framework (Elliot, 1999; Elliot & McGregor, 2001).

The 2 X 2 achievement goal framework crosses the performance-learning (called mastery in the goal-orientation research) distinction with the approach-avoidance distinction. This framework yields four achievement goals: mastery-approach (focused on attaining task-based competence), performance-approach (focused on attaining normative competence), mastery-avoidance (focused on avoiding task-based incompetence, and performance-avoidance (focused on avoiding normative incompetence). The one-item performance-oriented goal measure used in the current study was not normative in nature and perhaps could have been interpreted as a mastery-approach goal focused on attaining competence. As Cury and colleagues note, "measures that fail to attend to the approach-avoidance distinction often yield results that are difficult to interpret..." (Cury et al., p.

666). Based on Cury and colleagues recent research, future work should use the 2 X 2 approach when examining the links between implicit theories of weight management, goal-orientations, and performance. Additionally, future research should examine in a more intensive longitudinal study actual goal-setting and subsequent achievement.

Interestingly, implicit theories were also related to self-perceived achievement at time 2 based on goals set at time 1 for individuals whose BMI classification was obese. Individuals classified as obese who believed more strongly that weight is a fixed entity reported remarkably lower success on their goals. Although the number of obese individuals who participated in the current study was low, results were exploratory in nature, and results should be interpreted with caution, the findings point to the potential usefulness of studying the impact of implicit theories on the dieting success of obese individuals. Interventions using the implicit theoretical approach may be especially relevant for obese individuals holding an entity theory.

In summary, the findings in the current study illustrate how implicit theories can be applied to understanding motivation in the domain of weight management. Results parallel research in other achievement domains (see Legget & Dweck, 1988) demonstrating the vulnerability created within an entity framework. For example, entity theorists in an intelligence domain report more anxiety and reduced achievement when faced with the challenges of middle school and entity theorists in an athletic domain face similar outcomes after setbacks in physical education classes (see Legget & Dweck, 1988; Ommundsen, 2001). Similarly, entity theorists of weight management exhibited

greater feelings of helplessness and more maladaptive coping following setbacks when compared to more incremental theorists.

Additionally, results point to the importance of continuing to identify mediators and moderators when investigating how meaning systems alter psychological processes. The effects of implicit theories are rarely the simple product of peoples' theories alone (Molden & Dweck, 2006). Rather, implicit theories serve as core assumptions that interact with and relate to domain relevant constructs to predict outcomes. For example, in an academic achievement domain, entity theories are posited to have detrimental effects on self regulation and achievement especially when perceived competence is low, but not when it is high. In contrast, incremental theorists are not easily influenced by competence evaluations (Dweck & Legget, 1988). For example, individuals with highly contingent self-esteem within an entity framework were especially vulnerable to negative feedback (Niiya, Crocker, & Bartmess, 2004). However, incremental theorists' regulation and behavior following a setback were not affected by contingent self-esteem. Similarly, in the current study, more strongly adhering to entity beliefs when coupled with a need to lose weight (e.g., high BMI) rendered individuals vulnerable to failing on their achievement goals. Additionally, implicit theories were indirectly linked to coping and regulatory strategies via feelings of helplessness and reduced optimism about future dieting. In conclusion, the current paper by linking theoretical traditions in the helplessness and achievement literatures to the implicit theories literature can stimulate work on how people's lay theories serve as core beliefs that create a larger meaning system which guides cognition, affect, and behavior in an array of domains.

Limitations & Strengths

I highlight several limitations of the present research. First, like much research in personality and social psychology, the sample was limited to university students in the United States. It seems plausible that there could be cultural differences in adherence to entity versus incremental beliefs of body weight or that the processes identified herein would function differently at younger ages. Future research could explore issues like these. For example, future research could investigate how implicit theories develop, if they are changeable, and how they affect motivation to maintain a healthy weight in adolescence as young adults begin to form beliefs about their body.

A second limitation is that the current research used neither behavioral measures of regulatory strategies nor experimental manipulations of implicit theories. The goal was to establish a valid scale of implicit theories of weight management and to explore initial relations between implicit theories of weight management and motivational patterns. However, the conclusions of the present research would be bolstered by replications employing different methodologies, especially those that could help to solidify causal conclusions. For example, future research could use *Psychology Today* type articles, as Dweck and colleagues (e.g., Hong et al., 1999) have employed, to manipulate entity and incremental beliefs about weight management. Additionally, the low alpha reliabilities for a number of the outcome variables could have attenuated results. Future research should, building on the scales used in the current study, develop more reliable measures of self-regulation and attribution tendencies.

Another limitation was the elapsed time between time 1 and time 2. Two weeks is not adequate to behaviorally assess achievement on weight loss goals. The mean score for weight loss was merely one pound. Future research should conduct a longitudinal study with multiple time periods that span at least 6 months to increase the variance in weight loss. An additional limitation was the potential for measures and procedures at time 1 to impact responses at time 2. To correct for these limitations, future research should use diverse methodological procedures including a more intensive longitudinal study that incorporates a number of follow-up assessments, a longer time period for goal achievement, and actual rather than hypothetical failures.

I also highlight several strengths of the present research. First, it merged ideas derived from research on implicit theories and helplessness theory with health behavior research to identify processes that advance our understanding of motivation in the novel domain of weight-management. To my knowledge, the current study was the first to suggest using the implicit theoretical approach to understanding dieting regulatory strategies and the first to explore the mediating role of helplessness and optimism in the implicit theories-regulatory link. Second, the procedures allowed me to rule out a number of alternative explanations for the findings by controlling for key constructs (e.g., trait self-control, dieting self-confidence) in other theoretical models predicting health behaviors (e.g., social-cognitive theory). The mechanisms at work in the present research are unique from the previously identified effects of dieting self-confidence and trait self-control.

An additional strength of the current research is that it raises a number of avenues for future research in an area of increasing importance—understanding motivation in weight management. As the obesity epidemic continues to be a central societal issue, an implicit theoretical approach to weight management can be used to help individuals effectively manage setbacks and persist in the face of failures. Additionally, implicit theories of weight management research could be extended to understanding stereotypes against people who are overweight. Finding predictors of prejudice and discrimination against overweight individuals is especially important as obesity increases and the pervasiveness of the stigma toward obese and overweight individuals intensifies (Teachman & Brownell, 2001). Perhaps beliefs about body-weight management also influence peoples' perceptions of overweight individuals. Even though holding an incremental belief about weight management is beneficial for self-regulation following setbacks, could it lead to more prejudice against overweight individuals? If an individual believes that body-weight is changeable, do they also feel that individuals are overweight because they are lazy and do not exert enough effort? In contrast, does holding a more entity view of body-weight lead individuals to interpret obesity as a disease caused by uncontrollable sources which in turn yields more sympathy? Future research could explore questions such as these examining whether implicit theories about weight management predict not only intrapersonal motivation but interpersonal interactions including feelings and attributions towards overweight individuals.

Applications

Research exploring how implicit theories of weight management affect motivation and prejudice against overweight individuals could be especially influential in determining public policy messages regarding the nature of the obesity epidemic. For example, based on the current study, more incremental beliefs lead to more effective affect and behavioral regulation after setbacks. Should public messages encourage an incremental view of body-weight? What if an incremental theory leads to more prejudice against overweight individuals? The answers to these questions are especially relevant as effectively managing body-weight continues to be a central issue.

Additionally, the results from the current paper could be of significant value in developing effective weight management interventions. Applying this work to younger students, as much of Dweck's work has done, could illustrate how underlying beliefs that develop at an early age influence motivational patterns and strategies that may continue throughout the lifespan. The current research could be bolstered by initiating an intervention similar to the one employed by Dweck in the academic domain (Dweck, 2006). She had students, via a video game, learn that intelligence is a malleable trait. Throughout the semester, students put more effort into learning and demonstrated improvement in school. As the rate of obesity continues to increase, especially among American children (e.g., Flegal, 1999), interventions that help students develop beliefs and strategies that lead to effective weight-management could prove especially useful.

Conclusion

Effectively regulating emotions and behavior following dieting setbacks is critical for weight loss success. What leads some individuals to persist and achieve their goals and others to feel helpless and avoid dieting all together? The results from the present study demonstrate that individuals' implicit theories of weight management influence whether individuals feel helpless or optimistic and whether they persevere or avoid dieting during challenging times. Specifically, believing more strongly that weight is changeable helps individuals regulate their emotions, which in turn is related to better regulatory strategies. Considering the increase in the rate of Americans and individuals worldwide who are overweight or obese, continuing to study dieting motivation through cognitive frameworks such as implicit theories can have important implications for public policy messages and weight-loss interventions.

List of References

List of References

- Abramson, L. Y., Seligman, M. E. P., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87*, 49-74.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179-211.
- Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivational processes. *Journal of Educational Psychology, 80*, 260-267.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Bandura, A. (1998). Health promotion from the perspective of social cognitive theory. *Psychology and Health, 13*, 623-649.
- Bandura, M., & Dweck, C. S. (1985). The relationships of conceptions of intelligence and achievement goals to achievement-related cognition, affect, and behavior. Unpublished Manuscript, Harvard University.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.
- Barron, K., & Harackiewicz, J. (2001). Achievement goals and optimal motivation: Testing multiple goal models. *Journal of Personality and Social Psychology, 80*, 706-722.
- Baumeister, R. E., Heatherton, T. E., & Tice, D. M. (1993). When ego threats lead to self-regulation failure: Negative consequences of high self-esteem. *Journal of Personality and Social Psychology, 64*, 141-156.
- Becker, M. H. (1974). The health belief model and personal health behavior. *Health Education Monographs, 2*, 324-47.
- Benenson, J., & Dweck, C. S. (1986). The development of trait explanations and self-evaluations in the academic and social domains. *Child Development, 57*, 1179-1189.

- Bergen, R. (1991). *Beliefs about intelligence and achievement-related behaviors*. Unpublished doctoral dissertation. University of Illinois, Champaign-Urbana.
- Berglas S., & Jones, E. E. (1978). Drug choice as a self-handicapping strategy in response to noncontingent success. *Journal of Personality and Social Psychology*, *36*, 405-417.
- Biddle, S. J. H., Wang, J. C. K., Chatzisarantis, N. L. D., & Spray C. M. (2003). Motivation for physical activity in young people: Entity and incremental beliefs about athletic ability. *Journal of Sports Sciences*, *21*, 973-989.
- Blokstra, A., Burns, C. M., & Seidell, J. C. (1999). Perception of weight status and dieting behavior in Dutch men and women. *International Journal of Obesity*, *23*, 7-18.
- Brissette, I., Scheier, M. F., & Carver, C. S. (2002). The role of optimism in social network development, coping, and psychological adjustment during a life transition. *Journal of Personality and Social Psychology*, *82*, 102-111.
- Brown, J. D., & Siegel, J. M. (1988). Attributions for negative life events and depression: The role of perceived control. *Journal of Personality and Social Psychology*, *54*, 316-322.
- Brunson, B., & Matthews, K. (1981). The Type-A coronary-prone behavior pattern and reactions to uncontrollable stress: An analysis of performance strategies, affect, and attributions during failure. *Journal of Personality and Social Psychology*, *40*, 906-918.
- Buford, R. W. (2004). Relations among implicit beliefs about athletic ability, athletic goal orientation and performance outcomes among touring golf professionals. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, *65*, pp. 3188.
- Chiu, C., Dweck, C. S., Tong, J. Y., & Fu, J. H. (1997). Implicit theories and conceptions of morality. *Journal of Personality and Social Psychology*, *73*, 923-940.
- Chiu, C., Hong, Y., & Dweck, C. S. (1994). Lay dispositionism and implicit theories of personality. *Journal of Personality and Social Psychology*, *73*, 19-30.
- Cohen, J, Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*. Mahwah, NJ: Lawrence Erlbaum Associates.

- Cronbach, L. J., Gleser, G. C., Nanda, H., & Rajaratnam, N. (1972). *The dependability of behavioral measurements. Theory of generalizability for scores and profiles*. New York: Wiley.
- Cury, F., Elliot, A. J., Fronseca, D. D., & Moller, A. C. (2006). The social-cognitive model of achievement motivation and the 2 X 2 achievement goal framework. *Journal of Personality and Social Psychology, 90*, 666-679.
- Diener, C. I., & Dweck, C. S. (1978). An analysis of learned helplessness: Continuous changes in performance, strategy, and achievement cognition following failure. *Journal of Personality and Social Psychology, 36*, 451-462.
- Diener, C. I., & Dweck, C. S. (1980). An analysis of learned helplessness II: The processing of success. *Journal of Personality and Social Psychology, 39*, 940-952.
- Dohn, F., Beattie, J. S., Aibel, C., & Striegel-Moore, R. H. (2001). Factors differentiating women and men who successfully maintain weight loss from women and men who do not. *Journal of Clinical Psychology, 57*, 105-117.
- Doll, A. H., Petersen, S., & Stewart-Brown, S. L. (2000). Obesity and physical and emotional well-being: Associations between body mass index, chronic illness, and the physical and mental components of the SF-36 Questionnaire. *Obesity Research, 8*, 160-170.
- Dweck, C. S. (1975). The role of expectations and attributions in the alleviation of learned helplessness. *Journal of Personality and Social Psychology, 31*, 674-685.
- Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, 41*, 1040-1048.
- Dweck, C. S. (2000). *Self-theories: Their role in motivation, personality, and development*. Philadelphia: Psychology Press.
- Dweck, C. S. (2006). *Social cognitive development and interventions*. Paper presented at the annual Society for Personality and Social Psychology Conference (January, 2006).
- Dweck, C. S., Chiu, C., & Hong, Y. (1995a). Implicit theories and their role in judgments and reactions: A world from two perspectives. *Psychological Inquiry, 6*, 267-285.
- Dweck, C. S., Chiu, C., & Hong, Y. (1995b). Implicit theories: Elaboration and extension of the model. *Psychological Inquiry, 6*, 322-333.

- Dweck, C. S., Hong, Y., & Chiu, C. (1993). Implicit theories: Individual differences in the likelihood and meaning of dispositional inference. *Personality and Social Psychology Bulletin, 19*, 644-656.
- Dweck, C. S., & Elliott, E. S. (1983). Achievement motivation. In P. Mussen & E. M. Hetherington (Eds.), *Handbook of child psychology* (pp. 643–691). New York: Wiley.
- Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 25*, 109-116.
- Dweck, C. S., & Molden, D. C. (2005). Self-Theories: Their impact on competence motivation and acquisition. In A. J. Elliot & C. S. Dweck's (Eds.), *Handbook of competence and motivation*. (pp. 122-140). New York: The Guilford Press.
- Dweck, C. S., & Reppucci, N. D. (1973). Learned helplessness and reinforcement responsibility in children. *Journal of Personality and Social Psychology, 25*, 109-116.
- Dweck, C. S., Teeney, Y., & Dinces, N. (1982). Implicit theories of intelligence as determinants of achievement goal choice. Unpublished raw data.
- Dwight, S. A., Cummings, K. M., & Glenar, J. L. (1998). Comparison of criterion-related validity coefficients for the Mini-Markers and Goldberg's Markers of the Big Five Personality factors. *Journal of Personality Assessment, 70*, 541-550.
- Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34*, 169–189.
- Elliot, A. J. (2005). A conceptual history of achievement goal construct. In A. J. Elliot & C. S. Dweck's (Eds.), *Handbook of competence and motivation*. (pp. 52-72). New York: The Guilford Press.
- Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 72*, 218-232.
- Elliott, E. S. & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology, 54*, 5-12.
- Elliot, A. J., & Harackiewicz, J. (1996). Approach and avoidance goals and intrinsic motivation: A mediational analysis. *Journal of Personality and Social Psychology, 70*, 461-475.

- Elliot, A. J., & McGregor, H. A. (2001). A 2 X 2 achievement goal framework. *Journal of Personality and Social Psychology, 80*, 501–519.
- Erdley, C. A., Cain, K. M., Loomis, C. C., Dumas-Hines, F., & Dweck, C. S. (1997). Relations among children's social goals, implicit personality theories, and responses to social failure. *Developmental Psychology, 33*, 263-272.
- Erdley, C. A., & Dweck, C. S. (1993). Children's implicit personality theories as predictors of their social judgments. *Child Development, 64*, 863-887.
- Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J., 1999. Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods, 4*, 272–299.
- Farrell, E., & Dweck, C. (1985). *The role of motivational processes in transfer of learning*. Unpublished Manuscript.
- Ferguson, K. J., & Spitzer, R. L. (1995). Binge eating disorder examination. In C. G. Fairburn & G. T. Wilson (Eds.), *Binge Eating: Nature, Assessment, and Treatment*, (12th ed., pp. 317-360.). New York: Guilford.
- Finch, J. F., & West, S. G. (1997). The investigation of personality structure: Statistical models. *Journal of Research in Personality, 31*, 439-485.
- Finkel, E. J., & Burnette, J. L. (May, 2005). *Implicit theories of relationships and forgiveness*. Paper presented at the Midwestern Psychology Association Annual Meeting, Chicago, Illinois.
- Flega, K. M., Carrol, M. D., Kjcmarak R. J., & Johnson, C. L. (1998). Overweight and obesity in the United States: Prevalence and trends, 1960-1994, *International Journal of Obesity, 22*, 39-47.
- Flegal, K. M. (1999). The obesity epidemic in children and adults: Current evidence and research issues. *Medicine and Science in Sports and Exercise, 31*, 509-514.
- Forsyth, D. R. (1986). An attributional analysis to students' reactions to success and failure. In Robert S. Feldman (Ed.), *The social psychology of education*, (pp. 17-34). New York: Cambridge University Press.
- Franiuk, R., Cohen, D., & Pomerantz, E. M. (2002). Implicit theories of relationships: Implications for relationship satisfaction and longevity. *Personal Relationships, 9*, 345-367.

- Franiuk, R., Pomerantz, E. M., & Cohen, D. (2004). The causal role of theories of relationships: Consequences for satisfaction and cognitive strategies. *Personality and Social Psychology Bulletin, 30*, 194-1507.
- Gervey, M., Chiu, C., Hong, Y., & Dweck, C. S. (1999). Differential use of person information in decisions about guilt versus innocence: The role of implicit theories. *Personality and Social Psychology Bulletin, 25*, 17-27.
- Goetz, T. E., & Dweck, C. S. (1980). Learned helplessness in social situations. *Journal of Personality and Social Psychology, 39*, 249-255.
- Gorenflo-Gilbert, M. A. (1999). The effects of implicit theories of leadership ability on goal orientation, attributional processes, and learning outcomes. *Dissertation Abstracts International: The Sciences and Engineering, 60*, (4-B), (pp. 1895).
- Graham, S., & Golan, S. (1991). Motivational influences on cognition: Task involvement, ego involvement, and depth of information processing. *Journal of Educational Psychology, 83*, 187-194.
- Grant, H., & Dweck, C. S. (2003). Clarifying achievement goals and their impact. *Journal of Personality and Social Psychology, 85*, 541-553.
- Harackiewicz, J. M., & Elliot, A. J. (1993). Achievement, goals, and intrinsic motivation. *Journal of Personality and Social Psychology, 65*, 904-915.
- Harackiewicz, J. M., & Elliot, A. J. (1995). Life is a roller coaster when you view it through entity glasses. *Psychological Inquiry, 6*, 298-301.
- Heider, F. (1958) *The psychology of interpersonal relations*. New York: John Wiles.
- Henderson, V. L., & Dweck, C. S. (1990). Motivation and achievement. In S. S. Feldman and G. R. Elliot (Eds.), *At the threshold: The developing adolescent*. Cambridge, Mass: Harvard University Press.
- Hill, J. O., & Peters, J. C. (1998). Environmental contributions to the obesity epidemic. *Science, 280*, 1371-1374.
- Hiroto, D. S., & Seligman, M. E. P. (1975). Generality of learned helplessness in man. *Journal of Personality and Social Psychology, 31*, 311-327.
- Holmes, O. J., Frank, D. I., & Curtin, J. (1999). Health beliefs, health locus of control, and women's mammography behavior. *Cancer Nursing: An International Journal for Cancer Care, 22*, 149-156.

- Hong, Y. (1994). *Predicting trait versus process inferences: The role of implicit theories*. Unpublished doctoral dissertation, Columbia University.
- Hong, Y., Chiu, C., Dweck, C. S., Lin, D., & Wan, W. (1999). Implicit theories, attributions, and coping: A meaning system approach. *Journal of Personality and Social Psychology, 77*, 588-599.
- Hong, Y., Chiu, C., Hansen, I. G., Tong, Y., Chan, G., Wong, R. Y. M., Lee, S., & Fu, H. (2003). How are social identities linked to self-conception and intergroup orientation? The moderating effect of implicit theories. *Journal of Personality and Social Psychology, 85*, 1147-1160.
- John, O. P., & Benet-Martinez, V. (in press). Measurement: Reliability, construct validation, and scale construction. In H. T. Reis and C. M. Judd (Eds.), *Handbook of research methods in social psychology*. Cambridge, England: Cambridge University Press.
- Jung, R. T. (1997). Obesity as a disease. *British Medical Bulletin, 53*, 307-321.
- Kasimatis, M., Miller, M., & Marcussen, L. (1996). The effects of implicit theories on exercise motivation. *Journal of Research in Personality, 30*, 510-516.
- Kasser, T., & Ryan, R. M. (1996). Further examining the American dream: Differential correlates of intrinsic and extrinsic goals. *Personality and Social Psychology Bulletin, 22*, 280-287.
- Kelly, G.A. (1955). *The Psychology of Personal Constructs*. W. W. Norton, NY, NY.
- Kelley, K. N., & Forsyth, D. R. (1984, April). *Attribution affect linkages after success and failure*. Paper presented at the annual meeting of the Eastern Psychological Association, Baltimore.
- Kenny, D. A., Kashy, D. A., Bolger N. (1998). Data analysis in social psychology. In D.T. Gilbert, S.T. Fiske, and Lindzey, G. (Eds.). *Handbook of social psychology* (4th ed., pp. 233-265). New York: Oxford University Press.
- Knee, C. R. (1998). Implicit theories of relationships: Assessment and prediction of romantic relationship initiation, coping, and longevity. *Journal of Personality and Social Psychology, 74*, 360-370.
- Knee, C. R., & Canevello, A. (2006). Implicit theories of relationships and coping in romantic relationships. In K. D. Vohs, & E. J. Finkel (Eds.), *Self and relationships: Connecting intrapersonal and interpersonal processes* (pp. 160-176). New York, NY: Guilford.

- Knee, C. R., Nanayakkara, A., Vietor, N. A., Neighbors, C., & Patrick H. (2001). Implicit theories of relationships: Who cares if romantic partners are less than ideal? *Personality and Social Psychology Bulletin*, 27, 808-819.
- Knee, C. R., Patrick, H., & Lonsbary, C. (2003). Implicit theories of relationships: Orientation toward evaluation and cultivation. *Personality and Social Psychology Review*, 7, 41-55.
- Knee, C. R., Patrick, H., Vietor, N. A., & Neighbors, C. (2004). Implicit theories of relationships: Moderators of the link between conflict and commitment. *Personality and Social Psychology Bulletin*, 30, 617-628.
- Lefcourt, H. M. (1976). *Locus of control: Current trends in theory and research*. Hillsdale: Lawrence Erlbaum Associates.
- Leggett E. L., & Dweck, C. S. (1986). *Individual differences in goals and inference rules: Sources of causal judgments*. Manuscript, Urbana-Champaign: University of Illinois.
- Leondari, A., & Gialamas, V. (2002) Implicit theories, goal orientations, and perceived competence: Impact on students' achievement behavior. *Psychology in the Schools*, 39, 279-291.
- Levy, S. R., & Dweck, C. S. (1999). The impact of children's static versus dynamic conceptions of people on stereotype formation. *Child Development*, 70, 1163-1180.
- Levy, S. R., Plaks, J. E., Hong, Y., Chiu, C., & Dweck, C. S. (2001). Static versus dynamic theories and the perception of groups: Different routes to different destinations. *Personality and Social Psychology Review*, 5, 156-168.
- Levy, S. R., Stroessner, S. J., & Dweck, C. S. (1998). Stereotype formation and endorsement: The role of implicit theories. *Journal of Personality and Social Psychology*, 74, 1421-1436.
- Licht, B. G., & Dweck, C. S. (1984). Determinants of academic achievement: The interaction of children's achievement orientations with skill area. *Developmental Psychology*, 20, 628-636.
- Marsh, H. W. (1996). Positive and negative global self-esteem: A substantively meaningful distinction or artifacts? *Journal of Personality and Social Psychology*, 70, 810-819.

- Midgley, C., Arunkumar, R., & Urdan, T. (1996). 'If I don't do well tomorrow, there's a reason:' Predictors of adolescents' use of academic self-handicapping strategies. *Journal of Educational Psychology, 88*, 423-434.
- Molden, D. C. & Dweck, C. S. (2006). Finding "meaning" in psychology: A lay theories approach to self-regulation, social perception, and social development. *American Psychologist, 61*, 192-203.
- Morgenthau, G. A. (2001). Implicit beliefs about the malleability of substance abuse: Implications for treatment motivation and outcome. *Dissertation Abstracts International: The Science of Engineering, 61*, 4983.
- Mueller, C. M., & Dweck, C. S. (1997). *Implicit theories of intelligence: Malleability beliefs, definitions, and judgments of intelligence*. Data, New York: Columbia University.
- Murphy, G. L., Medin, D. L. (1985). The role of theories in conceptual coherence. *Psychological Review, 92*, 289-312.
- Niiya, Y., Crocker, J., & Bartmess, E. N. (2004). From vulnerability to resilience: Learning orientations buffer contingent self-esteem from failure. *Psychological Science, 15*, 801-805.
- Ommundsen, Y. (2001). Students' implicit theories of ability in physical education classes: The influence of motivational aspects of the learning environment. *Learning Environments Research: An International Journal, 4*, 139-158.
- Ommundsen, Y. (2001). Self-handicapping strategies in physical education classes: The influence of implicit theories of the nature of ability and achievement goal orientations. *Psychology of Sport and Exercise, 2*, 139-156.
- Ommundsen, Y. (2003). Implicit theories of ability and self-regulation strategies in physical education classes. *Educational Psychology, 23*, 141-157.
- Overmier, J. B. and Seligman, M. E. P. (1967). Effects of inescapable shock upon subsequent escape and avoidance responding. *Journal of Comparative and Physiological Psychology, 63*, 28-33.
- Peterson, C., & Seligman, M. E. P. (1984). Causal explanations as a risk factor for depression: Theory and evidence. *Psychological Review 91*, 347-374.
- Piaget, J., & Garcia, R. (1991). In P. Davidson & J. A. Easley, Jr., (Eds.). *Toward a logic of meanings*. Hillsdale, NJ: Erlbaum.

- Pintrich, P. R., & Schunk, D. (2002). *Motivation in education: Theory, research, and applications* (2nd ed.). Upper Saddle, NJ: Prentice Hall.
- Plaks, J. E., Grant, H., & Dweck, C. S. (2005). Violations of implicit theories and the sense of prediction and control: Implications for motivated person perception. *Journal of Personality and Social Psychology, 88*, 245-262.
- Plaks, J. E., Levy, S. R., Dweck, C. S., & Stroessner, S. J. (2004). In the eye of the beholder: Lay theories and the perception of group entitativity, variability, and essence. In V. Yzerbyt, C. M. Judd, & O. Corneille (Eds.), *The psychology of group perception: Perceived variability, entitativity, and essentialism* (pp. 127–146). New York: Psychology Press.
- Rhodewalt, F. (1994). Conceptions of ability, achievement goals, and individual differences in self-handicapping behavior: On the application of implicit theories. *Journal of Personality, 62*, 67-85.
- Rolls, B. J., Fedoroff, I. C., & Guthrie, J. F. (1991). Gender differences in eating behavior and body weight regulation. *Health Psychology, 10*, 133-142.
- Ross, M. (1989). Relation of implicit theories to the construct of personal histories. *Psychological Review, 96*, 341-357.
- Rothman, A. J., Salovey, P., Turvey, C., & Fishkin, S. A. (2003). Attributions of responsibility and persuasion: Increasing mammography utilization among women over 40 with an internally oriented message. In P. Salovey & A. J. Rothman (Eds.), *Social Psychology of Health* (pp.261-271). New York, NY: Psychology Press.
- Rotter, J. B., (1966). Generalized expectancies for internal vs. external control of reinforcement. *Psychological Monographs, 80*, 1-28.
- Ruvolo, A. P., & Rotondo, J. L. (1998). Diamonds in the rough: Implicit personality theories and views of partner and self. *Personality and Social Psychology Bulletin, 24*, 750-758.
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*, 54-67.
- Saucier, G. (1994). Mini-Markers. A brief version of Goldberg's unipolar Big-Five markers. *Journal of Personality Assessment, 63*, 506-516.
- Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health assessment and generalized outcome expectancies, *Health Psychology, 4*, 219-247.

- Schroder, K. E. E., & Schwarzer, R. (2004). Habitual self-control and the management of health behavior amongst heart patients. *Social Science and Medicine*, 60, 859-875.
- Seidell, J. C. (1995). The impact of obesity on health status: Some implications for health care costs. *International Journal of Obesity Related Metabolic Disorders*, 6, 13-16.
- Seligman, M. E. P. & Maier, S. F. (1967). Failure to escape traumatic shock. *Journal of Experimental Psychology*, 74, 1-9.
- Sheldon, K. M., Ryan, R. M., Rawsthorne, L. J., & Illardi, B. (1997). Trait self and true self: Cross-role variation in the Big-Five personality traits its relations with psychological authenticity and subjective well-being. *Journal of Personality and Social Psychology*, 73, 1380-1393.
- Snyder, M., & Gangestad, S. (1986). On the nature of self-monitoring: Matters of assessment, matters of validity. *Journal of Personality and Social Psychology*, 51, 125-139.
- Snyder, C. R., Irving, L. M., & Anderson, J. R. (1991). Hope and health. In C. R. Snyder & D. R. Forsyth (Eds.), *Handbook of clinical and social psychology* (pp.247-395). Orlando, FL: Academic Press.
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural models. In S. Leinhardt (Ed.), *Sociological methodology* (pp. 290-312). San Francisco: Jossey-Bass.
- Stotland, S., & Zuroff, D. C. (1990). A new measure of weight locus of control: The dieting beliefs scale. *Journal of Personality Assessment*, 54, 191-203.
- Taberner, C., & Wood, R. E. (1999). Implicit theories versus the social construal of ability in self-regulation and performance on a complex task. *Organizational Behavior and Human Decision Processes*, 78, 104-127.
- Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Psychological Science*, 16, 939.
- Teachman, B. A., & Brownell, K. D. (2001). Implicit anti-fat bias among health professionals: Is anyone immune? *International Journal of Obesity*, 25, 1525-1531.

- Tedesco, A. M. (1999). Implicit theories and self-regulatory processes: Implications for organizational behavior. *Dissertation Abstracts International: The Sciences and Engineering*, 60, (pp.400).
- Tiggemann, M., & Rothblum, E. D. (1988). Gender differences in social consequences of perceived overweight in the United States and Australia. *Sex Roles*, 18, 75-86.
- Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., & Deci, E. L. (2004). Motivating learning, performance, and persistence: The synergistic effects of intrinsic goal contents and autonomy-supportive contexts. *Journal of Personality & Social Psychology*, 87, 246-260.
- Wallston, K. A. (2005). The validity of the MHLC scales. *Journal of Health Psychology*, 10, 623-631.
- Wallston, K. A., & Wallston, B. S. (1978). Development of the multidimensional health locus of control (MHLC) scales. *Health Education Monographs*, 6, 160-170.
- Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review*, 92, 548-573.
- Westerterp-Plantenga, M. S., Kempen, K. P., & Saris, W. H. (1998). Determinants of weight maintenance in women after diet-induced weight reduction. *International Journal of Obesity*, 22, 1-6.
- Wood, R., & Bandura, A. (1989). Impact of conceptions of ability on self-regulatory mechanisms and complex decision-making. *Journal of Personality and Social Psychology*, 56, 407-415.
- Wood, R. E., Phillips, K. W., & Tabernero, C. (2002). *Implicit theories of ability, processing dynamics and performance in decision-making groups*. Unpublished manuscript, University of New South Wales.
- Zuckerman, M., Kieffer, S. C., & Knee, C. R. (1998). Consequences of self-handicapping: Effects on coping, academic performance, and adjustment. *Journal of Personality and Social Psychology*, 74, 1619-1628.

Appendix A: Implicit Theories of Weight Management

Read each sentence below and then write the number that indicates how much you agree with each statement.

1	2	3	4	5	6
Strongly	Agree	Mostly	Mostly	Disagree	Strongly
Agree		Agree	Disagree		Disagree

- _____ 1. You have a certain body weight, and you can't really do much to change it
- _____ 2. Your body weight is something about you that you can't change very much
- _____ 3. No matter who you are, you can significantly change your body weight
- _____ 4. To be honest, you can't really change your body weight
- _____ 5. You can always substantially change your body weight
- _____ 6. You can change your basic body weight considerably
- _____ 7. Body shape and size are fixed by biological constraints
- _____ 8. Genetics play a small role in overall body weight
- _____ 9. Individuals have a set body-weight that fluctuates slightly but does not really change
- _____ 10. If you choose the right weight-loss strategy, body weight can be significantly altered

Appendix B: Attributions, Affect, and Regulatory Strategies

Please take a moment and read the following situation. Imagine that it actually happened to you. Throughout the following questions, we ask that you really put yourself in this situation and answer honestly how you think you would respond.

SITUATION

Imagine that you have been on an eight-week diet program. The healthy approach to weight loss is to lose 1-2 pounds per week. The program is designed to include healthy meal choices and an exercise program. Many people who follow the program are able to lose 1-2 pounds per week which, after eight weeks, would be about 12 pounds lost on average. However, you receive feedback about your progress after 8 weeks and have actually gained 3 pounds.

Please take a brief moment and reflect on how you would feel and think. Please write these feelings and thoughts below.

Reflecting on what you read, please write down a few factors that you think might have contributed to the dieting setback?

ATTRIBUTIONS

Please rate how important you think the following factors would likely have been in determining your dieting setback that you read about above. Remember to imagine yourself actually in this situation when responding to the following questions.

We have listed a few factors that students have mentioned as important causes following dieting setbacks and would like you to rate how much you agree or disagree with each cause from 1 to 7:

- | | | |
|-----------------------------|-------------|-------------------------|
| 1 = very strongly disagree, | 4 = neutral | 5 = agree |
| 2 = strongly disagree, | | 6 = strongly agree |
| 3 = disagree, | | 7 = very strongly agree |

- | | |
|---------------|--|
| 1 2 3 4 5 6 7 | I am not very good at dieting |
| 1 2 3 4 5 6 7 | I was not committed to the diet |
| 1 2 3 4 5 6 7 | I did not exert adequate effort on the dieting program |
| 1 2 3 4 5 6 7 | The diet program was too difficult to follow |
| 1 2 3 4 5 6 7 | The diet required more effort than I was willing to give |
| 1 2 3 4 5 6 7 | I was distracted by too many other things in my life |
| 1 2 3 4 5 6 7 | I was not motivated to do well |
| 1 2 3 4 5 6 7 | I do not have the willpower to control my diet |
| 1 2 3 4 5 6 7 | I have never been very good at controlling what I eat |
| 1 2 3 4 5 6 7 | I lack the ability to diet effectively |

AFFECT SCALE

Please decide if the words listed below describe the feelings and emotions you would be likely to experience following a dieting setback. Please circle the number of how well it represents how you feel to the left of the word.

- 1 = not at all true 2 = slightly true 3 = somewhat true 4 = true 5 = very true

1 2 3 4 5 helpless	1 2 3 4 5 sad	1 2 3 4 5 challenged
1 2 3 4 5 inadequate	1 2 3 4 5 shame	1 2 3 4 5 undesirable

Appendix C: Goals

DIETING GOALS

Please write down one goal pertaining to weight management that you would like to reach in the next two weeks. If you do not have or want a goal please skip this section. When you return in two weeks, you will be asked to write this goal again and to report how well you feel you did in reaching the goal.

STRATEGIES: Individuals take an array of approaches to managing their weight. In reaching the above goal, please write down a couple of the strategies you plan to employ.

Dieting Goals

For the following questions, please indicate you answer using the scale provided by writing your response next to each item

1	2	3	4	5	6
Strongly Agree	Agree	Mostly Agree	Mostly Disagree	Disagree	Strongly Disagree

- _____ 1. I choose the easiest type of diet to avoid dieting setbacks
- _____ 2. I diet to look thinner than my friends and peers
- _____ 3. I diet to improve my health and knowledge of body-weight maintenance
- _____ 4. I diet to show that I can lose weight

Appendix D: Validity and Additional Measures

Convergent Validity: Health Locus of Control

Please answer the following questions using the scale below

1	2	3	4	5
Completely Disagree	Somewhat Disagree	Neither agree Nor disagree	Somewhat Agree	Completely Agree

- ___ 1. If I get sick, it's my own behavior which determines how soon I get well again.
- ___ 2. I am in control of my health.
- ___ 3. When I get sick I am to blame.
- ___ 4. The main thing which affects my health is what I myself do.
- ___ 5. My physical well-being depends on how well I take care of myself.
- ___ 6. If I take care of myself, I can avoid illness.
- ___ 7. If I take the right actions, I can stay healthy.

Dieting Beliefs Scale:

Please respond to each of the following statements by indicating how well each statement describes your beliefs. Place a number from 1 (*not at all descriptive of my beliefs*) to 6 (*very descriptive of my beliefs*) in the space provided before each statement

1	2	3	4	5	6
<i>Not at all descriptive of my beliefs</i>					<i>Very descriptive of my beliefs</i>

- ___ 1. By restricting what one eats, one can lose weight
- ___ 2. When people gain weight it is because of something they have or have not done
- ___ 3. A thin body is largely a result of genetics
- ___ 4. No matter how much effort one puts into dieting, one's weight tends to stay about the same.
- ___ 5. One's weight, to a great extent, is controlled by fate
- ___ 6. There is so much fattening food around that losing weight is almost impossible
- ___ 7. Most people can only diet successfully when others push them to do it
- ___ 8. Having a slim or fit body has very little to do with luck
- ___ 9. People who are overweight lack the willpower necessary to control their weight
- ___ 10. Each of us is directly responsible for our weight
- ___ 11. Losing weight is simply a matter of wanting to do it and applying yourself
- ___ 12. By increasing the amount one exercises, one can lose substantial weight
- ___ 13. Most people are at their present weight because that weight level is natural
- ___ 14. Unsuccessful dieting is due to lack of effort
- ___ 15. In order to lose weight people must get a lot of encouragement from others

Discriminant Validity: Shortened Version of the Big Five

“Please use this list of common human traits to describe yourself as accurately as possible. Describe yourself as you see yourself at the present time, not as you wish to be in the future. Describe yourself as you are generally or typically, as compared with other persons you know of the same sex and of roughly your same age. Before each trait, please write a number indicating how accurately that trait describes you, using the following rating scale:”

1	2	3	4	5	6	7	8	9
Extremely Inaccurate	Very Inaccurate	Moderately Inaccurate	Slightly Inaccurate	Neutral	Slightly Accurate	Moderately Accurate	Very Accurate	Extremely Accurate
___	Bashful	___	Energetic	___	Moody	___	Systematic	
___	Bold	___	Envious	___	Organized	___	Talkative	
___	Careless	___	Extraverted	___	Philosophical	___	Temperamental	
___	Cold	___	Fretful	___	Practical	___	Touchy	
___	Complex	___	Harsh	___	Quiet	___	Uncreative	
___	Cooperative	___	Imaginative	___	Relaxed	___	Unenvious	
___	Creative	___	Inefficient	___	Rude	___	Unintellectual	
___	Deep	___	Intellectual	___	Shy	___	Unsympathetic	
___	Disorganized	___	Jealous	___	Sloppy	___	Warm	
___	Efficient	___	Kind	___	Sympathetic	___	Withdrawn	

Trait General Optimism:

Indicate the degree to which each of the items represents your feelings according to the following code.

1	2	3	4	5
Do Not Agree At All		Agree Somewhat		Agree Completely

Response

- ___ 1) I'm always optimistic about my future.
- ___ 2) It's easy for me to relax.
- ___ 3) I rarely count on good things happening to me.
- ___ 4) I enjoy my friends a lot.
- ___ 5) If something can go wrong for me, it will.
- ___ 6) I'm a believer in the idea that "every cloud has a silver lining."

Implicit Theories in Additional Domains

Implicit Theories of Intelligence

Read each sentence below and write the number that indicates your agreement with each statement.

1	2	3	4	5	6
Strongly Agree	Agree	Mostly Agree	Mostly Disagree	Disagree	Strongly Disagree

- _____ 1. You have a certain amount of intelligence, and you can't really do much to change it.
- _____ 2. Your intelligence is something about you that you can't change very much.
- _____ 3. To be honest, you can't really change your intelligence.

Implicit Theories of Personality

Read each sentence below and write the number that indicates your agreement with each statement.

1	2	3	4	5	6
Strongly Agree	Agree	Mostly Agree	Mostly Disagree	Disagree	Strongly Disagree

- _____ 1. People can't really change what kind of personality they have.
- _____ 2. Someone's personality is a part of them that they can't change very much.
- _____ 3. A person can do things to get people to like them, but they can't change their personality.

Control Constructs: Trait Self-Control

Please read each statement below and consider how well it describes you generally. Then give it a rating to indicate the extent to which you agree with it.

1	2	3	4	5
Completely Disagree	Somewhat Disagree	Neither agree Nor disagree	Somewhat Agree	Completely Agree

- _____ 1. I have a hard time breaking bad habits.
- _____ 2. I am lazy.
- _____ 3. I say inappropriate things.
- _____ 4. I do certain things that are bad for me, if they are fun.
- _____ 5. I refuse things that are bad for me.
- _____ 6. I wish I had more self-discipline.
- _____ 7. I am good at resisting temptation.
- _____ 8. People would say that I have iron self-discipline.
- _____ 9. Pleasure and fun sometimes keep me from getting work done.
- _____ 10. I have trouble concentrating.
- _____ 11. I am able to work effectively toward long-term goals.
- _____ 12. Sometimes, I can't stop myself from doing something even if I know it is wrong.
- _____ 13. I often act without thinking through all the alternatives.

Dieting Self-Confidence Scale:

For the following questions, please indicate your answer using the scale provided by writing your response next to each item

Disagree Strongly Neutral/mixed Agree Strongly

1 2 3 4 5 6 7

- _____ 1. I usually feel confident in my ability to manage my weight
- _____ 2. When I start a diet, I often feel confident that I will be able to lose weight
- _____ 3. I feel positive about my ability to manage my weight

Appendix E: Demographics & Dieting History

1. For time two of the study we need an identification number: Please enter the last 4 digits of your social security number

2. What is your sex?

_____ Male _____ Female

3. What is your age (Fill in)? _____ Years Old

4. What is your race?

_____ African American _____ Asian American _____ Caucasian
 _____ Hispanic _____ Native American _____ Other (_____)

5. My family's average income is approximately _____

6. My mom's highest education is _____

7. My dad's highest education is _____

Dieting History

For the following questions, please circle only one answer

1. How would you describe your current weight?

Too big
 Too little
 Just right

2. How frequently over your whole life have you lost more than 10 pounds by dieting?

Never
 1±2 times
 3±5 times
 6±10 times
 More than 10 times

3. How many times did you start a weight reducing diet in the last year?

Never
 Once
 2±3 times
 4±5 times
 More than five times
 Continuously

4. Are you trying to do something about your weight at the moment?

- I am trying to lose weight
- I am trying to gain weight
- I am trying to stay the same weight
- I do not do anything about my weight

If you have tried to lose weight over the last 12 months or are trying to lose weight at the moment, please answer the following questions

5. What was your reason for trying to lose weight? (give only one answer)

- Medical advice
- To look better
- Health problems
- To avoid health problems
- Better physical condition
- To fit into clothes more easily
- Other

6. What method of weight loss did you use?

- Special diet
- Reduced calories
- Increased exercise
- Skipping meals
- Special dietary product
- Group program such as Weight Watchers
- Other

7. I am currently on a diet (please circle) Yes No

Please use the following scale to answer the questions below

1	2	3	4	5	6
Strongly	Agree	Mostly	Mostly	Disagree	Strongly
Agree		Agree	Disagree		Disagree

_____ 1. I have a family history of obesity

_____ 2. Members of my immediate family are overweight

_____ 3. Members of my extended family are overweight

_____ 4. It is important to me to be a healthy weight

Please answer the questions below

5. What is your current weight? _____

6. What is your height? _____

7. What is your ideal weight? _____

Please see Researcher

8. Scale Weight _____
(to be assessed by researcher)

Appendix F: Measures Time II

ID # _____

Scale Weight _____

Read each sentence below and then write the one number that indicates how much you agree with each statement.

1	2	3	4	5	6
Strongly Agree	Agree	Mostly Agree	Mostly Disagree	Disagree	Strongly Disagree

- _____ 1. You have a certain body weight, and you can't really do much to change it
- _____ 2. Your body weight is something about you that you can't change very much
- _____ 3. No matter who you are, you can significantly change your body weight
- _____ 4. To be honest, you can't really change your body weight
- _____ 5. You can always substantially change your body weight
- _____ 6. You can change your basic body weight considerably
- _____ 7. Body shape and size are fixed by biological constraints
- _____ 8. Genetics play a small role in overall body weight
- _____ 9. Individuals have a set body-weight that fluctuates slightly but does not really change
- _____ 10. If you choose the right weight-loss strategy, body weight can be significantly altered

GOALS

Please write down the goal that you set two weeks ago when you participated in the study. If you do not remember your goal or did not set a goal, please continue answering the remainder of the questions on the next pages.

How well do you think that you did in achieving this goal?

1	2	3	4	5	6
Very Poorly	Poorly	Somewhat Poorly	Somewhat Well	Well	Very Well

Please circle your response to the following question

Would you consider your performance on your goal to be

SUCCESSFUL OR UNSUCCESSFUL

Appendix G: Debriefing Form

Dear Participant,

The study that you just completed looked at how different beliefs about weight management influence reactions to dieting setbacks.

We are investigating whether people who think that body weight is a fixed entity are as likely to persist following dieting setbacks as people who believe that body weight is a changeable trait. These different beliefs are termed implicit theories and they have been shown to be very influential for motivation in the domain of academic achievement.

There has been a great deal of research on implicit theories, but to our knowledge, no one has investigated how these beliefs can be extended to understanding motivation in the domain of body weight management. That is, we don't know of any research that looks at how implicit theories influence affect, cognition, and future behavior following dieting setbacks. However, we think that this is a very important aspect of understanding dieting motivation. We hope that our research will add to the existing research on implicit theories and motivation and benefit society in some way.

We have a favor to ask you. It's very important that nobody come into our study with any special prior knowledge. If that happens, the results of our research might be useless. Therefore, we ask you not to tell anyone about this study until the end of the semester. Please keep what happened here confidential until then. We really appreciate your cooperation.

If you have any questions or concerns, please feel free to contact Jeff Green (jdgreen@vcu.edu) or Jeni Burnette (burnettejl@vcu.edu).

Thank you for your cooperation and participation.

Please do not take this sheet with you.

Vita

Jeni L. Burnette was born on October 5, 1977 in Raleigh, North Carolina, and is an American citizen. She graduated from Saint Mary's High School, Raleigh, North Carolina in 1996. She received her Bachelor of Arts in psychology and industrial relations from The University of North Carolina at Chapel Hill in 2000. She received her Masters of Science in Psychology from Virginia Commonwealth University in 2002. She has taught numerous courses at the University of Richmond and Virginia Commonwealth University, including Research Methods and Analyses, Social Psychology, Applied Social Psychology, and has served as the teaching assistant for graduate-level statistics.