THE INFLUENCE OF ACTIVELY OPEN-MINDED THINKING, INCREMENTAL THEORY OF INTELLIGENCE, AND PERSUASIVE MESSAGES ON MASTERY GOAL ORIENTATIONS

By

JUDITH ARLENE LADD

A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

2009

To Jon Wallin Ladd, my love, my everything
and
To the Memory of Bernice Magram, my mother

ACKNOWLEDGMENTS

I am more than grateful for the support and encouragement of my husband Jon. He enthusiastically donated his time and energy to help me achieve my goals. I am also thankful to my family, friends, and former colleagues who believed that I could accomplish a feat of this magnitude. Further, I would like to give special thanks for the contributions of two exceptional friends. Evelyn Chiang, Ph.D. continually provided invaluable support and professional assistance throughout the doctoral process and Lori Love, a first year classmate helped me through early program jitters. Lori perished over the Bay of Guinea in August, 2007. She is missed by many, but especially by Jeda, the indomitable black cat she bequeathed to me.

I wish to thank the faculty of the educational psychology department and others at the University of Florida. In particular, my committee members, Doctors David Therriault, David Miller, Tracy Linderholm, and Linda Behar-Horenstein, who generously shared their knowledge and expertise.

Finally, I would like to acknowledge the contribution of my mother, Bernice Magram, who quietly instilled a deep and life-long love of learning. Her pride in my accomplishments was manifest. She always seemed to know what was important. My pursuit of a doctoral degree would have made perfect sense to her.

TABLE OF CONTENTS

APPENDIX

LIST OF TABLES

Abstract of Dissertation Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Doctor of Philosophy

THE INFLUENCE OF ACTIVELY OPEN-MINDED THINKING, INCREMENTAL THEORY OF INTELLIGENCE, AND PERSUASIVE MESSAGES ON MASTERY GOAL ORIENTATIONS

By

Judith Arlene Ladd

August 2009

Chair: David Therriault
Major: Educational Psychology

Achievement motivation is a critical issue for students and educators at every level. For students who enter the university community, it may be the first time that self-motivation and self-regulation will become an issue. Research in achievement motivation, therefore, could enhance the college experience. Goal theory was chosen as framework to explore the fundamental processes that support achievement motivation. Mastery goals have been found to be beneficial and adaptive for college students and are the focus of this study.

Two persuasive essays (i.e., messages) that advocated the endorsement of mastery goals were developed for this study. The messages were identical except for the manipulation of the argument support; anecdotal vs. empirical. Also, two learner characteristics, actively open-minded thinking and an incremental theory of intelligence, were expected to interact with the messages and influence the adoption of mastery goals.

Pre-manipulation questionnaires that assessed actively open-minded thinking and incremental theory of intelligence were given to 279 undergraduates randomly assigned to one of three groups. Participants in each group read an essay that promoted mastery goals supported with either anecdotal evidence, empirical evidence, or an unrelated essay (control group). They

then responded to measures of goal orientation (two), essay comprehension, text perceptions, and personal information. Analysis of Variance (ANOVA) tests were conducted to analyze the relationships between persuasive messages, actively open-minded thinking, and incremental theory of intelligence, as they each affected the endorsement of mastery goals.

The hypothesized interaction between message and learner characteristics was not supported. Regarding the learner characteristics, there was a main effect for actively open-minded thinking on mastery goal endorsement. Participants high in actively open-minded thinking favored mastery goals significantly more than those low in actively open-minded thinking. A similar main effect was found for participants who subscribed to an incremental theory of intelligence. Participants high in incremental theory of intelligence favored mastery goals (on one of the two goal orientation measures) significantly more than those who were low in incremental theory of intelligence.

CHAPTER 1
STATEMENT OF THE PROBLEM

Motivating students to engage in the process of academic learning and to exert full effort to complete educational tasks across diverse academic subjects presents a major challenge for today's educators (Alderman, 2004). Numerous researchers have addressed this issue by examining achievement motivation as it relates to cognitive engagement, self-regulation, commitment to effective learning strategies, task persistence, and ultimately, academic performance (Kaplan & Maehr, 2007). Pintrich (1999) has noted the significant influence of motivational factors during the learning process that underscores their importance for further attention and study.

Achievement motivation has been identified as a fundamental constituent in theoretical conceptualizations that describe conceptual change and the learning process (e.g., Pintrich, Marx, & Boyle, 1993; Linnebrink & Pintrich, 2002a). In particular, a dynamic relationship between motivational beliefs (e.g., achievement goals) and cognitive engagement is featured in a model of academic achievement proposed by Pintrich and Schrauben (1992, p. 153). In their discussion of factors that facilitate academic success, Linnenbrink and Pintrich (2002b) cited the significant contribution of motivation in academic settings. Motivational researchers have noted that knowledge in isolation from motivated behavior is insufficient for students to be successful (Dweck & Master, 2008; Pintrich, 1989; Pintrich et al., 1993). Having cognitive skills along with the inclination to use them is essential for academic success (Linnenbrink & Pintrich, 2002b, p. 313).

There is also evidence to suggest that having sufficient knowledge about a subject unaccompanied by motivational beliefs is inadequate to enhance performance. Blackwell, Trzesniewski, and Dweck (2007) examined the influence of achievement motivation on

performance in an interventional study of 48 students in seventh grade in a junior high school. The control and experimental groups received instruction in study strategies designed to assist students in improving their math performance. In addition, the experimental group received two motivational lessons, based on the incremental theory of intelligence, that informed them that intelligence is malleable, emphasized effort when approaching schoolwork, and encouraged them to bravely meet challenges and overcome them. The results from this study showed that the experimental group, in comparison to the control group, had higher grades and improved classroom behavior. The authors concluded that motivational beliefs contributed to improved performance and that having knowledge of study skills without concomitant motivation does not guarantee their use. Clearly, motivational beliefs have the potential to serve an important purpose in the learning process.

Educators at every level are responsible for directing students toward academic goals and assisting in fostering those goals. As a prerequisite for meeting these responsibilities, teachers need to draw upon strategies derived from motivational research. Research is needed to develop effective strategies that will help students achieve those goals. Accordingly, a fuller and more robust understanding of the motivational processes that contribute to academic achievement is essential, if desired academic goals are to be achieved. In recent years, goal theory has emerged as one of the most significant areas of research in achievement motivation that can provide a foundation for further strategy development.

Achievement goal theory posits that students' motivational beliefs influence behavior and affect performance (Ames & Archer, 1988; Dweck & Leggett, 1988; Elliot & Dweck, 1988; Nicholls, 1984). Dweck (1986) observed that some students appeared motivated, seeking challenges and persisting in the face of obstacles. She deemed this behavior pattern to be

adaptive and described students who exhibited this tendency as learning-oriented. Dweck described students who avoid challenges or give up upon reaching an impediment as performance-oriented. A point of interest, even though the two behavior patterns were very different, the two groups did not differ in cognitive ability (p. 1041). Dweck and her colleagues (e.g., Diener & Dweck, 1980: Dweck & Leggett, 1988; Elliot & Dweck, 1988) along with many other researchers (see Kaplan & Maehr, 2007 for a review) have explored the implications of achievement goal related beliefs as they relate to academic outcomes for students of all ages.

Using goal theory as a framework (Ames, 1992; Dweck & Leggett, 1988), I explored one motivational process—the development of mastery goals. In this dissertation, *mastery goals* (also referred to in the literature as learning or task goals) refer to a student's preference for learning for its own sake, that is, the pursuit of the acquisition of skills or knowledge that increase understanding and foster self-improvement. Mastery goals are often contrasted with *performance goals* (also referred to as ability or ego goals), that is, the desire to demonstrate ability. The purpose of this study is to investigate two learner characteristics, a tendency toward actively open-minded thinking and a belief in an incremental theory of intelligence, that are likely to interact with a persuasive message, with either anecdotal or empirical supporting evidence, that will jointly encourage the adoption of mastery goals.

Subsequently, the dichotomous conceptualization of mastery and performance goals was expanded into a trichotomous model with performance goals subdivided into performance-approach and performance-avoid (Elliot & Church, 1997). That is, performance goals were still associated with external judgmental concerns with performance-approach reflecting a desire to demonstrate ability to others and performance-avoid goals with a desire to hide a lack of ability from others. Subsequently, Elliot (1999) fully crossed the model by sub-dividing mastery goals

into mastery-approach and mastery-avoid. Mastery goals continued to be identified with a desire to gain knowledge and skills with mastery-approach reflecting a desire to seek opportunities for self-improvement and mastery-avoid as a desire to shun situations where personal growth was unlikely. There has been little support for the inclusion of the mastery-avoidance goal orientation and the trichotomous model predominates in the literature (Kaplan & Maehr, 2007, but see Elliot & McGregor, 2001).

On the basis of the assumption that multiple goals play a part in directing achievement motivation, Murphy and Alexander (2000) raised the issue of the relationships among goal orientations that would generate an optimal level of motivation. In order to consider the most advantageous goal orientation for university students, the possibility of separability, or how independent each of the goal orientations are from each other, is of interest. Pintrich (1999) suggested that achievement goals were separable and that endorsement of multiple goals at any one time were likely. Combinations of goals could be associated with advantageous educational outcomes. He described the multiplicative interaction effect or the simultaneous adoption of high mastery and high performance goals. Alternatively, the normative model with a strong focus on mastery goals in combination with low performance goals might be most potent in motivating students toward positive academic outcomes. Barron and Harackiewicz (2001) postulated, based on the multiple goal assumption, that there are four combinations with potentially favorable achievement outcomes. First, the *additive hypothesis* proposes that both mastery and performance goals, acting independently but in concert, lead to positive achievement outcomes. The *interactive hypothesis* suggests that the two goals interrelate such that neither is best independently but together they interact to bolster motivational effects. The *specialized goal hypothesis* that individual goals are best depending on the particular outcome sought. Finally, the

selective goal hypothesis requires the individual to select the appropriate goal depending on the situation or circumstances (p. 708).

Studies that have compared single goal to multiple goal endorsement have found that mastery goals, or mastery goals in combination with other goals (e.g., performance goals), are most closely associated with positive educational outcomes. Barron and Harackiewicz (2001) compared the mastery goal perspective, or the conviction that emphasis solely on mastery goals is best, to the multiple goal perspective, or that combinations of goals may be superior. In a sample of university students, they found that whether goals were self-set (Study 1) or assigned randomly and induced artificially (Study 2), mastery goals or mastery goals in conjunction with performance goals resulted in positive academic outcomes. Other researchers who have explored the multiple goal perspective have confirmed the academic benefits associated with mastery goals or mastery goals along with other goals (Bouffard, Boisvert, Vezeau, & Larouche, 1995; Ng, 2008; Riveiro, Cabanach, & Arias, 2001; Valle, Cabanach, Nunez, Gonzalez-Pienda, Rodriguez, & Pineiro, 2003).

Considerable research, both correlational and experimental, has shown that mastery goal-orientations are associated with positive educational outcomes (Dweck, 2000; Dweck & Leggett, 1988; Pintrich, 2003). Students who hold mastery goals tend to put forth more effort and persevere longer in completing learning tasks than students who prefer performance goals. They are likely to spend more time with the material, analyze it thoroughly, and consider its implications to a greater degree than students who elect other personal goals, such as learning to please others or outperform them (Harackiewicz & Linnenbrink, 2005). In light of the importance of the behaviors associated with mastery goals, it is essential that researchers focus on their role in motivation and explore strategies to foster their development.

The Benefits of Mastery Goals

The adoption of mastery goals has been associated with many positive cognitive, affective, and behavioral academic outcomes. Within an educational context, specific academic outcomes that are associated with mastery goals have been judged as "adaptive" (e.g., Dweck, 1986; Harackiewicz, Barron, Elliot, 1998; Pintrich, 1999). Middleton and Toluk (1999) described the interrelationship among cognitive structures and motivational variables as a basic platform for adaptive behavior in academic settings.

Dweck (1986) referred to adaptive motivational patterns as those that students prize, pursue, and sustain in the face of obstacles. They lead to achievement goals that are important to the individual (p. 1040). In contrast, a maladaptive pattern is characterized as a failure to attain important academic goals by selecting behaviors that fail to lead to successful academic outcomes. Pintrich (1999) considered the endorsement of mastery goals to be "the most adaptive goal orientation for self-regulated learning" (p. 467). Ames and Archer (1988) described adaptive achievement behavior as trying hard, bringing suitable strategies into play, accepting challenges, and actively seeking learning (p. 265). Evidence that holding a mastery goal orientation is adaptive can be found in studies delineating its relationship to positive cognitive, affective, and behavioral academic outcomes.

Adaptive cognitive behaviors for college students are primarily related to the employment of efficacious self-regulatory strategies. Some motivational problems and associated patterns of achievement behavior can have similar implications across all grades. For example, a student who avoids challenges, fails to persist in the face of obstacles, and exerts little effort in their studies will likely have difficulty successfully completing their coursework. In 2007, the degree completion rate for an undergraduate cohort who began in fall 2001 and graduated in summer 2007 (a 6-year bachelor's degree completion rate) was approximately 56.1% despite their initial

academic ability (National Center for Higher Education Management Systems, 2007). This startling statistic suggests that motivational problems may contribute to the attrition rate.

Cognition

Pintrich et al. (1993) introduced motivational factors, as key components, into a model of conceptual change. In particular, mastery goal endorsement was proposed as an important influence on cognitive processes (p. 178). However, the path between goal endorsement and conceptual change may be indirect or even circuitous (p. 174). They believed that motivational factors such as goal orientations affected cognitive processes as learning took place. For example, mastery goals would direct attention to anomalies that could prompt dissatisfaction with current knowledge, highlighting areas of concern, and ultimately leading to conceptual change. Pintrich and Schrauben's (1992) model proposed that motivational beliefs served a meditational function between learner characteristics and academic achievement (p. 153). Many correlational studies (e.g., Pintrich & Garcia, 1991) have attested to a relatively strong relationship between mastery goals and conceptual change but empirical evidence of direct effects has been difficult to document.

Working memory. Linnenbrink, Ryan, and Pintrich (1999), in a sample of 177 undergraduates, explored the relationship between goal orientations and working memory performance. In addition, researchers assessed negative affect and task-irrelevant thoughts as potential mediators between goal orientation and working memory functions. Working memory performance was assessed by using measures of capacity and processing efficiency (p. 218). The researchers induced either a mastery or performance goal perspective. However, a manipulation check revealed that the groups did not differ on goal preference, though it may be possible that the induction made mastery goals differentially salient for participants predisposed toward mastery goals. Self-reported goal orientations were used in their analyses. They found that

mastery goals were significantly related to working memory ($r = .19$, $p < .01$). Further regression analyses revealed that the relationship between mastery goal orientation and working memory function met the criteria for mediation such that negative affect mediated the relationship (mastery goal → negative affect, $\beta = -.36$, $p < .001$; negative affect → working memory, $\beta = -.24$, $p < .001$) (p. 220, 222). That is, students in the mastery goal condition were less encumbered with negative feelings (e.g., anxiety, frustration) and were able to perform better on the working memory task.

Knowledge retention. Directed attention, thoughtful consideration, and accurate encoding of information all contribute to enhanced learning, but for how long? Elliot and McGregor (1999), in a sample of 172 undergraduates (study 2), found that mastery goal orientation, in contrast to performance goal orientation, led to longer retention of previously learned information. Even though this relationship was not the focus of their study, they found a significant relationship between mastery goal orientation and an end-of-semester pop quiz (controlling for SAT score). Their experimental design included an exam during week 6 of the semester, composed of information from three previous exams. At the end of the semester, a shorter version of that exam was administered as a pop quiz. The pop quiz was based on the six-week exam questions and design. Of interest, they found a significant relationship between the overall score on the pop quiz and the short answer and essay section scores and mastery goal orientation ($\beta = .13$ pop quiz overall and $\beta = .14$ short answer and essay section). This natural setting study provided preliminary evidence that mastery goals are associated with knowledge retention at the end of the semester.

Affect

The relationship among mastery goal adoption and adaptive affect has been examined from the perspective of intrinsic motivation and discrete emotions. Affect is predicted to interact with

cognition to enhance or impede learning. Mastery goals have been associated with positive affect such as interest (Hulleman, Durik, Schweigert, & Harackiewicz, 2008) and course enjoyment (e.g., Lee, Sheldon, &Turban, 2003). Harackiewicz, Barron, and Elliot (1998) noted that intrinsic motivation, referred to as a combination of interest and enjoyment, is particularly important for college students as they make decisions about their future. Intrinsic motivation has been associated with mastery goals across multiple studies (e.g., Rawsthorne & Elliot, 1999).

Pekrun, Elliot, and Maier (2006) examined the relationship between goal orientations and several discrete emotions. In an undergraduate sample of 102 German students (Study 1), goal orientation self-report questionnaires were completed during the third week of the semester, after sufficient time had passed for course goals to be formed. The emotions measure, assessing eight discrete emotions, was completed 12 weeks later. The data were subjected to multiple regression analyses to examine the predictive value of goal orientations on academically relevant emotions. They found that mastery goals were a positive predictor of enjoyment ($\beta = .37$), hope ($\beta = .31$), and pride ($\beta = .32$) and a negative predictor of anger ($\beta = -.20$) and boredom ($\beta = -.30$) (p. 588). Further, these results were replicated in an American sample of undergraduates ($N = 167$) (Study 2).

Cron, Slocum, VandeWalle, and Fu (2005) investigated the influence of goal orientations on emotional reactions to performance feedback and self-set goal level. They hypothesized that mastery goals would likely act as a buffer to mitigate the emotional effects after negative performance feedback. In a sample of 102 upperclassmen in a challenging business course, they assessed exam grade goals (i.e., self-set goal level) at two emotionally sensitive times during the semester. Goal orientations were measured at the beginning of the semester. During the class period prior to the first exam (Time 1) they asked participants to estimate their grade for that

exam. Then, they assessed emotional reactions (i.e., nine negative emotions–anger, frustration, shame, sadness, disappointment, depression, worry, uncomfortable) in the class period after the exam and after the students received their exam grade (p. 66). Five weeks later (Time 2), they repeated the process (i.e., estimated grade goal, exam, performance feedback, emotional reactions). The analyses centered on students who received a lower exam grade than the self-set goal level at Time 1 (N = 82) (p. 66). A regression analysis that examined predictors of self-set goal level Time 2 revealed a significant interaction between mastery goals and negative emotions. Further analysis to discern the nature of the interaction revealed that those participants who were low in mastery goals experienced greater negative emotion which resulted in their setting lower goal levels for Exam 2 ($\beta = -.26$, $p < .01$). For participants high in mastery goal orientation, emotional reactions were unrelated to goal level at Exam 2 ($\beta = -.06$, *ns*). Though context is likely to influence goal salience in real-world settings, this study's design provided evidence that mastery goals may interact with emotional reactions to help students adapt to and meet educational challenges.

Lee, Sheldon, and Turban (2003) investigated the influence of goal orientation on course enjoyment. In a sample of 335 undergraduates in a required management course, they found that mastery goals had a significant direct effect on enjoyment ($\beta = .31$, $p < .001$) as well as on mental focus ($\beta = .19$, $p < .001$), a factor that may support learning and performance. Mastery goals have not been found to be associated with negative affect or emotions that hinder learning. Mastery goals were negatively related to test anxiety (Elliot & McGregor, 1999), and negatively predicted boredom ($\beta = -.30$), anger ($\beta = -.10$ *n/s*) (Pekrun et al., 2006, p. 591), and loss of intrinsic motivation ($\beta = -.39$) (Grant & Dweck, 2003).

Behavior

Plainly, motivated students are more likely to perform better than unmotivated students (Hidi & Harackiewicz, 2000). Evidence that those students who adopt mastery goals tend to select strategies and behaviors that support learning can be found in studies that examined the relationship between goal orientations and the use of self-regulatory strategies. Pintrich and Schrauben (1992) proposed that college students select various strategies to support their pursuit of knowledge. Among these are cognitive strategies (e.g., "rehearsal, elaboration, organizational") (p. 159) and metacognitive and self-regulatory strategies ("planning, monitoring, regulating") (p. 151). Correlational research has further emphasized the existence of this relationship.

Vrugt and Oort (2008), in a correlational study, observed the role of mastery goals in a model that first differentiated between students who used either effective or less effective self-regulation strategies. They found that mastery goals influenced metacognition ($\beta = .50$ effective and .53 less effective) that, in turn, affected deep cognitive strategies ($\beta = .39$), metacognitive strategies ($\beta = .41$), surface cognitive strategies ($\beta = .24$) and resource management strategies (e.g., time management, study location selection) ($\beta = .38$) (p. 133). Based on these strong correlational associations, further study is needed to investigate the relationship between mastery goals and self-regulatory behaviors.

Fisher and Ford (1998) observed the influence of mastery goals on effort allocation during a learning task. The sample of 121 undergraduates from psychology courses completed measures of cognitive ability and goal orientation and then were asked to engage in a learning task. The researchers assessed amount of effort (time to learn the task), off-task mental effort (self-reported scale), mental workload (self-report scale), type of effort (learning strategies questionnaire), and use of examples strategy (completion of provided sample problem in packet). After working with

the learning materials and completing the above scales, participants completed knowledge and application tests based on the task materials. In the regression analyses, cognitive ability was entered first as a covariate. Results indicated that mastery goals significantly predicted use of elaboration strategies ($\beta = .28$, $p < .01$) and mental workload ($\beta = .19$, $p < .05$). The researchers concluded that together "cognitive ability, mastery orientation, and time on task are the most important predictors of performance on the knowledge outcome" (p. 413).

In an academic context, mastery goals have been found to have a negative relationship to self-defeating behaviors such as use of self-handicapping strategies (Midgley, Kaplan, & Middleton, 2001), help-seeking threat (Karabenick, 2003), early adolescent cheating (Anderman, Griesinger, & Westerfield, 1998; Wolters, Yu, & Pintrich, 1996) and procrastination (Howell & Watson, 2007). Among the constellation of factors that contribute to achievement related behaviors, it is clear that goal orientations may play an intermediary but meaningful role.

Academic Achievement. Correlational relationships between mastery goals and final course grade have varied among studies though they were generally low and positive. Bouffard et al. (1995) obtained an $r = .12$, $p < .05$ (males) and $r = .19$ $p < .001$ (females). Lee, Sheldon, and Turban (2003, p. 261) found a correlation of .04, *ns*. Elliot and Murayama (2008) obtained one of the few negative correlations between mastery goals and exam performance, $r = -.06$ *ns* (p. 624). Dupeyrat and Marine (2005) found a correlation of $r = .33$, $p < .01$ (p. 51) in a small sample of French adults ($N = 76$).

Church, Elliot, and Gable (2001) conducted a field study that involved a sample ($N = 297$, study 2) of undergraduates in a chemistry course designed to pique interest and improve performance. They hypothesized that goal orientations would mediate the relationship between perceived classroom environment (lecture engagement, class evaluation focus, harsh evaluation)

and competence valuation (independent variables) and graded performance and intrinsic motivation (i.e., interest and enjoyment) (dependent variables) (p. 44). In study 2, researchers obtained SAT scores and participants completed measures for perceived classroom environment and goal orientation at Time 1, prior to the first exam. Intrinsic motivation was assessed one or two classes before the final exam. Course grade was obtained at the end of the semester (p. 47). They found that, although lecture engagement ($\beta = .37$, $p < .01$), evaluation focus ($\beta = -.13$, $p < .05$), and concern with harsh evaluation ($\beta = -.23$, $p < .01$) significantly predicted mastery goals and mastery goals significantly predicted graded performance ($\beta = .20$, $p < .01$) in the expected directions, criteria for meditational influence of goal orientation on graded performance were not met (p. 49). However, mastery goals did mediate that relationship when the outcome measure was intrinsic motivation (p. 50). Church et al. conjectured that the positive influence of mastery goals on graded performance may have resulted from the specialized mission for that particular course. The professors may have inadvertently created a context in which mastery goal orientation would facilitate successful performance. They concluded that "the issue of what enhances the link between mastery goals and performance attainment is in need of research attention" (p. 52).

Grant and Dweck (2003) investigated the influence of goal orientations on various undergraduate behavioral outcomes. In their study, students in a pre-med chemistry course, completed a goal orientation questionnaire, read a vignette that asked them to imagine a failure situation, and then specified how they thought they would respond if such an event happened to them. They found that mastery goals had a negative relationship with withdrawal of time and effort ($\beta = -.40$), and a positive relationship with planning ($\beta = .57$). Further regression analyses

in their study revealed that mastery goals and effort were significant predictors of achievement (the sum of exam grades in four courses) (p. 53).

In contrast to most other studies that have investigated the relationship between mastery goals and achievement outcomes, Grant and Dweck's (2003) research demonstrated that the adoption of mastery goals could influence achievement. In study 4, they showed that mastery goals predicted course grade ($\beta = .20$, $p < .01$) and in study 5, unlike other goal orientations, mastery goals predicted grade improvement ($\beta = .25$), $p < .01$) (p. 549). However, the authors cautioned that these findings may be limited to a particular sub-group, high achieving university students, and context, a challenging science course.

Research has generally shown that mastery goals are not significantly associated with academic achievement. However, there are no studies that have reported serious detrimental effects of mastery goals relative to other goal orientations in affecting achievement outcomes. Some researchers (see Barron & Harackiewicz, 2001) have proposed that a multiple goal perspective, especially in light of contextual or situational presses, may be the proper perspective in understanding the relationship between goal orientations and academic achievement. I argue that further research is needed to identify and clarify the conditions under which mastery goals are related to academic achievement.

Hidi and Harackiewicz (2000) stated that at the college level, difficult or boring classes, uncompromising professors, and the appeal of extracurricular distractions present serious motivational tests for many college students. Further, as students enter the university milieu, they are likely to encounter a greater need for self-regulation; that is, the monitoring of one's own learning and study strategies (Pintrich, 1989). A better understanding of how to foster the adoption of mastery goals at the college level may facilitate resolution of such motivational

problems. The purpose of this dissertation was to investigate two student characteristics as moderators of the effect of two types of persuasive messages on students' endorsement of mastery goals.

Changing Mastery Goals

Goal orientations are defined as personal beliefs that consist of reasons for behavior in academic settings (Pintrich et al., 1993). Pintrich and Schrauben's (1992) model depicting the relationships among motivation, cognition, and the classroom context portrays motivational beliefs as having three general components—expectancy, value, and affect (p. 152). Achievement goal beliefs are subsumed under value in their model (p. 155) that includes reasons offered for participating in an academic activity. This aspect of their model is consistent with Dweck and Leggett's (1988) conception that goal orientations are based on reasons and purposes described for engagement or disengagement in a learning activity. In both theoretical models, beliefs about motivation play an integral part in achievement motivation.

Pintrich (2000a) described motivational beliefs such as goal orientations as "inherently cognitive and assumed to be accessible by the individual" (p. 96). Attempts to identify the factors that are likely to influence attitudes or modify related beliefs have a long history in research on persuasion in social psychology (Petty & Wegener, 1997). Two important influences on attitude change are the characteristics of the message and personal characteristics (Petty & Cacioppo, 1996). The focus on changing mastery goals in this study is based on social psychological research on attitude change through persuasion and that research relevant to the study from that perspective will be reviewed in the following section.

Message Characteristics

Characteristics of messages have been found to influence conceptual change; a process that theorists have argued is similar to altering beliefs (Hynd, 2003; Mason, 2001). Persuasive texts

have been employed as a means to effect conceptual change. Researchers have explored argument structure (e.g., refutational vs. non-refutational, Hynd & Alvermann, 1986) and evidence types (e.g., anecdotal vs. data summary, Baesler & Burgoon, 1994) as they relate to persuasiveness and ultimately, conceptual change.

Characteristics of persuasive messages have been studied as they relate to persuasiveness and affect beliefs (Murphy, 2001; Vosniadou, 2001; O'Keefe, 2003). Aspects of persuasive messages have been found to exert enough influence to modify beliefs. Some text features that were found to support the effectiveness of persuasive text are comprehensibility, believability, and utility (Hynd, 2001, p. 705). Multiple studies have compared the efficacy of different types of evidence offered in support of the claim and argument within the persuasive message (e.g., Baesler, 1997).

Within the literature on persuasion, the type of evidence in an argument aimed at changing beliefs has been found to be an influential feature of persuasive messages (Reinard, 1988). For example, Boster, Cameron, Liu, Lillie, Baker, & Ah Yun (2000) found that the presence of statistics in a message describing the quality of cafeteria food affected the judgment and attitudes of the undergraduate participants. Other studies have noted the benefits of anecdotal evidence. For example, Feeley, Marshall, and Reinhart (2006) found that narrative evidence was superior to statistical evidence in a message advocating organ donation. Clearly, the influence and effectiveness of different types of evidence (e.g., empirical or anecdotal) on belief change has been mixed (Allen & Preiss, 1997; Reinhart, 2006). In addition, persuasive message topics vary widely and few researchers have investigated the effect of persuasive evidence types on motivational constructs.

The research on message types (i.e., anecdotal and statistical evidence) is mixed. It is possible that other factors may confound the effects of the evidence types on belief change. Personal characteristics (e.g., prior knowledge, openness to ideas) may be one such factor. Personal characteristics may have a moderating influence on evidence type and alter beliefs.

In this study, I assessed the effect of two persuasive message types, one with an anecdotal message and one with an empirical message, and the interaction of these messages with two personal characteristics, actively open-minded thinking and incremental theory of intelligence, as they relate to belief changes in mastery goal orientation. In this way, I will add to our understanding of the role of persuasion in belief change as it relates to achievement goal orientations.

Personal Characteristics

People's internal dispositions, those previously acquired patterns of thinking that learners bring to the learning situation, act as a filter that inhibits, supports, or distorts messages intended to alter their attitudes. Such psychological characteristics are likely to play a significant role in initiating attitude change. These dispositions vary on the basis of the individual's experiences and self-understandings (Bandura, 1986, 2008). People who are more inclined to seek out and scrutinize new information (i.e., those who readily engage in actively open-minded thinking and those who believe that intelligence is malleable and can be increased through effort) may consider elements in persuasive arguments more thoroughly than those who do not (cf. Perloff, 2003, p. 214). In this study, these two dispositions, actively open-minded thinking and implicit theories of intelligence, were examined as moderators of the effect of message type on mastery goals.

Actively open-minded thinking (AOT). Actively open-minded thinking is a personal characteristic that may be important in changing mastery goal orientations. According to Baron

(1985, 1994), actively open-minded thinking refers to dispositions to scrutinize and seriously consider new information and ideas even when information is contradictory to prior beliefs. Those who possess this disposition to a greater degree are more likely to weigh evidence presented in a persuasive message than those who are less disposed to actively open-minded thinking (Stanovich & West, 1997). For example, in a sample of 349 undergraduates, Stanovich and West (1997) investigated the relationship between actively open-minded thinking and students' ability to evaluate arguments independently of their prior beliefs. The investigators found that students' actively open-minded thinking was a significant predictor of argument quality even when cognitive ability was controlled, suggesting that people who are disposed to actively open-minded thinking tend to attend to and consider evidence presented within an argument more than those who hold onto prior beliefs when new evidence is available.

Offering further evidence of the relationship between actively open-minded thinking and the tendency to scrutinize persuasive messages, Stanovich and West (1998) conducted four experiments that explored the relationships between actively open-minded thinking and rational thinking tasks. Of particular interest here is the relationship between actively open-minded thinking and the statistical reasoning or inductive preferences task. On this measure, participants were exposed to two types of evidence and required to make a decision after reading both types of evidence. One type of evidence was based on statistical information that favored the decision (e.g., buy a car). The other type of evidence was anecdotal (i.e., single case or personal experience) and favored the opposing view (e.g., not buy the car). Higher scores on this measure indicated a preference for statistical evidence. Stanovich and West found a small but statistically significant relationship between actively open-minded thinking and a preference for statistical reasoning. The correlations ranged from .20 to .28 in the three experiments reported in their

research. These results suggest that people who are high in actively open-minded thinking tend to prefer statistical evidence over anecdotal evidence during a decision-making process.

In light of these results, it seemed possible that in this study, students who were high in actively open-minded thinking might be more influenced by an empirical message than by an anecdotal message. In contrast, students low in actively open-minded thinking might be more influenced by the anecdotal message than by the empirical message. However, no research has investigated the role of actively open-minded thinking as a potential moderator of the effect of message type on beliefs such as goal orientations. Actively open-minded thinking, however, is similar to Cacioppo and Petty's (1982) description of need for cognition. Need for cognition is a dispositional preference for effortful thinking across contexts (Cacioppo & Petty, 1982). Cacioppo, Petty, and Morris (1983) developed a need for cognition scale, which was created "to distinguish between those who dispositionally tend to engage in and enjoy analytic activity and those who do not" (p. 806).

Cacioppo, Petty, Feinstein, and Jarvis (1996) summarized correlates of need for cognition found in over 100 studies. Of particular relevance to this study, need for cognition was related to the Ideas subscale of Costa and McCrae's (1978) Openness to Experience scale (r = .78). In fact, Stanovich and West (e.g., 1997, 1998) included both the Need for Cognition and Openness to Experience scales on their composite measures of actively open-minded thinking in their early work on this topic. Also, need for cognition had a low, but significant relationship to orientation to uncertainty, which refers to a "desire to maximize information gain rather than maintain one's own perceived reality" (Cacioppo et al., 1996, p. 213).

Need for cognition, like actively open-minded thinking, implies a preference for acquiring new information over satisfaction with preexisting knowledge that could strengthen the

likelihood of scrutiny of evidence within a persuasive message. In a study of college students' interpretations of conflicting information on a controversial issue, Kardash and Scholes (1996) asked their participants to write a conclusion after reading a text that presented conflicting evidence on the topic of whether HIV causes AIDS. The researchers found that students who scored lower on need for cognition tended to ignore the contradictory evidence in their conclusions, whereas the conclusions of those with higher need for cognition more accurately represented the contradictory evidence in the text they had read.

One study has shown that need for cognition can moderate the effect of message type on beliefs. Vidrine, Simmons, and Brandon (2007) investigated whether need for cognition moderated the effect of message type on college students' perceptions of the risks of smoking. They found that students who were high in need for cognition perceived greater risks of smoking if they read a fact-based message than if they read an emotion-based message; in contrast, students who were low in need for cognition perceived greater risk if they read the emotion-based message than if they read the fact-based message. In light of the similarity between need for cognition and actively open-minded thinking, I hypothesized that findings similar to those obtained by Vidrine et al. (2007) would be obtained in this study. That is, actively open-minded thinking would moderate the effect o.f message type on mastery goals.

Implicit theories of intelligence (ITI). Dweck (1999) used the term implicit theories to refer to the presuppositions people hold about the stability of personal attributes (e.g., intelligence, personality). Dweck, Chiu, and Hong (1995) described two implicit theories of intelligence as core assumptions that serve as a framework for understanding and judging human ability (p. 268). An entity theory of intelligence, which refers to the belief that intellectual ability is genetically fixed and remains so throughout life, and in contrast, an incremental view of

intelligence which is the belief that intellegience can be increased through effort. People who adopt the entity perspective construe intellectual ability as an immutable personal characteristic and those with the incremental viewpoint tend to perceive intellectual ability as dynamic and malleable (Dweck, 1999).

Dweck (1999) conceived of these self-theories of intelligence as relatively stable yet susceptible to revision. In a longitudinal study of 508 undergraduate students at the University of California at Berkeley, Robins and Pals (2002) found support for the stability of implicit theories of intelligence, finding no significant changes in students' scores on implicit beliefs of intelligence measured in Years 2, 3, and 4 of their university program. However, Dweck and Master (2008) and Aronson, Fried, and Good (2002) have reported greater short-term increases in students' incremental theories of intelligence when they read an article that offered information demonstrating the modifiability of intelligence than did students who read an article that presented information indicating that intelligence is largely fixed.

In Dweck and Leggett (1988) and subsequent studies by Dweck and her colleagues (e.g., Zhao & Dweck, 1994), and others (e.g., Button, Mathieu, & Zajac, 1996; Roedel & Schraw, 1995) implicit theories of intelligence have been shown to be positively related to goal endorsements. People who have an entity perspective of intelligence prefer performance goals. In contrast, those who hold an incremental theory tend to endorse mastery goals (Dweck et al., 1995b; Dweck, 1999). For example, Robins and Pals (2002), in a sample of college students ranging from 200 to 508 over the course of their multi-year study, found a moderate correlation between students' entity theory of intelligence and their performance goals ($r = .31$, $p < .05$) a significant negative relationship between an entity theory of intelligence and mastery goals ($r = -.25$, $p < .05$) indicating that mastery goals are associated with the incremental theory of

intelligence (p. 323). Relationships between incremental beliefs of intelligence and motivational characteristics that are consistent with behavior patterns associated with mastery goal orientations include strategy use (r = .31) (Braten & Olausson, 1998), motivation, diligence, and concentration (Ommundsen, Haugen, & Lund, 2005), enjoyment of the educational process, interest in academic pursuits and grades (Aronson et al., 2002), and self-esteem through the college years (Robins & Pals, 2002). Thus, because of its close association with behavior patterns akin to the pursuit of mastery goals and it's key role in Dweck's model that described goal orientations (Dweck & Leggett, 1988) an incremental theory of intelligence is considered part of the framework of constructs that serve as antecedents and consequences of mastery goals and are likely to be a psychological characteristic that would interact with a persuasive message to influence endorsement of mastery goals (Payne et al., 2007).

Efforts to alter implicit theories of intelligence have met with some success. For example, Bergen (1991) contrasted the effect of two articles designed to induce entity and incremental views on response to failure. He found that students who held the incremental perspective did exhibit greater persistence when compared to those with an entity view. Ommundsen et al. (2005) found that those students with an incremental view were better able to concentrate (r = .25), demonstrated conscientiousness (r = .26), and engaged in deep processing of information (r = .15) (p. 468). Mangels, Butterfield, Lamb, Good, and Dweck (2006) employed neuro-imaging techniques to investigate attentional and mental processing implications of entity and incremental theories of intelligence. They concluded that incremental theorists engaged in deeper semantic processing that enabled them to make significantly more error corrections than the entity theorists did.

It seems reasonable to assume that incremental theorists who construe intelligence as malleable are likely to scrutinize text messages more thoroughly than entity theorists and thus be receptive to persuasive messages. However, no studies have explored the effect of the interaction between type of persuasive messages and an incremental theory of intelligence on the adoption of mastery goals. On the basis of this rationale, I hypothesized that implicit beliefs would interact with persuasive messages such that incremental theorists would notice, consider, and evaluate the evidence in an argument more thoughtfully than those who hold an entity view.

Summary

In sum, individual differences in the personal characteristics of actively open-minded thinking and implicit theories of intelligence are psychological characteristics likely to affect how people respond to persuasive messages. Specifically, the evidence suggests that people who are high on actively open-minded thinking are more likely to seek and accept information that conflicts with their expectations than are people who are low on actively open-minded thinking. Applied to this study, this evidence suggests that those who are high on actively open-minded thinking are more likely to be influenced by an empirically based message on the benefits of mastery goals, whereas those who are low on actively open-minded thinking are more likely to be influenced by an anecdotal message. With respect to implicit theories of intelligence, it is expected that incremental theorists will respond to persuasiveness of messages and enhance mastery goal orientations accordingly as compared to entity theorists.

Purpose of the Study

In consideration of the potential benefits of mastery goals to students, I investigated the effect of two types of persuasive messages on mastery goal orientation. I also examined whether actively open-minded thinking and incremental theory of intelligence moderated the effect of type of persuasive message on students' mastery goal orientations.

An experiment was conducted to compare the effects of an empirically-based text, an anecdote-based text, and a control condition in which the text was unrelated to mastery goals to determine which text would have the strongest effect on the endorsement of mastery goals. One message presented a persuasive text argument using experimental research results that indicated positive relationships between mastery goals and desirable behaviors related to learning (i.e., self-regulation, interest, deep processing, persistence, and enjoyment). This message was designed to increase participants' understanding of the benefits of mastery goals on the basis of scientific data. The other message, though similar to the empirically-based message in length and reading difficulty, presented anecdotal examples as evidence for the adoption of mastery goals. In the control condition, participants read a text of equivalent length and difficulty that discussed the peculiarities of memory.

Research Questions

With this study, I proposed to answer three questions:

1. Is the effect of type of persuasive message (anecdotal, empirical, or control) on mastery goals moderated by actively open-minded thinking immediately after reading the text?
2. Is the effect of a persuasive message (anecdotal, empirical) on mastery goals moderated by incremental beliefs about intelligence immediately after reading the text?
3. If the effect of the type of persuasive message on mastery goals is not moderated by actively open-minded thinking or an incremental belief about intelligence, then does type of persuasive message (anecdotal vs. empirical) affect endorsement of mastery goals immediately after reading the text?

Theoretical Significance of the Study

Pintrich and Zusho (2002) proposed a general model for student motivation and self-regulation at the college level (p. 59). The model suggests that personal and contextual factors together affect motivational and self-regulatory processes that, in turn, mediate adaptive learning outcomes. Also, because it is a social-cognitive model, relationships in the model are expected to

be reciprocal (p. 58). Motivational and self-regulatory processes are proposed to be malleable and interactive. If we presume that this model is a fair representation of the major factors that influence positive learning outcomes, then studies that investigate the relationships within this system are likely to be most useful in assisting students in supporting their own motivation and self-regulation.

One key relationship in motivational social-cognitive models that has received little attention is the relationship between personal characteristics and contextual factors that influence students' adoption of mastery goals (motivational processes). For college students, researchers have identified several personal characteristics (e.g., conscientiousness, openness to experience) that have influenced mastery goals (Payne et al., 2007). Various contextual variables have been found to influence the adoption of mastery goals (e.g., temporary goal inductions) (Bergin, 1995, Harackiewicz & Elliot, 1993). Student's perceptions of the classroom goal structure (i.e., academic environment) have been found to influence their goal orientations (e.g., Greene, Miller, Crowson, Duke, & Akey, 2004). The Pintrich-Zusho Model is social-cognitive in that it presumes that personal characteristics and contextual factors will interact to influence motivational processes. However, few studies have investigated the synergistic effects of personal characteristics and contextual factors and their influence on motivational processes.

Other aspects of the Pintrich-Zusho Model (e.g., mastery goals, mediated by self-regulatory strategies, affect achievement) have been demonstrated. For example, Linnenbrink and Pintrich (2002a), using a sample of 110 undergraduates (study 2), investigated the relationship between mastery goals and conceptual change within the context of physics knowledge and understanding. The participants first completed a pre-test on physics knowledge. Following that, participants read a short narrative about a student exemplifying a mastery goal

(seeking to learn) or performance goal (besting others), were then asked to recall a situation similar to that of the narrative's character, and then focus on either "learning and understanding" or be prepared to "answer the questions better than anyone else" (p. 134). This series of activities constituted the goal induction portion of the experiment. After that, they read a text on physics. Follow-up measures included physics comprehension along with self-reports on goal orientation and use of self-regulatory strategies. The goal induction failed to differentiate the groups sufficiently to discern group outcome differences. Therefore, analyses incorporated the self-report goal orientation measure. Results indicated that mastery goals (and pre-test physics knowledge) were significant predictors of scores on the post-test physics knowledge measure ($\beta = .33$, $p \leq .001$). They also found that the relationship between mastery goals and increased physics knowledge (pre- to post-test) was mediated by reported use of elaboration strategies and the negative relationship to negative affect (p. 129). In their study, pre-test knowledge was entered into the regression equations as the first predictor but those scores were not controlled. However, their study provided preliminary evidence of the influence of self-regulatory strategies on the relationship between mastery goals and achievement outcomes.

With respect to the relationship between personal characteristics and mastery goals, Zweig and Webster (2004) investigated the association between the Big Five personality factors (i.e., extraversion, emotional stability, openness to experience, conscientiousness, agreeableness) and goal orientations. Their participants, 786 undergraduates recruited from introductory psychology courses, completed questionnaires that assessed personality factors and goal orientations (p. 1700). They found that all five personality factors were significantly related to and distinct from mastery goal orientations. Of interest, conscientiousness ($\beta = .43$, $p < .05$) and openness to experience ($\beta = .37$, $p < .05$) were the strongest predictors of mastery goals in their model (p.

1704). Their study did not examine the reciprocal relationships (i.e., mastery goals prediction of personality factors) that would be expected in the Pintrich-Zusho model. The authors recommended that future research is needed to identify mediators (e.g., contextual factors) that could redirect (toward mastery goals), interact with, or strengthen the existing relationships between personality factors and goal orientations (p. 1705).

With respect to the relationship between contextual influences and motivational processes (e.g., goal endorsement), Linnenbrink and Pintrich (2001) emphasized that "goal theory stresses the importance of examining both "objective" features of the classroom environment that can promote certain types of goals as well as more "subjective" and personal perceptions or construals of the context" (p. 256). Previous research, primarily conducted with younger students, has noted the association between personal goal orientations and students' perceptions of classroom goal structures (e.g., Roeser, Midgley, & Urdan, 1996; Urdan & Midgley, 2003; Wolters, 2004). Urdan (2004) noted that variation in teacher's motivational messages and methodological issues (e.g., between and within classroom comparisons) may obfuscate directionality and clarity in understanding contextual influences and directionality in the student-classroom relationship (p. 230).

A study that explored contextual factors and goal orientations with respect to their influence on self-regulatory strategies at the college-level was conducted by Lyke and Kelaher Young (2006). In their study, 322 undergraduates in a Human Development course completed a goal orientation self-report measure (Patterns of Adaptive Learning Survey - PALS) and a measure that assessed typical strategy use at the beginning of the semester (Time 1). These same measures, along with scales that assessed perceptions of mastery structured classroom and perceptions of performance structured classroom, were completed at the end of the semester

(Time 2) (p. 482). Results indicated that students' goal orientations remained stable during the semester (p. 48*2).* Also, students' mastery goal scores (Time 1) correlated significantly with perceptions of a mastery structured classroom (Time 2) ($r(210) = .33$, $p < .001$). Similarly, students' performance goal scores (Time 1) correlated significantly with perceptions of a performance structured classroom (Time 2) ($r(210) = .19$, $p < .01$). That is, students' perceptions of class goal structure tended to match their own goal orientations leading the researchers to comment "Classroom goal structure, then, may very well be in the eye of the beholder" (p. 487). Such sampling methods that compare personal goals and perceptions of goals, done in natural settings, often fail to identify specific contextual elements that are associated with goal orientations.

Researchers who have deliberately tried to advocate the adoption of mastery goals (contextual to motivational processes path) have primarily done so using subtle techniques such as goal inductions. Goal inductions have met with mixed success. Linnenbrink and Pintrich (2002a) induced alternative goal orientations using a short instructional paragraph (study 1) unsuccessfully (p. 121). In study 2, they attempted to bolster the goal induction by asking participants to first read a small narrative story about a student who typified either a mastery or performance orientation followed by a request to recall a similar situation from their own life. Finally, the participant received the same instructions that were employed in study 1. This goal induction also failed (p. 128). Harackiewicz and her colleagues (e.g., Elliot & Harackiewicz, 1996) and others (e.g., Bouffard, Bouchard, Goulet, Denoncourt, and Couture, 2005) have successfully induced alternative goals by highlighting goal type characteristics prior to engaging in a task. However, Brophy (2005) has questioned definitional and methodological procedures in some goal induction research (p. 169).

Clearly, more research is needed to identify personal and contextual factors that, together, could encourage the adoption of mastery goals. Based on previous research, I selected two personal factors that are likely to interact with a contextual factor (persuasive messages) to affect mastery goals. Actively open-minded thinking has been shown to be related to analogous personal factors that have previously been shown to relate to mastery goals (e.g., openness to experience) and interact with contextual factors (e.g., need for cognition) to affect self-belief systems. Second, I chose incremental theory of intelligence as a personal factor that has been found to be related to mastery goals as proposed in Dweck & Leggett's (1988) model and is likely to respond to persuasive messages.

Investigations into the effects resulting from an interaction between personal and contextual factors and their combined influence on motivational processes will enhance our understanding of how best to promote the adoption of adaptive goal orientations. To address this issue in this dissertation, I examined the effect of the interaction of two personal characteristics (i.e., an incremental belief about intelligence and actively open-minded thinking) and the contextual variable of type of persuasive message (anecdotal, empirical, or control) on the adoption of mastery goals.

Practical Significance of the Study

Within the framework of goal theory, people are described as assessing the meanings associated with academic contexts, and goals are conceived of as the *reasons* or purposes they offer for striving in academic environments (Maehr & Kaplan, 2007). For example, people who tend to endorse mastery goals share a desire to learn and increase their range of skills for the purpose of enhancing their competence. This desire includes an acceptance of and appreciation for reasonable challenges and fuels the effort to meet commitments. Alternatively, people disposed toward performance goals instead of mastery goals are more concerned with the

judgments of others and tend to approach academic situations as opportunities to demonstrate or conceal their abilities from the scrutiny of others. Researchers have identified consistent patterns of motivated behavior associated with mastery and performance goals. For example, research conducted with university students that explored the relationship between goal orientations and use of self-regulatory strategies found that mastery goal orientations were positively associated with the self-regulatory strategies of elaboration, organization, and self-regulation (Pintrich, 1999).

Dweck and Master (2008) posited that an understanding of study strategies in itself is insufficient; rather, a motivation to appropriately employ strategies is necessary for optimal academic outcomes (p. 45). There is some emerging evidence to suggest that this is the case. Blackwell et al. (2007), in an intervention study, compared two groups of junior high students. They found that those students who received the study skills as well as motivational training achieved higher math grades than those in the skills only condition (study 2, p. 257). The present study is designed to assist college students in potentially acquiring an adaptive motivational component to augment their repertoire of study strategies.

Effective strategies based on such investigations on the interaction of personal and contextual factors that foster adoption of mastery goals might provide the basis for identifying strategies for fostering students' development of motivation to learn for the sake of learning. In the hope of providing evidence of such factors, in this study I investigated the effect of the interaction of two personal factors (i.e., incremental beliefs and actively open-minded thinking) and one contextual factor (i.e., type of persuasive messages: empirical vs. anecdotal) on mastery goals.

As college students engage in the management of their own learning, regulation of their own motivation (metamotivation) and thinking (metacognition) becomes more important (Boekaerts, 1995). Mastery goals are related to and support adaptive self-regulatory strategies (e.g., meeting challenges, seeking help when needed) and avoiding maladaptive self-regulatory strategies (e.g., procrastination, work-avoidance) (Pintrich, 1999). Therefore, the findings of this study could provide useful insights that would enable college students to facilitate their own learning.

CHAPTER 2
REVIEW OF THE LITERATURE

In this chapter, I present an overview of the theoretical background and research support for promoting mastery goals over performance goals. I begin with a discussion of the nature of goals within an academic context and the general framework of the relationships among them. That is, I will consider whether mastery goal orientations are stable, personality traits—displayed across contexts and situations, temporary states of being—situationally sensitive, or somewhere between the two. Also, I review the studies that demonstrate the benefits for those who select and work toward mastery goals. Further, research on goal orientations has stimulated a debate relative to the number of goals, what they are, how they are configured (e.g., operate independently, additively, selectively), and their potential for interaction. A brief review of this controversy is included in order to situate the present study within the context of current research as well as address possible anomalies arising from alternative conceptions and experimental results.

For the purposes of this dissertation, goal orientations are presumed to be quasi-traits that are akin to malleable attitudes and beliefs (DeShon & Gillespie, 2005). As such, factors that are likely to influence mastery goal orientations are considered and described. The process for changing mastery goal orientations as attitudes or beliefs using persuasive messages is derived from the work of Petty and Cacioppo (1986, 1990; Petty et al., 1997). This perspective forms the foundation of the rationale for persuading students to choose mastery goal orientations in academic contexts. In this study, I summarize the literature on message characteristics that are most likely to be effective in supporting the adoption of mastery goal orientations. That is, I will consider elements of messages that will foster elaboration of content, build interest, contribute to affective responses, incorporate meaningfulness and personal relevance, and suggest the most

effective argument type. This discussion will form the basis for the hypothesized results expected from the differential influence of alternative persuasive messages on mastery goal orientations.

The psychological characteristics of the learner are key aspects in the interaction with and interpretation of persuasive messages. I present evidence of two attributes; incremental theories of ability and actively open-minded thinking that studies suggest are likely to interact with persuasive messages in an academic setting. Finally, research is discussed that relates to two types of persuasive message evidence types, anecdotal and statistical, that will be compared in this study in terms of their effectiveness in encouraging the selection of and adherence to mastery goals.

The Nature of Mastery Goals

Researchers' attempts to understand achievement motivation within a goal theory framework have achieved some measure of success. Notable progress has been made in defining the underlying concepts, constructs, and processes (Pintrich, 2000a). Also, models have been constructed that reasonably explain how a group of related concepts surrounding mastery goals have evolved from the initial research of the early theorists in this field (Ames, 1992; Dweck & Leggett, 1988; Nicholls, 1984). Recent summaries of research related to achievement goal theory (DeShon & Gillespie, 2005; Grant & Dweck, 2003; Kaplan, 2004; Kaplan & Maehr, 2007; Pintrich, 2000a) have offered useful approaches to forming a manageable structure and have forged a meaningful and constructive understanding of achievement goal theory.

Accessibility, Variability and Separability

According to Murphy and Alexander (2000), there are three unresolved issues concerning the nature of achievement goals. They are accessibility, separability, and variability (p. 37). Accessibility refers to an individual's level of awareness or conscious access to achievement beliefs. Pintrich (2000a) argued that because goal orientations are not generally conceived of as

innate motives or drives, the issue of accessibility is moot. He believed that they are explanatory rationales, known consciously to the individual, and are by definition, accessible (p. 96).

Variability refers to the degree that achievement goals are thought of as “traits” or relatively unvarying personality characteristics that are expressed similarly across situations and contexts (Murphy & Alexander, 2000). Alternatively, others have considered achievement goals to be temporary or “states” of being that are susceptible to environmental influences (e.g., Steele-Johnson, Heintz, & Miller, 2008). Comparative permanence is what primarily distinguishes the two conceptualizations. Traits are more stable than states and can be expected to vary individually resulting in different behavioral outcomes (Kaplan & Maehr, 2007).

There is evidence to support both perspectives. Goal beliefs, either mastery or performance, were found to be moderately stable during the school grade transition from sixth to seventh grade (Anderman & Midgley, 1997), within a school year during high school (Nolen & Haladyna, 1990), and across the college years as moderated by their relationship to implicit beliefs (Robins & Pals, 2002). Researchers who have presumed that goal orientations behave in a trait-like way have measured these traits similar to other personality factors. That is, they have used self-report surveys and questionnaires (Dweck, 1999). Researchers who have focused on the vulnerability of goal orientations to situational or environmental influences (i.e., classroom contexts) have either temporarily induced goal orientations in order to investigate subsequent related behaviors or studied the influence of various factors with the classroom environment (Urdan, 2004).

In particular, the categorization of goals proposed by DeShon and Gillespie’s (2005), [based on Button et al. (1996)] comprehensive review and meta-analysis of goal orientation conceptualizations and operationalizations, is a positive beginning. Based on 88 empirical

studies, they organized definitions of goal orientations into five distinct groups: goals, traits, quasi-traits, mental frameworks, and beliefs. By goals they assumed the typical meaning of the adoption or preference for a specific aim or target goal. Traits were considered personality dispositions that are articulated across contexts and situations. Quasi-traits were defined as somewhat stable personality features but with the potential to be influenced by environmental factors. Mental-frameworks were a conglomeration of privately held values, attitudes, affects, goals, and thoughts. Beliefs included generalized belief systems (e.g., implicit theories relative to ability) (p. 1101). These five groups have proved useful in understanding motivation in an achievement context, especially the first three, which merit additional elaboration here.

First, with respect to goals, early research on the implications of goal adoption and, later, goal orientation, focused on two principal reasons why students perform well in an achievement context. The first important reason is to develop and improve the self based on an intraindividual standard. That is, to acquire the knowledge and skills that expand the reservoir of abilities and gain competency that leads to growth. This line of reasoning led to the adoption of what has variously been named mastery, learning, or task goals (Ames, 1992; Dweck & Leggett, 1988; Nicholls, 1984). Reasons offered by students that revealed a desire to prove competency, especially in comparison to others, would be labeled performance or ego goals. Under DeShon and Gillespie's classification, these rationales would be included in the goals group. More recently researchers have sub-divided the dual goal model, mastery and performance by incorporating an approach or avoid framework. That is, goals can be conceived of as either mastery-approach or mastery-avoid or performance-approach or performance-avoid (Elliot, 1999, 2005). The essential distinction remained that individuals' engagement and persistence

emanates from either a desire to improve the self (i.e., to acquire knowledge and competence) or enhance the self-image (i.e., demonstrate competence and impress others in a social situation).

In studies in which goal orientations are conceived of as enduring traits or dispositions (Button et al., 1996; Phillips & Gully, 1997; Silva & Nicholls, 1993) individuals who tend to hold mastery goals (e.g., improve the self) and persons who tend to hold performance goals (e.g., show ability) are presumed to maintain their goals over time and in a variety of situations. From this perspective, goals are considered to be distinct from each other and spread along a unidimensional continuum with mastery goal orientations at one end and performance goal orientations at the other. As a result, in studying goal orientations, and before experimentation proceeded, a questionnaire was usually completed to identify and separate the two types into distinct groups using a median split (e.g., Schraw, Horn, Thorndike-Christ, & Bruning, 1995).

Within the trait or dispositional research program, cognitions, behavior, and outcomes are expected to vary based on goal orientation tendencies. Quasi-traits also include the two primary goal-orientations, but they are described as vulnerable to and potentially modified by situational or contextual demands (DeShon & Gillespie, 2005, p. 1101). Of the 88 studies reviewed and analyzed by Deshon and Gillespie, only 13.5% fell into this category (p. 1100).

The issue of separability has been studied from several perspectives. Separability refers to how achievement goal beliefs can be distinguished within an individual. The unidimensional approach (i.e., dual goal model), conceptualized by Dweck (1986) and others (Ames, 1990; Nicholls, 1984) divides students' goal orientations into either mastery goal oriented or performance goal oriented. Subsequently, the notion that multiple goals can co-exist within an individual and be activated usefully in a given context or circumstance has been explored (Pintrich, 2000a).

Multiple goal models consisting of four different goals (i.e., mastery-approach, mastery-avoid, performance-approach, performance-avoid) (Elliot, 1999; Elliot & McGregor, 2001) or three-goal models (mastery, performance-approach, performance-avoid) (Elliot & Church, 1997; Young, 2007) have received some attention and support. Finney, Pieper, and Barron (2004) found clear support for the four-factor model based on a sample of over two thousand freshmen undergraduates. The separation of mastery goals into mastery-approach and mastery-avoid has found empirical support (Elliot & McGregor 2001; Young, 2007). However, the concept of mastery-avoidance, or the concern that sufficient learning will take place, may have been artificially created to make the approach-avoid distinction symmetrical and may not have full empirical basis (Pintrich, 2003, p. 676). Mastery avoidance is not only difficult to conceptualize but may be difficult to separate from other goal orientation concepts that have been proposed (e.g., work-avoidance) (Was, 2006). Young (2007) did not find a distinction between performance-avoidance and mastery-avoidance (p. 241) and concluded that his data provided evidence for the three-goal model. Pintrich (2003) also noted that empirically sound relationships to mastery-avoidance were scarce and questioned the significance and usefulness of the concept.

Most studies have focused on a three-goal model with mastery goals as a single goal and performance goals bifurcated into the approach-avoid distinction (Pintrich, 2000b). Ross et al. (2002) observed that across the twelve studies they reviewed, with participants ranging from 2nd grade through college, almost half reported the relationship between mastery goals and performance-approach to be low and positive (p. 484). The assumption that multiple goals are present within each person and that mastery and performance-approach goals have been found to be slightly positively related raises the question of which combination of goals are optimal for performance and achievement.

Harackiewicz, Barron, Carter, Lehto, and Elliot (1997) noted the predominance of studies that have found associations between individual achievement goals and adaptive outcomes (p. 1285). For example, Grant and Dweck (2003), in a sample of pre-med college students, found that mastery goals were associated with positive coping strategies ($\beta = .57$), intention to exert effort and persist in the face of obstacles ($\beta = -.40$ for withdrawal of effort) and intrinsic motivation (i.e., course enjoyment and interest) ($\beta = -.39$ for loss of intrinsic motivation) (p. 547).

Many studies have explored the implications of membership in either mastery or performance orientation categories. Perhaps an exemplar might best illuminate the differences that are the focus of the present study. Consider Nicholls's (1989) description of the divergent purposes Amundsen and Scott espoused in their race to reach the South Pole first. Nicholls proposed that Amundsen epitomized the trait of mastery, whereas Scott epitomized the performance goal orientation. Nicholls portrayed Amundsen as a man with great curiosity, with an eye towards careful planning, and a thirst for knowledge. In contrast, Scott is depicted as completely committed to self-promotion, personal glory, and how he could surpass others. In other words, their differing goal orientations are viewed as personality attributes that, for each man, resulted in different behavior patterns and performance outcomes (pp. 103-105). Interestingly, both men achieved the desired goal, to reach the South Pole.

Mastery Goals are Adaptive and Beneficial

To better explain patterns of observed behavior and the adaptivity of goal seeking activities, Pintrich (2000b) extended the multiple goal approach derived from the theorizing of earlier achievement motivation researchers (Elliot, 1997). Inasmuch as it is probable that everyone has *both* goal orientations, each to a greater or lesser degree, Pintrich (2000b), in a sample of 8th and 9th grade students, explored the hypothesis that both mastery goals alone and

mastery goals in combination with performance-approach goals are equivalently adaptive which was supported. His findings in an earlier study with college students (Pintrich & Garcia, 1991) also provided evidence that mastery goals are helpful in achievement contexts, but performance goals only enhanced the performance of students who rated their mastery goal orientation as low. In sum, (Pintrich, 2000b) research supported the idea that mastery goal orientations are associated with positive, valuable, and adaptive student outcomes, but performance goal orientations can have mixed results or even create a non-adaptive helpless response pattern (Dweck,1999).

Various research findings of constructive and adaptive relationships between the adoption of mastery goals and positive traits have been reported. These mastery goal relationships include intrinsic motivation (Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000), deep concentration, lack of worry, seeking of opportunities for growth (Csikszentmihalyi & Nakamura, 1989), self-efficacy, valuing of educational pursuits, positive affect, usage of adaptive metacognitive strategies (Harackiewicz & Linnenbrink, 2005), long-term knowledge retention (Elliot & McGregor, 1999), use of complex cognitive strategies, linkages to prior knowledge, interest levels (Anderman, Austin, & Johnson, 2002), effort, persistence in the face of obstacles, coping strategies (Grant & Dweck, 2003), use of both cognitive and metacognitive strategies (Pintrich & Garcia, 1991), effort (amount and type), knowledge acquisition (Fisher & Ford, 1998), final course grade (Mattern, 2005), appraisals of challenge as opposed to threat in pre-task assessments, and finally, absorption during test preparation (McGregor & Elliot, 2002).

However, from existing research, it is uncertain whether goal orientations act as traits (relatively stable personality components) or, as quasi-traits that can vary across situations and contexts. Tiger Woods, possibly the best professional golfer ever, serves as a good example of

this distinction. Tiger is extremely competitive and has described himself that way in multiple interviews. Within a trait framework, Tiger would probably be deemed performance goal oriented. But to retain his superlative ranking, he consistently needs to upgrade his knowledge and hone his skills. In 2004, he stepped back from his game, re-tooled his swing at the risk of losing his near-term competitions, and focused on gaining the mastery he needed to reach his previous lofty goals (Diaz, 2005). Thus, Tiger exemplifies someone who has *both* performance and mastery goals acting in concert. Like Tiger, it is probable that everyone has mutually interactive needs to perform well, relative to others, and to gain the requisite skills to do so. Mastery and performance goals, whether acting separately or in tandem, support learning and are adaptive in educational contexts.

Mastery goal orientations, however, have been judged as more adaptive than performance goal orientations (Ames & Archer, 1988; Heyman & Dweck, 1992; Kaplan, 2004; Linnenbrink & Pintrich, 2000). In particular, the seminal and oft cited work of Dweck and Leggett (1988) contrasts adaptive motivation to helpless response patterns. That is, students with mastery goals, when faced with impediments or negative feedback choose reasonably challenging tasks and persevere to completion. Students exhibiting helplessness, in contrast, are likely to avoid challenging tasks or abandon them shortly after engagement.

Achievement Goal Theory Debate

Partly in response to Elliot's (1999) subdivision of mastery and performance goals into approach and avoid categories and partly to suggest a research agenda to explore what appeared to be ambiguous research findings, Pintrich (2000a) and Harackiewicz, Barron, Pintrich, Elliot, and Thrash (2002) called for a revision of the commonly accepted dual goal framework. In addition, the proposed changes incorporated multiple goals and combinations of goals. The idea that mastery goals alone are optimal across all achievement contexts and among developmentally

diverse populations came under scrutiny. Interest in the multiple goal perspective was fueled by subsequent exchanges (Harackiewicz et al., 2002; Kaplan & Middleton, 2002; Midgley et al., 2001) that suggested an efficacious role for the adoption of performance approach goals and further challenged the sole benefits attributed to mastery goal orientations.

Despite the increasing realization of the impact that mastery goal orientations have on achievement, performance-approach goals continue to be omnipresent and frequently encouraged in today's classrooms. The belief that students should engage with educational material in order to demonstrate ability and surpass others, seems unavoidable. Harackiewicz et al. (1998) focused on college students' goal orientations and related outcomes. They found that performance-approach goals tended to be associated with higher course grades, whereas mastery goals were associated with an enduring interest in the course material in both large lecture and small seminar college courses (Barron & Harackiewicz, 2003; Harackiewicz et al., 1998). That is, mastery goals have their place but do not necessarily underlie all positive and adaptive educational outcomes. At least for this population, performance goals get results too.

Because they believe that the multiple goal perspective is optimal, Barron and Harackiewicz (2001) described four hypothetical combinations of goals: the *additive goal hypothesis* suggests that each goal orientation, mastery and performance-approach, operates independently. The *interactive goal hypothesis* proposes that the two goal orientations work together dynamically. The *specialized goal hypothesis* implies that each contributes unique features that lend support to positive academic outcomes, and, finally, the *selective goal hypothesis* places the relative importance of each goal as a conscious choice for the individual when negotiating a task or coursework.

In summary, the dispute about the benefits of mastery goal orientations or mastery goal orientations in combination with other goals continues. However, in consideration of the extensive research findings associating positive and adaptive outcomes with mastery goal orientations and for the purposes of this study, it is apparent that the adoption of mastery goals supports learning and is unequivocally beneficial.

Persuasive Messages and Goal Orientations

Of the many conceivable contextual influences on mastery goal orientations in academic settings, teacher beliefs and discourse are likely to be the most powerful. Teachers design lessons, emphasize their valued goals, and normally choose tasks that support their own perspectives on knowledge and learning. For example, Patrick, Anderman, Ryan, Edelin, and Midgley (2001) compared children's perceptions of the classroom goal structure to observed teacher behavior and discourse. They found that children successfully interpreted and internalized teacher messages relative to mastery and performance goal emphases. That is, teacher practices that put emphasis on a mastery goal orientation were perceived accurately by their students as corroborated by observational data. Thus, it appears that teacher communications of goal orientations permeated classroom activities (e.g., tasks, grouping, and assessment) and became important environmental features for the students.

One type of teacher discourse that has received much attention is persuasion. In a series of articles (see special issue on persuasion, *International Journal of Educational Research*, 2001), several researchers demonstrated relationships between persuasive messages and their effects on students' knowledge and beliefs. Teacher discourse stands as a primary method for directly transmitting mastery goal orientations. It is important here to consider the potential effects of persuasive messages on motivation generally and goal orientations in particular. Specifically, it

is necessary to address the question of how persuasion and its unique features interact with students' psychological factors to influence and strengthen student mastery goal orientations.

Persuasion and Mastery Goal Orientations

Persuasion, the art of formulating and explicating an argument to convince others to adopt a particular viewpoint, has its roots in classical philosophy (Fives & Alexander, 2001; Woods & Murphy, 2001). One of the primary aims of persuasive rhetoric has been to alter the understandings, principles, and attitudes of others. Educational researchers (Murphy, Long, Holleran, & Esterly, 2003) have recognized the strong similarity between the persuasive process and the aspirations and behaviors of classroom teachers. Teachers use persuasion as a matter of course to promote educational goals, modify students' understandings, and provide meaningful and effective learning experiences (Hynd, 2001).

Teachers' persuasive efforts may have diverse goals. Hynd (2001) categorized the goals of teacher persuasive discourse into four groups: (a) knowledge goals, which involve adding to students' information, correcting misconceptions, and realigning naïve beliefs with disciplinary standards, (b) socialization goals, which entail encouraging students to recognize the benefits of complying with societal mores, (c) critical-thinking goals, which consist of developing students who are motivated to challenge and evaluate new information as a routine matter, and (d) emancipatory goals, which encourage students to generate their own values and goals and seek ways to achieve them. Hynd (2001) conceived of these general groups as competing goals. However, features of mastery goal orientations can be found within each of these groups. For example, a student who chooses a task in order to gain knowledge and build skills would, based on this categorization, select knowledge goals and seek self-improvement, a key attribute of mastery goal orientations. For that same student, the newly gained knowledge could be their contribution to collaborative group projects which fulfills, for them, a social goal. They possess

the newly acquired ability to integrate that information with that of others (i.e., critical thinking goals) and express their mastery in that area (emancipatory goals). Consequently, teachers who promote mastery goals are, in effect, addressing the four types of persuasion goals when promoting the adoption of mastery goals.

Persuasion as a Person X Context Dynamic

deCharms (1976) asked the question, "How do you help a person to change?" (p. 64). His response recognized the interplay of intrapersonal factors and the role that teachers play in effecting this change. He asserted that it is important to assist students in seeing the benefits of committing to personal change (p. 65). A student's response to a persuasive message relies on both the characteristics of the learner's personal psychology and the nature and delivery of that message. The mechanisms of the learner by persuasive message dynamic, and the role of persuasion in it, are unclear.

Murphy and Alexander (2004) conducted a research study employing three naturally occurring texts (e.g., an article from *Time* magazine) and explored their modification of subject matter knowledge, relevant beliefs, and interest. Participants were evaluated on the three outcome constructs before and after the text reading. Of importance here, change in belief favoring the text article's perspective was found to be significant for participants who reported moderate attitudes on the three topics in the study's texts. This study confirmed the interaction of learner with persuasive message by comparing pre-reading to post-reading beliefs for individuals (p. 359). Further, the authors concluded that their investigation indicated that a persuasive message can act as a *catalyst* in facilitating the overall persuasive process. In chemistry, catalysts act as facilitators of reactions while they remain unchanged by the process. In this case, features of the persuasive message (e.g., argument structure, affective content) contributed to and facilitated belief change. That is, as students perceive and respond to text content (e.g., course

material, texts) elements of persuasive messages interact with and influence their attributed meanings and interpretations of that content to become an amalgamation of belief with message resulting in an altered belief.

Studies exploring learner characteristics that prompt the learner to respond to persuasive messages differentially have been sparse. Learner characteristics such as psychological traits or past experiences may affect their acceptance or rejection of persuasive arguments. One learner characteristic, prior and relevant knowledge, contributes to learner receptiveness to persuasive messages (Dole & Sinatra, 1998). Also, a student must have basic requisites (e.g., knowledge, appropriate reading level) and the inclination to engage with the message in order for the persuasive process to begin (Murphy, 2001).

Even though the learner must be at least minimally motivated to accept the contents of a persuasive message, it is unclear how the process of persuasion interacts with personal psychological factors to spur interest, engagement, or action. Similar to the behaviors of catalysts in physical science, how a catalyst works may be hidden even though the result is well-known. In recounting the implications of their study on the process of persuasiveness, Alexander, Buehl, and Sperl (2001) pointed out (along with Stanovich & West, 1997) that researchers have yet to consider psychological factors that make certain persuasive messages more appealing to individuals than others. They stated that researchers need to explore "any predisposition to argumentation, such as open-mindedness or resistance that may exist" (p. 669).

Actively Open-minded Thinking (AOT) and Mastery Goal Orientations

One potential factor that is likely to facilitate receptiveness to persuasive messages is actively open-minded thinking. In keeping with Dweck's meaning-system approach to mastery goal orientations (Dweck, 1999), other psychological factors are likely to share explanatory power in the persuasive process. Among these contributing factors are individual differences in

rational thought processes. In effect, individuals who prefer mastery goals over performance goals are likely to have other characteristics that operate in the selection and achievement of their goals. That is, a willingness to exert effort, elect reasonable challenges, and take risks to increase learning requires sustaining personal beliefs. Rational thought, or the use of logical and complex thinking processes, is within consciousness, deliberate, and effortful. This type of effortfulness necessitates the marshalling of cognitive abilities along with a willingness to deploy them.

Along these lines, Bandura (1986) proposed a fundamental distinction between learning (having knowledge) and performance (demonstrating knowledge). In a similar fashion, Baron (1985) proposed a rational thinking parallel between cognitive abilities (having intelligence—context/situation independent) and cognitive dispositions (demonstrating intelligence—context/situation appropriate). Baron suggested that cognitive dispositions or tendencies to utilize intellectual capabilities are within the individual's control and subject to conscious rational thought. One cognitive disposition likely to support mastery goal adoption is that of actively open-minded thinking.

Actively open-minded thinking is a cognitive disposition proposed by and derived from Baron's theorizing on a tendency toward open-mindedness melded with concepts from the critical thinking literature. Stanovich and West (1998) described actively open-minded thinking as follows: (a) favoring contemplative over impetuous behavior, (b) exhibiting a tendency to analyze options and alternative perspectives, (c) questioning and re-examining one's own assumptions, and (d) welcoming different beliefs and possibilities (p. 167). Actively open-minded thinking includes the notion of flexibility and an energetically outward seeking of knowledge.

Individuals who favor mastery goals tend to seek self-improvement by expressing and acting on a desire to acquire knowledge and skills. They are also prone to deploy cognitive resources in the attainment of such endeavors (Fisher & Ford, 1998). Thus, it is predicted in this dissertation that people who prefer mastery goals share the fundamental psychological characteristic of actively open-minded thinking. Such individuals are self-motivated to increase their knowledge and skills set and use those cognitive abilities in the service of acquiring even more.

Few relationships have been demonstrated for actively open-minded thinking as it relates to quasi-traits such as goal orientations. In considering the two primary elements of actively open-minded thinking, cognitive ability and a disposition to appropriately use that ability, several related links have been investigated. For example, cognitive ability has not been found to differ between students who adopt mastery versus performance goals (e.g., Button et al., 1996; Fisher & Ford, 1998). Yet, more recently, cognitive ability was shown to moderate different performance patterns for college students with high ability compared to those of lower ability (Bell & Kozlowski, 2002). In particular, they found that individuals with high ability experienced higher perceived self-efficacy when a mastery orientation was emphasized, but this relationship did not hold true for individuals with lower ability. They concluded that cognitive ability may be a consideration in adaptive academic outcome patterns.

Further, studies in which cognitive ability has been partialed out have shown that cognitive dispositions and actively open-minded thinking in particular, provide unique and significant contributions to the variance on a variety of measures of rational thinking. For example, Kokis, MacPherson, Toplak, West, and Stanovich (2002), in a study comparing 10- and 11- year old thinkers to 13-year old children, found that when cognitive ability was controlled, cognitive style

measures (e.g., actively open-minded thinking, need for cognition) explained variance on measures of analytic reasoning. In fact, actively open-minded thinking was an important and distinctive predictor of performance on an analytic reasoning scale. Thus, the contribution of cognitive style constructs to our understanding of the elements of rational thought should be recognized.

More recently, other relationships between actively open-minded thinking and rational thinking (e.g., reasoning and problem-solving) constructs have been found. Sinatra, Southerland, McConaughy, and Demastes (2003) used a composite of scales, including actively open-minded thinking, to explore correlates of college students' understandings and acceptance of biological evolution. In their study, participants' scores on the actively open-minded thinking subscale were significantly related to knowledge and acceptance of evolution. Their findings provide evidence that actively open-minded thinking is related to thought processes and belief systems.

Finally, in a study exploring the relationship between epistemological beliefs (e.g., certainty of knowledge) and cognitive dispositions (e.g., need for cognition), Kardash and Sinatra (2003) found significant commonality between beliefs and dispositions. The similarity between these psychological systems highlights the evidence for a common underlying relationship between the interpretations and meanings people attribute to epistemological beliefs and cognitive dispositions. Open-minded thinking and openness to belief change share psychological foundations with the epistemological belief that knowledge is flexible and are sufficiently close enough constructs to demonstrate the existence of an underlying quasi-trait affecting cognitive dispositions and epistemological belief processes.

Implicit Theories of Intelligence (ITI) and Mastery Goal Orientations

Dweck and Leggett (1988) reasoned that beliefs about intelligence (cognitive ability) perform as an "underlying psychological process" to orient students toward "particular goals" (p.

256). They based their argument on Dweck and colleagues' research (e.g., Dweck & Leggett, 1988). In their studies, two different theories of intelligence were proposed: the entity theory and the incremental theory. Holders of the *entity* view of intelligence regard cognitive ability as fixed. That is, they believe that intelligence is unalterable by life's events and genetically determined at birth. In contrast, the *incremental* view of intelligence is that it is malleable and subject to change based on the acquisition of new knowledge and experiences.

Dweck believed that favoring one or the other of these beliefs (entity versus incremental) would not only predict alternative goal endorsements, but *cause* them (Dweck,1999). The strength of the relationship between implicit theories of intelligence and goal orientations has varied based on such diverse criteria as scales used or age of participant. Further, the directionality of the relationship has been called into question. That is, whether implicit theories of intelligence create the meaning context for differential goals or whether relatively stable goal dispositions foster different implicit theories of intelligence (sees Sorrentino, 1995, p. 315).

MacGyvers (1993), in a sample of fifth and eighth grade students, divided the sample at the mean for implicit theory of intelligence into two groups. Those below the mean on a 5-item entity- only scale were categorized as incremental theorists and those above the mean were entity-theorists. Then, within the group of incremental theorists, the group was further subdivided into four subgroups based on goal orientation (median split) –low performance/high mastery, high performance/low mastery, high performance/high mastery, and neither (low performance/low mastery). MacGyver found that incremental theorists who also reflected a mastery goal orientation (high performance/high mastery and low performance/high mastery) had the most adaptive academic outcomes. In this study, theory of intelligence significantly predicted goal orientation consistent with Dweck's model. That is, an incremental theory of

intelligence predicted mastery goal orientation (β = -.41) for middle socio-economic status (SES) students (8th grade sample) and an entity theory of intelligence predicted a performance goal orientation (β = .67 for upper SES, β = .58 for low SES students). However, in a sample of college students, Arnold (1991) did not find a relationship between implicit theory of intelligence and goal orientation.

Because belief and knowledge systems are predictably interrelated and complex, it may be enough for the present study to show that implicit theories of intelligence are related to goal orientations and that an incremental theory of intelligence and mastery goals are associated with similar concerns and behavior patterns (Dweck, Chiu, & Hong, 1995a, p. 323). Researchers who have examined the relationship between implicit theories of intelligence and goal orientations have met with mixed results.

Several studies with college students have supported the idea that implicit theories of intelligence are related to goal orientations. Payne et al. (2007) conducted a meta-analysis that explored aspects of the set of constructs that surround goal orientations. In their study, the correlation between an incremental theory of intelligence and a mastery goal orientation was small and in the expected direction (r = .12). Button et al. (1996) compared a six-item measure of implicit theory of intelligence (entity-only items) to a 16-item dual goal orientation scale that was constructed by them. Their results showed that an incremental theory of intelligence was correlated to mastery goals (r = .52, study 2; r = .45, study 3; r = .41, study 4). Also, the relationship between an incremental theory of intelligence and performance goals were in the expected direction (r = -.14, -.17, -.15, respectively). Robins and Pals (2002), in a longitudinal study with undergraduates, explored the relationships among implicit theories of intelligence and the hypothesized goals and associated behavior responses. The implicit theories of intelligence

were assessed with a 5-item (entity-only scale). For that reason, high scores on this scale represented an entity view of intelligence and the hypothesized relationship to mastery goals would be a negative correlation. However, mastery goals were measured with a single question (administered twice) in year-one and a three-item measure in years 2, 3, and 4 (p. 320). The sample item from this scale ("The knowledge I gain in school is more important than the grades I receive," p. 320) provided in their paper indicated that this scale may not be sufficiently powerful to fully capture the idea of holding a mastery goal. Their results indicated that the correlation between the implicit theory of intelligence scale and the goal orientation assessment was $r = -.25$ as predicted. In order to relate implicit theories of intelligence to hypothesized mastery oriented response patterns, the researchers employed a four-item scale that may more closely reflect the expected responses from those who tend to adopt mastery goals ("When something I am studying is difficult, I try harder," p. 321). That is, we would expect to see a preference for challenge-seeking, willingness to exert effort, and persistence in the face of obstacles. The correlation between the implicit theory of intelligence scale and the mastery oriented response pattern scale was $r = -.39$ ($p < .05$).

Other researchers have found various associations between implicit theories of intelligence and goal orientations. Blackwell et al. (2007), in a sample of junior high students, used a 6-item (three-entity and three-incremental) scale to assess implicit theories of intelligence. They compared scores on this measure to an age-appropriate version of PALS (Midgley et al., 1998). They found the association between an incremental theory of intelligence and mastery goals to be significant at the .01 level ($r = .34$) (p. 250). Also in a sample of young adolescents, Cury, Elliot, DaFonseca, and Moller (2006) who also used the six-item scale (three entity and three

incremental) found that an incremental theory of intelligence predicted mastery-approach goals ($\beta = .28$) and mastery-avoid goals ($\beta = .25$).

In contrast, Roedel and Schraw (1995) used scores on a two-item (entity-only) scale to compare implicit theories of intelligence to scores on a goal orientation scale. They found that those participants whose response to the theory of intelligence questions indicated that they held an entity view of intelligence correlated ($r = .21$, $p < .01$ first question, $r = .17$, $p = .03$ second question) with the performance goal scale. However, the scores did not show a corresponding relationship to the mastery goal scale ($r = .07$, $p = .37$ first question and $r = -.10$, $p = .22$ second question). The authors explained that the second result may be an artifact of floor effects for those participants with an incremental view of intelligence (p. 467). Dupeyrat and Marine (2005), in a small sample of French adults, used a longer version of the implicit theory of intelligence scale (5 entity and 4 incremental). They reported a significant positive relationship between an incremental theory of intelligence and mastery goals ($r = .27$, $p < .05$). However, this scale's reliability is questionable (entity items $\alpha = .69$, incremental items $\alpha = .56$). Braten and Stromso (2004), in small Norwegian sample ($N = 80$), used a translated version of the eight-item scale (4 entity and 4 incremental items) to examine its relationship to PALS (Midgley et al., 1998). Though the relationship between an incremental view of intelligence and mastery goals was in the expected direction, it was not significant ($r = .22$). Finally, Kennett and Keefer (2006) used the 8-item (4 entity and 4 incremental) scale to assess theories of intelligence. However, their choice of goal orientation scale was different than others reviewed above. They selected the Goal Orientation Questionnaire (Dweck,2000) that presumes a single continuum for goal orientation and pits mastery against performance goals (p. 447). Therefore, their measure does not represent the multiple goal theory discussed above. They found that an incremental theory of

intelligence (higher score on the theories of intelligence scale) correlated minimally though significantly with the goal orientation measure ($r = .16$, $p < .05$).

Efforts have been made to induce or manipulate theories of intelligence based on the notion that individuals may hold both theories to a greater or lesser degree and those beliefs could be stimulated. For example, Hong, Chiu, Dweck, Lin, and Wan (1999, study 3) asked participants to read a persuasive text that promoted either an entity or incremental theory of intelligence. This manipulation was designed to create a mental framework for the interpretation of negative feedback about their performance on an ability task. In the group where participants received a negative assessment of their intelligence, both implicit theory groups were then asked whether they would rather receive remedial assistance to improve their score on a similar task or work on a task unrelated to intelligence. The authors found that those who read the incremental theory of intelligence text were more likely to prefer a remedial tutorial than those who read the entity theory of intelligence article after receiving unsatisfactory performance feedback. Hong et al. concluded that theories of intelligence provide an interpretational framework that leads to attributions associated with goal orientations. Specifically, incremental theories of intelligence underlie effort attributions that lead to selection of mastery goals or a desire to improve the self through remedial assistance.

Dweck's (1986) model that specified that incremental theories of intelligence are associated with or may influence the likelihood that individuals will adopt mastery goals has found some preliminary support. Dweck spoke of the "flexibility of incremental theorists" (Dweck,1999). According to Dweck, students who are flexible in their thinking tend to exhibit this propensity in multiple situations. For them, this mental plasticity performs as a personality

trait and may constitute the common fundamental element shared by those who hold an incremental view of intelligence those and individuals who tend to adopt mastery goals.

To summarize, students who hold an incremental theory of intelligence are more likely to endorse mastery goals. The belief that intelligence is malleable may be a common feature shared by those who are strongly actively open-minded and prefer mastery goals.

Contextual Elements and Mastery Goals

Along with the psychological characteristics of actively open-minded thinking and an incremental theory of intelligence, in a social-cognitive framework, features of the environment can be expected to influence the adoption of mastery goals. One focus of the present study is to identify an element of the academic environment that supports or strengthens mastery goal orientations. Such features of students' surroundings constitute the *goal structure* and can emanate from several sources. These learning environments include the school and classroom as well as the home and surrounding culture. In the classroom, goal cues arise from such sources as instructional practices (e.g., task selection, feedback format), teacher discourse (e.g., de-emphasizing competition and comparison), and routinized norms and expectations (Ames, 1992). For the purposes of this dissertation, sources of persuasive information (e.g., text material) will be singled out for closer scrutiny.

Students can be expected to perceive, interpret, and respond to these cues differentially on the basis of their backgrounds, hierarchy of preferences, and dispositions (Mischel & Shoda, 1995). These individual differences are likely to affect how they respond to different situations and contexts. Contextual interactions would be expected to vary. Several researchers have studied student susceptibility and responsiveness to cues related to achievement goals in classrooms and schools.

Church et al. (2001) conducted two studies with college students that explored the relationship between classroom environmental factors and achievement goal endorsements. In their study, they selected lecture engagement, whether students perceived the professor as interesting or engaging, evaluation focus, whether students perceived an emphasis on grades, and harsh evaluation, whether students perceived that earning a good grade was attainable (p. 44). They assessed the perceptions of classroom environment prior to any grading feedback in the course. Their results indicated that mastery goals were positively associated with lecture engagement ($r = .33$, $p < .01$), and negatively associated with evaluation focus ($r = -.22$, $p < .01$) and harsh evaluations ($r = -.20$, $p < .01$) (p. 45). Using hierarchical linear modeling (HLM), they found that lecture engagement positively predicted mastery goals ($\gamma_{10} = .34$, $p < .05$) and evaluation focus and harsh evaluation negatively predicted mastery goals ($\gamma_{10} = -.38$, $\gamma_{10} = -. 23$, $p < .05$ respectively) (p. 46). However, the measure for evaluation focus generated an internal reliability of $\alpha = .65$ and that result should be interpreted with caution.

Patrick et al. (2001) conducted a multi-method study (questionnaire and observations) in elementary schools to provide insight into the link between teacher practices and students' perceptions of goal orientations. Their findings were consistent with other research on achievement goal theory (see Ames, 1992) in that teachers who emphasized mastery-related practices were successful in communicating that message to their students. However, it was unclear from this study whether these explicit communications interacted with the students' personal motivational orientations in affecting achievement outcomes. Specifically, it is unclear whether students' personal goal orientations were altered.

At the school level of analysis, Kaplan and Maehr (1999), in a sample of sixth grade students, found that the relationship between students' perceptions of their school's mastery

goals and students' GPAs was mediated by the students' personal goal orientations. Further, Roeser et al. (1996) using regression analyses, found support for a model indicating that the relationship between school goal structures and positive affective and behavioral outcomes in students was partially mediated by students' goal orientations.

Davis, Pastor, and Barron (2004) investigated the relationship between goal orientations and college majors in a large college sample (*N* = 1889). They believed that students' goal orientations could differ based the contextual influences of course sequences within a college major. They did find preliminary evidence for their hypothesis. They found differences in the performance-approach goal orientations among the majors they studied (p. 2).

Linnenbrink (2004) reviewed the Person by Context literature as it relates to achievement goal theory. She, as well as Urdan (2001), has noted the many contextual influences within classrooms. One fundamental assumption is that elements of both mastery and performance goals are present in every school and classroom though emphases may vary. Researchers who have studied the role of goal orientations in classrooms have primarily done so by surveying students' perceptions (e.g., Ames & Archer, 1988). However, caution is in order. Such assessment techniques, if used to evaluate the interaction between personal goals and perceived goal structures risk confounding the elements of the two concepts through the use of self-report questionnaires. It is difficult to clearly discern the teacher's message from the students' interpretation of that message without objectively observed confirmation (but see Patrick et al., 2001).

Features of the classroom context where mastery goals are emphasized have been linked to beneficial student outcomes such as emotional well-being in a sample of sixth grade students (Kaplan & Maehr, 1999) and appropriate help-seeking in a college sample (Covington &

Omelich, 1984). Whether mastery goal messages influence personal goal adoption or whether personal goal orientations affect the perception and interpretation of the context or both is still unknown. In other words, the direction of the relationship between personal goal orientation and features of the context is still unknown. I propose to add to our understanding of the Person by Context relationship by exploring how a feature of persuasive messages interacts with two psychological characteristics, incremental theory of intelligence and actively open-minded thinking, to influence mastery goal endorsement.

Persuasion and Message Characteristics

In theoretical models of persuasion, motivational processes have been given central roles in *mediating* the relationship between persuasive messages and belief changes. For example, Pintrich et al. (1993) highlighted motivational constructs, within a constructivist framework, as a facilitator of conceptual change. In a dual process model, Petty and Cacioppo (1986) posited that certain motivational factors can inspire more extensive message consideration, which supports the likelihood of higher elaboration and belief change. Dole and Sinatra's (1998) cognitive reconstruction of knowledge model placed motivation as a key characteristic in learners' tendency to process a persuasive message (p. 119). In fact, Dole and Sinatra construed the role of motivation as contributing to an iterative process whereby the process of attitude (belief) change can begin with either the learner (internal characteristic) or message (external characteristic) and engage in a dynamic between learner and message that can lead to or inhibit high or low cognitive engagement. In these models, the extent of cognitive engagement is essential in understanding and facilitating the process of belief change.

Both message characteristics and students' personal characteristics have been found to influence students' responses to persuasive messages. Message characteristics that influence the potency of the message include argument structure (e.g., refutational text, two-sided refutational

text), perceived source credibility, comprehensibility of the message, and the presence of affect in the message (Murphy & Alexander, 2004). Personal characteristics that have been found to increase responsiveness to persuasive messages include personal relevance of the message, prior knowledge of the content, and interest in the message (Alexander et al., 2001).

Presently, it is unclear which message characteristics are likely to be most effective in influencing mastery goal orientations. Alexander et al. (2001) noted that it is unknown whether arguments grounded in factual, empirical, or rational thought are more effective in altering beliefs like goal orientations than those centered on emotional, anecdotal, or experiential appeal (p. 670). For the purpose of this dissertation, persuasive texts with an anecdotal format and a empirical format will be compared. The literature supporting this choice is reviewed next.

Anecdotal and Empirical Texts and Belief Change

Persuasive messages contain arguments whose evidence can be presented in diverse formats. The type of support offered for the grounding arguments contributes to the impact of the arguments and are features of text that are designed to influence preexisting beliefs. Persuasive text that contains *anecdotal* evidence is based on single case exemplars. This text type can take the form of case histories, anecdotes, or simply the story of an individual or situation (Allen & Preiss, 1997; Kopfman, Smith, Ah Yun, & Hodges, 1998). In contrast to anecdotal evidentiary support, texts that accentuate *empirical* information bring to bear large numbers of cases in the pursuit of effective persuasive arguments. Empirical texts incorporate not only consolidated numerical data or empirical findings, but can also focus on synthesized quantitative discussions or summaries across multiple instances (e.g., data summaries) (Allen & Preiss, 1997; Kopfman et al., 1998). I review the literature for each evidence type, consider characteristics of each that make unique contributions to persuasive discourse, and examine studies that have affected

modifications of beliefs like mastery goal orientations. Please refer to Table 2 for specific aspects of interest in the studies cited below.

Table 2-1. Studies comparing anecdotal and empirical evidence types

Author	Participants	Message topic	Manipulation/comparisons	Dependent Measures	Major Findings
Baesler, 1997	100 Undergraduates	Crime, internship, birth-control	Narrative/Statistical Evidence x Topic comparisons	Beliefs change Cognitive response Credibility	Neither evidence type was more persuasive across topics
Baesler &Burgoon, 1994	292 Undergraduates	Juvenile delinquency	Text: Narrative/Statistical; Vivid/Nonvivid; Time: Immediate, 48hrs, one week	Belief scale Credibility scale Knowledge	Statistical text (vivid and nonvivid) more persuasive than control
Boster, Cameron, Campo, Liu, Lillie, Baker, & Ah Yun, 2000	284 undergraduates	Quality of cafeteria food	Audio tape; Statistical/Consistent & Statistical/Inconsistent examples	Judgments Attitudes	Statistics increased persuasiveness; "numbers confer credibility"
Dickson, 1982	179 Adult women	Refrigerator breakdown & consequences	Narrative (case history): quote list, scrip form Statistical: numerical, data summary. Vividness varied	Message perception and recall	Narrative not more vivid or interesting; narrative affected judgments based on recall
Das, Kerkhof, Kuiper, 2008	160 Adults	Fundraising for Leprosy Assoc.	Anecdotal/Statistical Framing (+/-) Goal Attain (yes/no)	Persuasion Intention to donate	Statistical better w/ neg frame Anecdotal better w/pos frame
Feely, Marshal, & Reinhart, 2006	412 Undergraduates	Organ Donation	Replication of Kopfman, et al	See Kopfman, et al.	Narrative better Order Matters

Table 2-1.Continued

Author	Participants	Message topic	Manipulation/comparisons	Dependent Measures	Major Findings
Greene & Brinn, 2003	141 University students	Tanning bed use		Informational Value Perception of realism Intention to tan	Narrative included perception of realism, both decreased intention to tan
Kazoleas, 1993	176 Undergraduates	Seat belt usage	Narrative/Statistical	Attitudes Retention	Initial attitudes unchanged; Narrative text increased attitude change over time
Koballa, 1996	38 Preservice teachers	Supplementary text	Anecdotal/Data summary Order of presentation	Attitude	Anecdotal more effective than data summary
Kopfman, Smith, AhYun & Hodges, 1998	90 Undergraduates	Organ donation	Narrative/Statistical, Prior thought & intent	Thought valence Credibility; Casual relevance Anxiety	Narratives affected affective outcomes Statistics affected cognitive outcomes narrative enhances heuristic processing
Lindsey & Ah Yun, 2003	486 Undergraduates	Year round academic schedule	Narrative/Statistical 3mediating variables	Attitudes	Statistical more persuasive than narrative

Table 2-1.Continued

Author	Participants	Message topic	Manipulation/comparisons	Dependent Measures	Major Findings
Morgan, Cole, Struttman, Piercy, 2002	280 Adults	Benefits of roll-over protection	Information-only Narrative/Statistical fear appeal	Message evaluation	Persuasive more effective than informative; Narrative better received than informative
Weber, Martin, Comm401, & Corrigan, 2006	332 Undergraduates	Organ donation	Myth refutation/Statistical Target audience similar/not similar Affect (+/-)	Similarity Signing behavior	Humorous/Myth group signed most donor cards
Yalch & Elmore-Yalch, 1984	126 Adults	Convenience of ATM machines	Quantitative content (hi/lo numerical data) Source expertise (expert/nonexpert)	Attitudes Cognitive responses	Quantitative message-expert most favorable Quantitative message had fewer cognitive responses

The Effect of Anecdotal vs. Empirical Messages on Beliefs

Some researchers have hypothesized that anecdotal arguments are more likely to contribute to changes in beliefs, whereas other researchers have expected empirical messages to be persuasive. First, I review studies that have supported anecdotal messages, followed by studies that have supported empirical messages, and then I review those that have found no differences.

Research supporting anecdotal messages

Strange (2002) has pointed out that anecdotes contain many elements that impact beliefs and can modify them. First, anecdotes can be more compelling than generalities. Anecdotes possess a quality that has the potential to encourage concentrated engagement with the topic, kindle the imagination, and promote serious consideration of the presented evidence.

Dickson (1982), in a sample of 174 women drawn from PTA and church groups, compared the influence of case information to statistical information on recall and judgments of likelihood of failure of the refrigerator brand described in the messages. Dickson employed four different messages, two with case information and two with statistical information. The first case information message presented five quotes from housewives describing their experience with Brand X refrigerator and one additional quote that expressed a negative experience. The second case information message was identical to the first but, in addition, elaborated on the negative incident. The first statistical information message summarized responses from 500 housewives and described, in quantitative terms (i.e., ratios, percents), the amount of problems associated with the Brand X refrigerator. The second statistical information message elaborated on the negative incident in numerical terms in terms of financial consequences (e.g., repair cost, food loss).

Dickson found that respondents considered the case information messages easier to recall than the statistical ($F(1, 149) = 6.1$, $p < .015$) (p. 402) . The author stated that, with respect to

actual recall “Fewer mistakes were made by those who read the case report” (p. 402). He also found that vividness and interest, two commonly proposed advantages of case information messages, had no effect on either recall or judgments.

Dickson’s study compared case information to statistical information presented as evidence with five arguments. The results favored case information with respect to memorability. Effects for vividness and interest may have held explanatory power for why anecdotal type evidence may be more memorable. However, Dickson found that they did not contribute to persuasiveness in his study. The study design did not incorporate a comparative control group that could have provided information on the benefits of information-type relative to a group that received nor information at all. The topic selected, though relevant to the sample population, may have unexpected confounding implications (e.g., prior knowledge or experiences). For example, prior experiences may be incorporated into the interpretation of the text as it was read and that feature alone would add unpredictable variability to the results. The author did not examine the equivalency of his groups with respect to the influences their backgrounds. Finally, the four messages were not designed specifically as persuasive arguments intended to produce belief or attitude change and a measure to assess post-reading attitudes was not employed.

Koballa (1986) compared persuasive arguments with anecdotal and data-summary supporting evidence intended to change attitudes. A small sample (N = 38) of elementary pre-service teachers based in two intact college classes participated in this study. Four messages were created that advocated the use of two different textbook supplementary science programs. The messages listed four identical argument stems favoring one of the two science programs (i.e., SCIS or SAPA) with either anecdotal or data-summary supporting evidence. There were four experimental conditions, SAPA-anecdotal, SAPA-statistical, SCIS-anecdotal, and SCIS-

statistical. The experimental design required each participant to read two of the messages, either SAPA-anecdotal and SCIS-statistical or SAPA-statistical and SCIS-anecdotal. Attitudes were assessed on a pre-test, post-test, and retention test (3 weeks later) using a semantic differential instrument (i.e., numerical rating across a continuum between two contrasting adjectives).

Results indicated that the participants did not differ on the pretest in their attitude toward either of supplementary science programs (M = 15.8; M = 15.9). The participants in the anecdotal condition (collapsed between the two programs) responded with an equivalent increase in positive attitude ($F(1, 38) = 32.7$, $p < .05$) (p. 444) on the post-test. A correlated t-test revealed a non-significant comparison mean score (post-test/retention test; $t = -2.13$ $p > .05$) (p. 446) on the attitude measure for those participants who read the anecdotal message. The author concluded that the attitude change, effected by the anecdotal message, persisted three weeks after the experimental session while the statistical message did not.

Koballa's is one of the few studies that used identical argument stems that compared anecdotal and data-summary evidence-types. Pre-experimental equivalence of attitudes toward the supplementary programs in the two experimental groups was assessed. Messages were constructed that would be relevant and emanate from a source that would be construed as credible by participants. However, the participants were assessed within two intact classes, not randomly assigned to testing conditions. Further, there was no control group on which to base comparisons. This study, though flawed, provided preliminary evidence that anecdotal evidence was more convincing than data-summary evidence and influenced attitudes in a head to head comparison.

Kazoleas (1993) was interested in meditational factors that might influence the relationship between evidence type and attitude change. In his study, 176 undergraduates in communication

classes were randomly assigned to one of four groups, narrative evidence, statistical evidence, irrelevant message (article on space program, control 1), or no-message (control 2). The messages promoted seat belt use. The persuasive message arguments were identical in each message except for supporting evidence (i.e., narrative or statistical). With the exception of the no-message condition, all participants read a text, formatted as an article derived from the proceedings of a congressional forum and then completed a post-test questionnaire (p. 43). The no-message group completed the post-test questionnaire and half of the participants completed a second post-test two weeks later. The questionnaire assessed retention, attitudes, perceptions of the speaker's expertise, trustworthiness, and vividness, number of math or research methods courses, and demographic data (p. 43).

With respect to scores on the attitude scale, results of an ANOVA indicated that the evidence groups differed significantly ($F(3,171) = 7.87$, $p < .05$). There were no significant differences between the two persuasive message groups and no significant differences between the two control conditions. However, in an ANOVA with contrasts, it was found that the experimental conditions (i.e., narrative and statistical messages) did not differ significantly from each other and the controls did not differ significantly from each other but the experimental conditions combined differed significantly from the control conditions combined (p. 45). The author concluded that persuasive messages, of either type, influenced attitudes more than unrelated or no messages at all. With respect to retention, a similar persistence pattern as that in the Koballa study was found. Compared to the statistical group, the narrative evidence group retained the increased attitude scores over time. Attitude persistence was significantly higher in the narrative group than the statistical group ($t(29) = 1.59$, $p < .05$, one-tailed test) (p. 46).

Comparison of evidence-type was not the central focus of this study. The researcher, based on prior research (see Kazoleas, 1993, p. 41), presumed that narrative rather than statistical evidence would serve as a more effective persuasive means in influencing attitudes. The purpose, then, was to find explanatory mediators of that relationship. Regression analyses suggested that vividness ($\beta = .28$, $p < .05$) and expertise ($\beta = .33$, $p < .05$) were moderate predictors of attitude change while trustworthiness, and retention were not (p. 45). However, interactions between evidence type and the explanatory predictors were not reported. The author stated that "Several attempts at modeling the relationship between evidence and attitude change failed to identify a model which fit the data" (p. 45). He concluded that persuasive messages, with either evidence type, were effective in influencing attitudes. The author cited familiarity with the topic and reported previous seat belt usage may be a limitation of his study (p. 48). Scores on the attitude scale may have been restricted by ceiling effects and the report that scores were negatively skewed (p. 44) appears to support this assumption. Kazoleas found that persuasive messages were more effective in modifying attitudes and that narrative evidence was more effective in maintaining that change.

Morgan, Cole, Struttman, and Piercy (2002) examined the role of evidence types in persuasive messages read by farmers or farm community members in Kentucky. The messages described the advantages of installing a rollover protective bar (RPO) in tractors. In their study, 433 farmers or farm community members read one of five messages and responded to a survey that consisted of a message evaluation scale and demographic questions. The messages were 1) information only, 2) narrative-based message, 3) statistics-based message, 4) fear appeal, and 5) "master message" (combined narrative with a fear appeal) (p. 230). Each message was short and

was accompanied by a graph, chart, or drawing. The message evaluation scale assessed respondent's attitude toward ROPS and seatbelts.

The results indicated a non-significant difference between the narrative and statistical message groups ($t(104) = 1.16$, $p = .25$) (p. 232). The narrative message influenced attitudes significantly more than the informative message ($t(118) = 2.03$, $p = .04$) (p. 232). The influence of the fear appeal was equivalently successful against the informative message. The authors suggested that the lack of difference between the narrative and statistical groups could be due to their efforts to make the statistical message easier to read and understand (p. 233).

Morgan et al. (2002) focused on characteristics of persuasive messages that were most likely to affect attitudes toward farm safety equipment. Their study was limited to a specific population and topic that is unlikely to have general appeal or relevance. Comparisons of group scores between the statistical message group and the narrative or fear groups on the message evaluation scale were not conducted. Such analyses could have provided more insight into message evidence differences. We cannot tell whether statistical messages are more or less persuasive than information-only messages and whether statistical messages are more or less persuasive than the fear appeals or master message (i.e., a combination of narrative and fear appeal). Their finding, that narrative messages influence attitudes toward ROPS more than information-only messages speaks to the efficacy of using narrative evidence in persuasive messages.

Feeley, Marshall, and Reinhart (2006) replicated, with some modifications, Kopfman, Smith, Ah Yun, and Hodges's (1998) study (see below) comparing characteristics of messages advocating organ and tissue donation (OTD). Feeley et al., in a sample of 412 undergraduates assembled from introductory communication courses, used a very similar research design along

with the vignettes created for the Kopfman et al. study. First, participants completed a scale that assessed their attitude toward organ and tissue donation. Then, at Time 1, they read one of three messages (i.e., statistical, narrative, actual – real news story about OTD containing both evidence types), then, they reported thoughts and emotions in an open-ended response format, responded to items assessing causal relevance (i.e., more personally involved with the message), message ratings, and anxiety. After that, (Time 2) they received and read a second vignette, different in evidence type from the first vignette they read and repeated the same response sequence as before. Therefore, each participant read two different evidence type vignettes and responded accordingly. Dependent measures consisted of total thoughts, positive thoughts, causal relevance, message ratings, and anxiety.

Results indicated that participants who read the narrative message (Time 1) reported significantly more total thoughts, greater causal relevance, and higher message ratings than participants who read the actual message and more positive thoughts than participants in the statistical group (p. 96). Time 2 results were similar in that respondents who read the narrative message expressed more positive thoughts, higher causal relevance, and a higher message rating than respondents who read the actual message (p. 96). The authors performed a MANCOVA, with message condition Time 1 and message condition Time 2 serving as the independent variables. Their analysis, using initial attitude as a covariate, was designed to observe the effects of Time 2 on the dependent variables independently from Time 1. They found that Time 2 responses were not affected by Time 1 reading and responses (p. 96).

Feeley et al., in contrast to Kopfman et al.'s (1998), found that narrative evidence in a persuasive message influenced potential attitudinal outcomes more than the actual message. They did not find message order effects or that the reading of the first message influenced the

responses after reading the second message. However, the messages in this study did not present parallel persuasive arguments. That is, even though all four persuasive messages advocated organ and tissue donation, they were different in content and style. Therefore, a comparison between narrative and statistical evidence types may have been confounded by other text features (e.g., source credibility, vividness). Though the messages employed in this study were specifically designed to persuade undergraduate participants to modify attitudes and intentions toward organ and tissue donation, a measure of persuasion or perception of persuasiveness was not included.

Weber, Martin, Members of COMM 401, and Corrigan (2006) also investigated persuasive messages advocating organ and tissue donation. The researchers were interested in the role of knowledge and emotion as well as message characteristics on the signing of organ donor cards. Three hundred thirty-two undergraduates from introductory communication courses read one of six messages. Affect and message characteristics were combined in the four experimental conditions; happy-statistics, happy-narrative, sad-statistics, and sad-narrative. The first control group read a public service story describing the experience of a mother of an organ recipient. It was designed to be affectively neutral (p. 79). The other control group read no message and simply completed the questionnaire. After reading their assigned message, participants completed a Homophily scale that assessed perceptions of their own similarity to organ donors. They then had the opportunity to sign an organ donor card. Confidentiality was preserved by having the participants submit the testing materials, questionnaire, and donor card together into a covered box. Rate of signing of donor cards served as the dependent variable in this investigation.

Message characteristics were compared to the control groups by collapsing the two narrative groups (happy and sad) into one narrative group and the two statistics groups (happy and sad) into one statistics group. The results of two chi-square analyses indicated that although the four groups differed significantly (χ^2 (3) = 10.29, $p < .01$) (p. 80), the narrative and statistical groups did not differ significantly (χ^2 (1) = 2.72, $p > .05$, $n = 215$) from each other. However, those participants in the narrative group signed donor cards at a higher rate (27.6%) than the statistical group (18.2%), the first control group (13.1%), and the second control group (8.9%). These results suggest that those participants who read the narrative message signed significantly more donor cards than those in the control conditions. When all six conditions were compared, the group that read the humorous narrative message signed the most donor cards (31.5%).

This study is one of the few investigations to directly measure resultant behavior (i.e., organ card signing) rather than self-report or promises of intent to sign after reading a persuasive message. One limitation of this study is that the contrast between message characteristics was unclear. Though the actual messages were not readily available for perusal, their descriptions indicated that the statistical messages did contain numerical supporting evidence. However, the narrative messages forwarded a one-sided argument aimed at refuting the myths surrounding organ donation. Thus, their content may have differed sufficiently to make comparison of evidence type impossible.

The majority of the investigations reviewed above found that anecdotal evidence has the advantage in persuading participants to change their attitudes when compared to control groups but not necessarily when compared to groups that read arguments with empirical evidence.

Research supporting statistical messages

Baesler and Burgoon (1994) focused on the elements of persuasive messages that contribute to the persistence of belief change. Participants, in a sample of 292 undergraduates enrolled in communication courses, read persuasive messages whose argument opposed juvenile delinquency. In the messages, evidence type (statistical or story), vividness (vivid or nonvivid), and time (immediately, 48-hours, and one-week after reading the messages) were manipulated. Participants were pretested on their knowledge of juvenile delinquency (prior knowledge), read one of the four messages (i.e., vivid-story, nonvivid-story, vivid-statistics, nonvivid-statistics), or no-message. All participants then completed a Belief Scale, Credibility Scale, and Knowledge Scale.

Results from a full-factorial ANOVA reported a main effect for evidence type ($F(1, 281) = 3.96$, $p < .05$) such that statistical evidence was more persuasive than story evidence (p. 592). Also, after 48-hours, the statistical conditions continued to be more persuasive than the story conditions. However, after one-week, the advantage for the statistical conditions had disappeared and, at that time, no difference was found between the evidence groups. When compared to the no-message condition, the persuasive messages were more effective in changing beliefs ($F(4, 171) = 4.64$, $p < .05$).

Baesler and Burgoon found that providing statistical evidence influenced beliefs more than story evidence and no message at all. In creating the messages in this study, the researchers were careful to maintain comparability of emotiveness and readability. The messages were constructed to be very similar, presenting the same "arguments, themes, and details to be included" (p. 588). The presentation of the evidence was not exactly parallel in that the story version described the experience of a single individual in narrative form rather than presenting an argument followed by an anecdote as support. Though the data analyses revealed a significant advantage for

statistical evidence at times one and two, the effect sizes in the entire study were small ranging from $\omega = .01$ to .07 (p. 595). The authors suggested that the complexity of belief systems may have contributed to the small effect sizes (p. 595). Another reason may be that the contrasts between the persuasive messages were insufficiently distinct.

Kopfman, Smith, Ah Yun, and Hodges (1998), focused on the reactions to narrative and statistical evidence types in persuasive messages. They hypothesized that statistical messages would evoke cognitive reactions whereas anecdotal evidence would stimulate affective reactions. Cognitive and affective reactions were presumed to mediate the relationship between message evidence type and persuasive outcomes (p. 295). Further, based on previous research, they hypothesized that prior thought and intent (PTI) would act as a moderator, affecting message type differentially. Ninety undergraduates, recruited from communication courses, first completed a measure that assessed PTI with respect to organ and tissue donation. Then, each participant read one of two statistical messages followed by the dependent measures. After that, they read one of two narrative messages followed by the same dependent measures. The first statistical message consisted of factual statements with numerical support highlighting the dire need for organ and tissue donation. The second statistical message began identically to the first but the argument statements were designed to dispel common myths associated with organ and tissue donation. The two narratives were very similar to each other. They each told the story of a college student who died and whose organs were donated. Two possible recipients were described along with their life changing recovery. The narratives differed in that one featured a male donor and the other a female donor.

The dependent measures consisted of total thoughts, valenced thoughts (positive, negative, neutral), ratings (credibility and effectiveness), causal relevance. Causal relevance was

composed of problem-solving or desire to help solve the organ shortage and similarity or how similar they felt to the character in the message. Anxiety, and thoughts and emotions were also assessed (p. 288).

Results indicated that the message containing statistical evidence led to statistically significant more total thoughts ($p < .05$), more positive thoughts ($p = .12$), but not significantly more, negative and neutral thoughts (*ns*), higher ratings ($p < .05$), a greater belief that the problems associated with organ shortage could be solved ($p < .07$), and expressed more similarity to the message's character ($p < .01$) than the message with narrative evidence. With respect to PTI, based on a mean split, there were no significant effects for evidence type.

This investigation sought to explore the nature of evidence type and potential impact on message readers. The researchers found that the influence of prior thought and intent influenced the cognitive and affective reactions but did not interact with message type. The experimental design lacked a comparative control group. The researchers hypothesized that differential effects on cognitive and affective reactions would affect the persuasiveness of the message, but this aspect of their model was not tested. Though statistical evidence was found to be more effective on all but two dependent measures, the effect sizes were small again highlighting the complexity surrounding persuasion and beliefs.

Lindsey and Ah Yun (2003), in a study similar to Kopfman et al. (1998), investigated meditational factors between evidence type in persuasive message and persuasive outcomes. In a post-test only experimental design, they explored the influence of narrative and statistical persuasive evidence on attitude toward a year-round academic schedule. They hypothesized that that relationship was likely to be mediated by perceived sample size heuristic, perceived verifiability of evidence, and perceived message credibility (p. 310). Participants were 486

undergraduates enrolled in communication courses. They were randomly assigned to one of four groups; narrative evidence message, statistical evidence message, no-evidence message, or no message. After that, they completed a self-report questionnaire whose scales assessed the three meditational factors and attitude toward a year-round academic schedule.

Results of a priori contrasts revealed that statistical evidence was the most convincing when compared to the narrative and both control groups. Specifically, statistical evidence resulted in significantly higher scores on the attitude scale than the narrative message ($t(482) = 6.34$, $p < .01$). The meditational variables were found to be highly correlated. Subsequent regression analyses indicated that when entered together into the regression model, the meditational variables were significant predictors of scores on the attitude scale. ($R = .86$, $R^2 = .73$; $F(3,242) = 213.69$, $p < .001$). Also, they found that evidence type as a predictor did not contribute additional explanation of variance to the model (p. 314) confirming that, taken together, the hypothesized meditational factors were mediators of the relationship between evidence type and attitude outcomes.

The persuasive messages developed for this study directly compared statistical and narrative evidence types against two control conditions (i.e., no-evidence message and no message). Both messages began with very similar introductory paragraphs advocating year-round academic schedules. The statistical message listed four statements containing numerical support evidence. The narrative message provided two similar anecdotal accounts that favored the year-round academic schedule. The authors have suggested that personal relevance relative to the topic of organ and tissue donation may explain the effectiveness of the statistical message findings. Even though Baesler (1997) found no difference in persuasiveness with either evidence

type, participants may respond to messages on such personal and serious topics as organ donation differently than other topics (e.g., goal orientation).

Green and Brinn (2003) investigated the influence of statistical and narrative persuasive messages, personality traits, and health related factors that contribute to intention to use tanning beds. One hundred forty-one Caucasian female undergraduates from assorted college courses were randomly assigned to one of three groups, narrative, statistical, or a no-message control. Half of the participants also completed a Risk Self-Assessment Survey. After reading their assigned message, they completed scales that measured the dependent variables, intention to tan, intention to protect skin, perceived susceptibility to skin cancer, and tanning behavior (number of times tanning bed was used in the previous month) (p. 448). Psychological factors that were also assessed were: self-esteem, public body consciousness, eating disorders, and imaginary audience (p. 450). Participants were contacted in a phone survey 3-4 weeks later to respond to a post-test survey that asked the number of times they had used a tanning bed in the previous month (i.e., the month following the experimental manipulation).

Change in tanning bed use was computed by subtracting the number of times participants reported using a tanning bed in the month prior to the experiment (tanning bed behavior) from the number times reported in the follow-up survey (i.e., during the month after participation in the study). Results obtained from a 3 x 2 ANOVA evidence type (narrative, statistical, no message) by self-assessment (present, absent) revealed that statistical evidence was more effective in discouraging tanning bed use than the narrative and no-message conditions ($F(2,136) = 3.02$, $p < .05$). The statistical message resulted in the most perceptions of susceptibility ($F(2,136) = 3.17$, $p < .05$) (p. 453). Both messages types were more effective in decreasing the intention to tan and increasing perceptions of susceptibility.

This study was one of the few in the persuasive evidence comparison literature to introduce personality traits as possible explanatory factors for the relationship between persuasive messages and attitudinal outcomes. Unfortunately, the data analysis in this study did not include message evidence along with personality variables in the regression analyses. Therefore, moderation effects, relative to evidence types were not described. Considering that the topic under consideration was an important health issue, it would have been useful to compare the influence of message types to a control that was information-only (no persuasive arguments at all). For that reason, we cannot be certain that reading factual information about tanning bed use may have been sufficient to affect intention to use or behaviors toward using tanning beds. Again, though statistical evidence was found to be significantly superior to the narrative and no-message conditions with respect to change in tanning bed use, the effect size was small (eta^2 = .05) (p. 451).

Research with inconclusive results

Baesler (1997) investigated the effects of anecdotal and statistical evidence in persuasive messages that endorsed different topics. Participants were 100 undergraduates randomly assigned to either a story or statistical group. Persuasive messages were designed to alter beliefs about crime, internships, or birth-control. Each participant completed a pre-test belief measure, read an article (story or statistical version), listed cognitive responses to the article, and completed a post-test belief measure. This process was repeated so that each participant read all three story or all three statistical messages and completed measures before and after each. The three topics composed the within-subjects portion of the experiment. The dependent measures evaluated beliefs and persuasiveness, cognitive responses (coded positive, negative, or neutral), exploratory variables (i.e., complexity, readability, personalness, scientificness), and credibility

and vividness. The dependent measures composed the between-subjects portion of the experiment.

Persuasiveness of evidence type was examined by computing belief change (pre- to post-test on belief scale) and comparing the results using a t-test contrast (p. 174). Both evidence types were found to be effective in changing beliefs for the crime topic ($t(50) = 9.77$, $t(48) = 13.30$, $p < .02$) but not the internships or birth-control topics. When evidence types were subjected to a 2 (evidence) by 3 (topic) ANOVA with post-beliefs as the dependent measure, neither type of evidence was found to be more persuasive than the other across topics (p.175).

This investigation explored the role of topic in influencing beliefs. The experimental design did not include a control condition that would have permitted comparisons between evidence type and a no-message condition on the belief post-test. The data analysis descriptions for this study were somewhat unclear (e.g., one or two-tailed t-test?) thus interpretation of the results should be made with caution. The authors reported an evidence by topic significant interaction with cognitive responses as the dependent variable. However, no further details were provided. The beliefs and message persuasiveness measure had a somewhat low reliability coefficient (Cronbach $\alpha = .69$) so it is uncertain what effect this might have on the results. The messages were not provided and the degree of equivalence while varying single factors could not be determined. Of interest here, this study concluded that topic may not matter when creating persuasive messages with either statistical or anecdotal evidence.

Das, Kerkhof, and Kuiper (2008), in a sample of 158 college students walking near a university campus, investigated the influence of framing, evidence types and likelihood of goal attainment on persuasion (i.e., perceived relevance, attitudes toward charity, attitudes toward message) and donation intention. The messages in this study were designed to increase valuing

and intention to donate to the Dutch Leprosy Foundation. Participants were randomly assigned to read one of eight messages that varied by evidence type (anecdotal or statistical), frame (positive or negative), and goal attainment (help multiple individuals or help a single individual). Half of the messages contained one of two goal attainment messages. In this study, the two dependent variables were persuasion, assessed by scales of perceived relevance, attitude toward charity, and attitude toward message and intention to donate that was assessed by one item "I am going to donate money to the Leprosy Foundation this year."

Participants who read the anecdotal messages reported more positive attitudes toward message than those who read statistical messages ($F(1,152) = 6.15$, $p = .014$). Further, framing effects were found in the interaction between evidence type and framing. The scores on the perceived relevance scale were higher when participants read the positively framed anecdotal message than when the anecdotal message was framed negatively ($F(1, 152) = 9.03$, $p = .003$) (p. 169). In the statistical condition the results were reversed in that those participants who read the negatively framed statistical message rated personal relevance higher than those who read the positively framed statistical message. Evidence type, with either frame, did not differ with respect to intention to donate.

This study highlighted the potential influence of framing of the evidence in persuasive messages designed to influence charitable donations. Framing the messages may augment message persuasiveness depending on evidence type. Messages with positive frames focused on a positive outcome (e.g., "Look how many people your donation would help!") compared to a negative outcome (e.g., "Look how many people will die if you don't help!"), each tapping different affective responses (e.g., guilt, pleased with oneself). Their finding that framing interacted with evidence type on only one outcome, perceived relevance, and that with only a

small effect size (eta^2 = .06 anecdotal condition, eta^2 = .04 statistical) indicates that more research in this area is needed to clarify this relationship. No other significant findings were reported for evidence type on the other attitudinal outcomes. The researchers commented that one limitation of their study was that prior knowledge and beliefs about charities generally or this charity in particular were assessed (p. 171). Prior knowledge or beliefs may have influenced the intention to donate or mitigate the effects of evidence type and framing.

Summary

The results in studies that compared anecdotal and empirical evidence types in persuasive messages have been mixed. Among the studies reviewed above, six advantage anecdotal, four empirical, and two were inconclusive. Some of the studies were head-to-head comparisons (e.g., Koballa, 1986) and others had significant findings of benefits only in specific circumstances (e.g., Kazoleas, 1993, anecdotal was superior after time passed). Several researchers have employed compilation and meta-analytic techniques in an effort to explain the variability in evidence type results.

Reinard (1988) undertook a lengthy narrative review of extant research on empirical and statistical evidence types. He noted the variability in factors and designs but believed that there were some consistent patterns within the results (p. 46). From his extensive reading of the literature at that time, he concluded that anecdotal strengthened persuasive messages more than statistical evidence (p. 24). Allen and Preiss (1997) employed meta-analytic statistical techniques to amalgamate and summarize the results across 16 studies comparing evidence types. They concluded that statistical evidence was slightly more persuasive than anecdotal (average r = .074, var_r =.029, N = 1836). They cautioned interpretation of their results and proposed the likely presence of moderator variables. Reinhart (2006) updated Reinard's (1988) literature review and improved and revised Allen and Preiss's (1997) study. In her meta-analytic study, anecdotal

evidence was found to be superior to statistical evidence across 13 studies that employed belief change as the outcome variable (p. 32). She too believed that moderator variables contributed to differential effects of evidence type in studies that sought to understand persuasion to change beliefs.

Several rationales have been forwarded to explain the mixture of results and small effect sizes found among studies comparing evidence types. For example, Baesler and Burgoon (1994) proposed vividness (information that is affectively stimulating, p. 584) as a moderator of evidence type. They found that vividness bolstered the effects of statistical evidence especially after a one-week delay (p. 593). Other researchers have included vividness (Baesler, 1997; Dickson, 1982; Kazoleas, 1993) as a potentially influential factor in persuasive messages, but their results have been mixed too. Other factors that have been proposed to affect the relationship between evidence type and attitudinal outcomes are personal relevance, prior beliefs and attitudes, and message formation (i.e., composition and content of the message) (Reinhart, 2006, p. 14).

The inconsistency in findings has yet to be resolved. In particular, there are few clear parallels among topics that endeavored to influence complex belief systems such as goal orientations. Green and Brinn (2003) was the only study reviewed above that introduced psychological factors as possible moderators or mediators on the relationship between persuasive messages and attitudinal outcomes. Additional research is needed to discover factors that influence and enhance the persuasiveness of evidence type on beliefs.

Anecdotal Persuasive Messages and Mastery Goals

Based on of my reading of the anecdotal and empirical persuasive message literature, I believe that a persuasive message containing anecdotal evidence, with some affective content within the exemplars, is more likely to affect beliefs such as mastery goal orientations. Even

though few studies of persuasion have directly addressed topics akin to motivational constructs, characteristics of messages supporting motivational beliefs, or factors that have been known to influence goal orientations, anecdotal persuasive messages have been found to have a stronger impact on attitudes and beliefs within a variety of subject areas than empirical messages.

CHAPTER 3
METHODS

The purpose of my dissertation study was to determine whether actively open-minded thinking (AOT) and an incremental theory of intelligence (ITI) interacted with two types of texts (empirical vs. anecdotal) differentially to influence mastery goal endorsement immediately after reading the text. If no interaction was present, then the purpose was to determine if type of persuasive message (anecdotal vs. empirical) affected endorsement of mastery goals.

Research Hypotheses

Hypothesis 1. There will be an AOT by Condition interaction for mastery goals such that (a) for participants who are high AOT the empirical condition will be more effective than the anecdotal condition and the anecdotal condition will be more effective than the control condition and (b) for participants who are low AOT the anecdotal condition will be more effective than the empirical condition and the empirical condition will be more effective than the control condition. Further, within each condition participants who are high AOT will score higher on a measure of mastery goals than will participants who are low AOT.

Hypothesis 2. There will be an ITI (Incremental Theory of Intelligence) by Condition interaction for mastery goals such that the effects of both types of persuasive messages will be larger for participants who are high ITI than for participants who are low ITI. Further, within each group participants who are high ITI will score higher on a measure of mastery goals than will participants who are low ITI.

Participants

Two hundred seventy-eight undergraduates were recruited from educational psychology courses offered at a large public university in the southeast. Their participation met the course

requirement that obligated them to participate in a research study or they were awarded extra course credit that did not exceed 1% of the total grade in the course.

Measures

Mastery Goal Orientation Measures

After reviewing multiple goal orientation scales (see Table 3.1), I selected two scales to assess mastery goal orientations after the participants received the manipulation assigned to their group. The two were selected on the basis of three criteria: (a) appropriateness for college students, (b) evidence of reliability and validity of participants' scores on the measure, and (c) conceptual relevance.

Mastery goal orientation. The first measure, the Mastery Goal Orientation Scale from the Patterns of Adaptive Learning Survey (PALS; Midgley et al., 1998) focuses on students' reasons for achievement behavior (see Appendix A). The Mastery Goal Orientation Scale of the PALS consists of six items with responses ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). The response options in this study were the reverse of those found in Midgley et al. in order to be consistent with other measures used in the study. Sample items included "I like schoolwork that I'll learn from even though I make a lot of mistakes" and "An important reason why I do my schoolwork is because I want to get better at it."

Several researchers have reported on the psychometric properties of this scale with undergraduate samples. For example, Day, Radosevich, and Chasteen (2003) and Ross et al. (2002) reported Cronbach's alpha coefficients of .84 and .78 respectively.

Jagacinski and Duda (2001), in a study with a college sample of 393 undergraduates, reported a Cronbach's alpha of .82 for the PALS Mastery Goal Orientation Scale, and they found that the PALS Mastery Goal Orientation Scale related positively to two other measures of goal orientation similar to mastery goals. The PALS correlated positively with the Task Orientation

Scale from Duda and Nicholls's (1992) Motivational Orientation Scale (r = .42) and with Button et al.'s (1996) Learning Scale from their Learning and Performance Scale (r = .55).

Researchers have found positive relationships between scores on the PALS Mastery Goal Orientation Scale and several motivational variables posited to relate to mastery goals, including academic self-efficacy, adaptive self-regulatory learning strategies, and positive affect, in studies with college students. For example, Hsieh, Sullivan, and Guerra (2007) found that the PALS Mastery Goal Orientation Scale was moderately correlated with perceived academic self-efficacy (r = .60) (p. 463). Shim and Ryan (2005), using the same PALS Mastery Orientation Scale, obtained significant correlations with perceived self-efficacy at two times during a semester (r = .46, time 1 and r = .32, time 2) (p. 340). Day et al. (2003) found that the PALS Mastery Orientation Scale correlated with deep processing (r = .44) (p. 446), which is considered to be an adaptive learning strategy. Jagacinski and Duda (2001) found that the PALS Mastery Goal Orientation Scale correlated positively with enjoyment (r = .69) and negatively with boredom (r = -.53) (p. 1028). Day et al. (2003) also found a positive relationship between the PALS mastery scale and enjoyment using regression analysis (β = .68) (p. 455).

Jagacinski and Duda (2001), in a sample of 393 college students, found acceptable fit for a two-factor model (mastery and performance). Further, the correlation between the two factors was -.02 (p. 1024). In another factor analytic study, Smith, Duda, Allen, and Hall (2002) found the loadings of all items on the mastery goal scale, with the exception of item 3 (.33), were above .40.

The second goal measure, the Mastery Goal Scale (Attenweiler & Moore, 2006) was selected to assess whether another type of mastery goal orientation scale might yield different results from the PALS scale. This goal orientation subscale was conceived as a domain-general,

dispositional quasi-trait, in contrast to the PALS, which is specific to mastery in school. The Attenweiler and Moore (A & M) scale was constructed from six other goal orientation scales intended for use with undergraduates, none of which is the PALS (Brett & VandeWalle, 1999; Button et al., 1996; Elliot & Church, 1997; Harackiewicz, Barron, Elliot, Carter, & Lehto, 1997; Horvath, Scheu, & DeShon, 2001; VandeWalle, Cron, & Slocum, 2001) (See Appendix A). This mastery goal orientation subscale consists of eight items with responses ranging from 1 (*not at all true*) to 7 (*very true*). Sample items include "I enjoy challenging and difficult tasks where I learn new skills" and "I prefer to work on tasks that force me to learn new things."

In a study of the responses of 472 undergraduates, across four waves of a survey, Attenweiler and Moore (2006) obtained a mean Cronbach's alpha of .89 for the participants' scores on their mastery goal scale. Using repeated measure confirmatory factor analysis to compare two-, three-, and four-factor models, Attenweiler and Moore found that the factor associated with the mastery goal items was moderately to strongly correlated across the four waves (the time separating the waves of data collection ranged from 3 to 5 weeks) with a mean correlation of .79 for the two-factor model with values ranging from .69 to .91, a mean of .79 for the three-factor model with values ranging from .69 to .90, and mean of .79 with values ranging from .68 to .90 for the four-factor model (p. 350). These results provided evidence of the relative stability of the mastery goal factor across models and time offering preliminary support for the conception of the factor as dispositional construct.

Task-choice goal measure. This single question, developed by Dweck, (1999, p. 185) asks participants to choose among four potential follow-up tasks (see below). According to achievement goal theory, people who hold mastery goals prefer challenging tasks over tasks that focus on demonstrating or avoiding performance. This item requires participants to choose

among tasks that represent different goal orientations: (a) a performance-goal task without challenge, (b) a mastery-goal task, (c) a performance-avoid-goal task, and (d) a performance goal with challenge.

Instruction: We may have more time later. If we do, which kind of task would you like to work on most? Mark only one answer! I would like to work on:

_____ (a) Problems that aren't too hard, so I don't get any wrong
_____ (b) Problems that I'll learn a lot from, even if I won't look so smart
_____(c) Problems that are pretty easy, so I'll do well
_____ (d) Problems that I'm pretty good at, so I can show that I'm smart

Thinking Dispositions Questionnaire

The Actively Open-minded Thinking (AOT) measure is a 41-item scale designed to assess actively open-minded thinking (See Appendix B). A participant's score is obtained by summing the responses to the 41 items. Higher scores reflect a stronger tendency toward actively open-minded thinking (Stanovich & West, 2007a). The response options range from (1) *strongly disagrees* to (6) *strongly agree*. Since the 41-item measure became available in 2007, Stanovich and his colleagues have reported consistent reliability estimates (Cronbach's alpha) of $\alpha = .83$ for the scores of 1,045 undergraduates (Stanovich & West, 2007a, 2007b) and $\alpha = .84$ for the scores of 195, 420, and 793 undergraduates respectively (MacPherson & Stanovich, 2007; Stanovich & West, 2007b, 2008; West, Toplak, & Stanovich, 2007).

The theoretical basis of the concept of actively open-minded thinking (Baron, 1985, 1988) along with the development of the 41-item measure suggests that the AOT measure should be related to need for cognition (Cacioppo, Petty, Feinstein, & Jarvis, 1996) and associated with epistemological beliefs, critical thinking, and reasoning tasks. Correlations between this measure and need for cognition and various rational thinking tasks have been found to be in the hypothesized direction. Stanovich and West (2008), in a sample of undergraduates ($N = 420$),

found a positive correlation (r = .39) between AOT scores and need for cognition scores in study 3 (p. 155). Further, the AOT scores in that same study correlated positively (r = .22, p < .001) with performance on a syllogistic reasoning task. West et al. (2008) found a correlation of .40 with need for cognition, .21 with a Heuristics and Biases composite, and .19 with a Belief Bias syllogisms task (p < .001, N = 793) (p. 935).

Theories of Intelligence Scale

An eight-item scale measuring beliefs about intelligence (Dweck, 1999, p. 178, Appendix C) was used to assess implicit theories of intelligence (ITI). The response options range from 1 (*strongly agree*) to 6 (s*trongly disagree*) on a Likert-type scale. I reverse scored the four entity items so that high scores on the scale represent an entity theory of intelligence. Four of the items represent an incremental theory of intelligence, and four represent an entity theory of intelligence. Sample items are "You have a certain amount of intelligence, and you can't really do much to change it" and "No matter who you are, you can significantly change your intelligence level." I only found three studies to date that include the eight-item scale from Dweck's book: Braten and Stromso (2004, 2005), and Niiya, Crocker, and Bartmess (2004).

Braten and Stromso (2004) used the eight-item scale (adapted for Norwegian undergraduates) in a sample of 80 undergraduates. They reported a Cronbach's alpha of .86 for the entity items and .88 for the incremental items. Braten and Stromso (2005) employed the eight-item Theory of Intelligence Scale (Dweck, 1999) in two samples of Norwegian undergraduates. They reported internal consistency separately for the entity items (business administration students .90, student teachers .88) and the incremental items (business administration students .92, student teachers .89). In a study of 127 introductory psychology students, Niiya et al. (2004) obtained a Cronbach's alpha of .94 (p. 802).

According to Dweck's social-cognitive model (1986), a preference for an incremental theory of intelligence should be negatively correlated to scores indicating an entity view of intelligence. In their two studies of Norwegian college students, Braten and Stromso (2004, 2005) found that incremental and entity views of intelligence, measured on the eight-item scale, correlated negatively (r = -.80) (2005, p. 554) and r = -.80 (2004, p. 381), both significant at p < .001. Niiya et al. (2004) found a similar correlation between the entity and incremental items (r = -.78, p < .01, p. 802). When I correlated participants' responses on the four-item incremental-only scale to the four-item entity-only scale in this study, the Pearson correlation (r = -.80, N = 278, p < .01) was consistent with the results of Braten and Stromso and Niiya et al.

Persuasive Text Characteristics

Hynd (2001) summarized features of persuasive text that were related to conceptual change. These included the ability to understand the text (p. 705), recognize the utility of the material (p. 706), and find it personally relevant (p. 707). To assess whether participants found the essays interesting, enjoyable, useful, and persuasive, participants were asked to indicate on a Likert-type scale ranging from (1) *not at all* to (5) *extremely* the degree to which they agreed with statements designed to check the persuasiveness features of the manipulation texts.

_____ (a) I found the essay interesting
_____ (b) I found the essay enjoyable
_____ (c) I found the essay useful
_____ (d) I found the essay persuasive

Comprehension Questions

In order to discern whether the participants were able to understand the essay, they were asked five comprehension questions. The questions were related to the manipulation message that they read.

Demographic Characteristics.

Participants were asked to respond to several questions about their personal characteristics. Specifically they were asked to indicate their gender, ethnicity, age, year in college, college major, number of education courses taken, and grade point average (GPA).

Conditions: Persuasive Messages

Participants were randomly assigned to one of two Conditions—a persuasive message whose argument was supported by anecdotal evidence (*anecdotal message*) or a persuasive message whose argument was supported by empirical evidence (*empirical message*) or to a control condition in which participants read a text unrelated to achievement goal theory (*control message*). The persuasive messages began with an identical expository text that provided an overview of goal theory and mastery and performance goals. The differences in the persuasive messages are described below. To increase the likelihood that the messages were of equal difficulty, the texts were written at comparable levels of reading difficulty as assessed using the Flesch-Kincaid Readability scale in Microsoft's text editor—Reading grade levels were as follows: 10.7 for the empirical message, 10.8 for the anecdotal message, and 10.4 for the control message. In addition, the essays were of similar length: The empirical message had 967 words, and the anecdotal and control essays had 970 words.

Anecdotal Message

Illustrative examples of people with differing achievement goals were presented as evidence supporting the argument that mastery goals are important and worthy of adopting in academic settings. The anecdotes were designed to be familiar to an undergraduate audience with elements (e.g., names, classroom situations) that students could identify as relatable to their own personal experiences.

Empirical Message

The evidence supporting the argument that mastery goals are important and worthy of adoption in academic settings consisted of research findings, including relevant numerical data from empirical studies. The empirical message was designed to parallel the anecdotal message in that identical argument sentence stems were used, but the supporting evidence contained numerical data. For example, see the following two excerpts from the anecdotal and empirical texts:

> Anecdotal text: Learning goals are linked to *persistence*. Persistence refers to the tendency of people to continue working even when the academic task is difficult. Amy's ultimate vocational goal was to teach elementary students, and her teacher education program included a child development course. That course required analysis and evaluation of case studies. On the first test Amy received a D on her analysis of the case study. In preparing for the next test, Amy was determined that she would learn to write a thorough analysis so that she would be able to apply this skill in working with children in her own classes. It was a struggle, but gradually Amy gained analytical skill in identifying behaviors in the descriptions of children's behavior that enabled her to use developmental theory to propose appropriate strategies to promote children's development.
>
> Empirical text: Learning goals are linked to *persistence*. Persistence refers to the tendency of people to continue working even when the academic task is difficult. In a study in a college-level statistics class, Miller and colleagues (1993) found that learning goals were related to persistence (r = .55). In contrast, performance goals were unrelated to persistence (r = -.07). These findings suggest that students who hold learning goals may have the willpower to meet the challenge of difficult learning tasks.

Control Message

An excerpt from Daniel Schacter's (2001) book *The Seven Sins of Memory: How the Mind Forgets and Remembers* was chosen for the control message. The passage selected was edited to make it equivalent in length and readability to the manipulation messages.

Procedure

Participants completed the measures in groups in a classroom setting. They read and signed a consent form before being given Packet 1 that contained the pre-manipulation measures

and one of the three manipulation messages. After they completed Packet 1, participants submitted it to me and I then gave them Packet 2. Packet 2 contained the post-manipulation measures for their assigned group.

Pre-manipulation Measures

Participants completed the following measures in groups:

1. Thinking Dispositions Questionnaire (41 items)
2. Implicit Theory of Intelligence Survey (8 items)

Responses were recorded on Scantron sheets.

Manipulations

Participants were randomly assigned to one of three groups.

1. Anecdotal message (970 words)
2. Empirical message (970 words)
3. Control message (968 words)
4.

Post-manipulation Measures

Participants completed the following measures. Their responses were recorded on the same Scantron sheet that was used for the pre-manipulation measure responses.

1. Persuasive text characteristics
2. Goal orientation measures
    a. Mastery Goal Orientation Scale from the PALS (Midgley, et al. (1998)
    b. Mastery Goal Scale (Attenweiler & Moore, 2006)
    c. Task-Choice Goal Measure (Dweck, 2000)
3. Comprehension questions
4. Demographic questionnaire

Data Analysis

The following statistical analyses were conducted. First, I calculated the means and standard deviations and correlations for the variables in the study. Then, I computed Cronbach

alphas for the scales used in the study. Finally, I conducted several ANOVA analyses. To test the expected interaction between actively open-minded thinking and type of persuasive message on mastery goal endorsement and the interaction between an incremental theory of intelligence and the persuasive messages (i.e., anecdotal and empirical) on mastery goal endorsement, I performed two ANOVA's, one with the Mastery Goal Orientation Scale from the PALS and the other with the Attenweiler and Moore (A&M) Mastery Scale, as the dependent measures. To test the hypotheses related to actively open-minded thinking, I first performed a median split of the scores on the Actively Open-Minded Thinking Questionnaire and then conducted a two by three (high/low AOT by Group) ANOVA using each mastery goal scale individually as the dependent measure. Similarly, I performed a median split for the scores on the scale on Implicit Theory of Intelligence and then conducted a two by three (high/low incremental theory of intelligence by Group) ANOVA using each of the mastery goal scales as the dependent measures.

For the Task-Choice Goal Measure, I separated participants' responses into two groups, those who chose a challenging task that indicated a preference for mastery goals and those who chose an unchallenging task that indicated a preference for performance goals. I calculated the frequency of those participants who chose the more challenging response (#2) and compared this choice across the three groups. In addition, I conducted a binary logistical regression with challenging vs. non-challenging response as the dependent variable.

For the persuasive text characteristics (i.e., interest, usefulness, enjoyment, persuasiveness), I performed individual one-way ANOVAs to assess group differences. For the comprehension questions, I calculated an individual score for each participant based on the number of items they answered correctly, ranging from zero to five. On the basis of those scores, I calculated the percentage of participants in each group with three or more correct answers.

Table 3-1. Mastery goal orientation scales

Author/Year	Items Likert range	Sample	*M*	*SD*	Internal Consistency	Comments/Correlates
Roedel, Schraw, & Plake, 1994	12-item 5 pt	187 undergraduates educ. psych. classes			.80	+ self agency - test anxiety test-retest *r* = .73
Roedel & Schraw, 1995	12-item 5 pt	157 undergraduates	3.62	0.41	not reported	
Button, Mathieu, & Zajac, 1996	8-item 7pt	(1) 374 undergraduates psych classes	5.49	1.04	.79	+ GPA *r* = .12 mastery; ns performance
	8-item 6 pt	(2) 215 adult workers	4.88	0.86	.81	Mean age 26.97 + theory of ability *r* = .53 mastery; ns performance
	8-item 8 pt	(3) 409 undergraduates psych classes	6.27	1.28	.85	+ GPA *r* = .25 mastery; ns performance + theory of ability *r* = .46 mastery; -.17 performance + social desirability *r* = .27 mastery; -.32 performance

Table 3-1.Continued

Author/Year	Items Likert range	Sample	*M*	*SD*	Internal Consistency	Comments/Correlates
	8-item 9 pt	(4) 443 undergraduates psych classes	7.21	1.36	.82	+ GPA *r* = .18 mastery; ns performance + theory of ability *r* = .42 mastery; -.16 performance
VandeWalle,1997	6-item 6 pt	(A) 66 undergraduates management classes			.88	
		(B) 198 undergraduates management classes			.85	
		(C) 239 community college business and psych classes			.89	
		(D) 53 community college accounting classes				Sample D only test-retest *r* = .66 (3 month interval) Mean age 32.2
Elliot & McGregor, 2001	6-items 7 pt	180 undergraduates intro to psych classes	5.55 3.89	1.18 1.53	.87 .89	mastery approach mastery avoidance

Table 3-1.Continued

Author/Year	Items Likert range	Sample	*M*	*SD*	Internal Consistency	Comments/Correlates
Jagacinski & Duda, 2001	MOS* 9-item 5 pt	393 undergraduates	4.25	0.47	.80	Skewness: -1.27 Kurtosis: 6.14
	PALS 1996 6-item 5 pt		3.35	0.67	.82	Skewness .09 Kurtosis -0.21 *r* = .27 performance avoidance
	Button et al., 1996 8-item 7pt		5.41	0.85	.87	Skewness -.58 Kurtosis .71 +socially desirability
Ross, Shannon, Salisbury-Glennon, & Guarino, 2002	PALS 5-item 5 pt	184 undergraduates 378 fourth--graders	3.7	0.68	.78	Context→ learner-centered approach
Day, Radosevich, & Chasteen, 2003	Button et al. 8-items 5 pt	384 undergraduates	3.82	0.62	.86	
	TEOS 7-items 5 pt		4.21	0.6	.87	derived from Mills (1997)

Table 3-1.Continued

Author/Year	Items Likert range	Sample	*M*	*SD*	Internal Consistency	Comments/Correlates
	VandeWalle 5-items 5 pt		3.75	0.69	.85	
	PALS, 1998 6-items 5 pt		3.44	0.71	.84	
Finney, Pieper, & Barron, 2004	5-item	2111 freshman university-wide	5.92 4.36	0.92 1.24	.76 .74	mastery approach mastery avoidance +deep processing
Attenweiler & Moore, 2006	8-item adapted Not PALS 7 pt	472 undergraduates	not	reported	.89	Multiwave design 4 waves 3 to 5 wks apart

CHAPTER 4
RESULTS

This dissertation focused on factors that influence the adoption of mastery goals. Two persuasive messages were created with differing supporting evidence (i.e., anecdotal or empirical) for an argument in favor of mastery goal adoption. Further, two learner characteristics, actively open-minded thinking and incremental theory of intelligence were hypothesized to interact with a persuasive message in order to enhance the adoption of mastery goals.

In this chapter, I will first describe the overall characteristics of the sample. Then, the reliability estimates will be computed for each of the measures used in this study. This description will be followed by a summary of the characteristics of the three randomly assigned groups prior to manipulation and after manipulation, including the descriptive statistics for the measures. After that, the results for the two by three ANOVAs that were conducted in order to compare the three groups on actively open-minded thinking and incremental beliefs will be presented. Finally, other pertinent findings will be described.

Characteristics of the Sample

The participants for this study were 279 students enrolled in one or more education courses in the College of Education at the University of Florida. They received course credit or extra credit in exchange for participation in the study. The participants were predominantly female (87%) and Caucasian (69%). Of the 272 participants who responded to the question, the sample had slightly more upperclassmen (juniors, seniors and graduate students – 55%) than underclassmen (freshman and sophomore - 42%). The participants' ages averaged approximately 20 years old and the mean of their self-reported grade point was 3.4. However, the first part of the data collection was conducted during the fall semester and the portion of the

sample that was in the freshman class (22%) could have reported their high school grade point, an estimation of a partial grade point, or no grade point at all. The top three college majors reported by the respondents were "Other" 21.9%, Education 19.4%, and Liberal Arts 16.5%. The list of possible majors neglected to include "Engineering" and those students likely chose the "Other" category or omitted the question.

Table 4-1. Descriptive statistics for nominal variables by group

		Anecdotal		Empirical		Control	
Measure		%	*N*	%	*N*	%	*N*
Gender							
	Female	88%	82	88%	83	85%	78
	Male	12%	11	12%	11	15%	14
Ethnicity							
	White	68%	63	66%	62	73%	67
	Black	8%	7	12%	11	10%	9
	Hispanic	17%	16	13%	12	11%	10
	Asian	4%	4	2%	2	5%	5
	Other	2%	2	7%	7	1%	1
Year							
	Freshman	16%	15	21%	18	32%	29
	Sophomore	28%	26	22%	19	12%	11
	Junior	39%	36	38%	33	38%	35
	Senior	17%	16	18%	16	17%	16
	Grad. Student	0%	0	1%	1	1%	1

Note. One participant in the anecdotal group did not respond to the ethnicity item, and seven participants in the empirical group did not respond to the year item.

Internal Consistency of the Scales

I calculated the reliability of the scales used for analysis (see Table 4.2). All of the estimates for Cronbach's alpha coefficient exceeded .80.

Table 4-2. Internal consistency for the scale scores on all variables (N = 279)

Measure	Cronbach alpha	# of items	*N*
Actively open-minded thinking	.84	41	271
Implicit theory of intelligence	.94	8	279
Mastery goals - PALS	.86	6	278
Mastery goals - A & M	.84	8	278

Tests of hypotheses. Hypothesis 1a predicted that people who were high AOT and who read an empirical persuasive message would score higher on a measure of mastery goal orientation than people who were high AOT and who read an anecdotal message or a text unrelated to goal orientation. In addition, hypothesis 1b predicted that people who were low AOT and who read a persuasive message with an argument supported by anecdotal evidence would score higher on a measure of mastery goal orientation than low AOT people who read an empirical or unrelated message. Finally, those people who were high AOT would score higher on a measure of mastery goals than people who were low AOT. To test these hypotheses, I conducted two factorial ANOVAs that compared mastery goal scores (PALS and A & M) for high AOT and low AOT across the three groups. The means and standard deviations for these comparisons are reported in Table 4-4.

The results of the ANOVAs are reported in Tables 4-5 and 4-6. The results indicated that the AOT by Group interaction was not significant at the .05 level, $F(1, 269) = .95$, $p = .38$ for the PALS; $F(1, 269) = 2.38$, $p = .09$, for the A&M. Therefore, hypotheses 1a and 1b were not supported. The final hypothesis related to actively open-minded thinking predicted that participants who were high AOT would achieve a higher score on a measure of mastery goals than participants who were low AOT, and that hypothesis was supported, $F(1, 269) = 7.99$, $p = .00$, for the PALS; $F(1,269) = 9.29$, $p = .00$, for the A&M.

Hypothesis 2a predicted that a person who held an incremental theory of intelligence (high ITI) would interact with a persuasive message (empirical or anecdotal) to support mastery goals more than a participant who did not read a persuasive message (control). The results did not support this hypothesis ($F(1, 273) = .40$, $p = .66$, for the PALS; $F(1, 273) = .81$, $p = .44$, for the A&M). As no interaction was found, I tested hypothesis 2b that those participants who were high

ITI would score higher on a posttest measure of mastery goals than those who do not prefer an incremental theory of intelligence. Results for this hypothesis were mixed. When the PALS mastery-goal scale was entered as the dependent measure, this hypothesis was not supported, $F(1, 273) = 2.04$, $p = .15$). However, on the A & M mastery goal scale, there was a significant difference between high and low ITI , $F(1,273) = 5.44$, $p = .02$.

Table 4-3. Means and standard deviations for scale scores on all variables

Variable		*M*	*SD*	*N*
Pre-Manipulation				
	Actively Open-minded Thinking	170.64	19.62	271
	Anecdotal	170.43	18.21	91
	Empirical	170.46	18.36	91
	Control	171.04	22.78	89
	Implicit Theory of Intelligence	3.03	1.17	278
	Anecdotal	3.16	1.20	93
	Empirical	3.02	1.15	93
	Control	2.89	1.16	92
Post-Manipulation				
	Mastery Goals-PALS	4.33	.89	278
	Anecdotal	4.25	.82	93
	Empirical	4.30	.88	93
	Control	4.43	.97	92
	Mastery Goals-Attenweiler & Moore	5.06	.63	278
	Anecdotal	4.99	.58	93
	Empirical	5.01	.64	93
	Control	5.17	.68	92

Other Findings

Task-Choice Question

I compared the responses to the single task-choice question that asked participants if they had more time would they prefer to work on a task that they could learn from (the mastery-goal

Table 4-4. Means and standard deviations for mastery goals by pre-manipulation measures and manipulation condition.

	Low AOT			High AOT			Low ITI			High ITI			Total		
							PALS								
	M	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*
Anecdotal	4.12	.80	45	4.34	.83	46	4.23	.88	49	4.27	.74	42	4.25	.82	93
Empirical	4.26	.74	46	4.41	.97	43	4.17	.76	46	4.44	.97	42	4.30	.87	93
Control	4.21	.97	43	4.71	.82	45	4.35	1.03	43	4.51	.92	46	4.43	.97	92
							A&M								
Anecdotal	4.94	.57	45	5.03	.59	46	4.97	.64	49	5.02	.64	42	4.99	.58	93
Empirical	4.98	.58	46	5.10	.60	43	4.90	.62	46	5.11	.53	42	5.01	.64	93
Control	4.97	.73	43	5.40	.45	45	5.03	.71	43	5.3	.54	46	5.17	.68	92

Table 4-5. Analysis of variance for mastery goals as a function of AOT and group (N = 270)

Source	*df*	*F*	η^2	*p*
		PALS		
AOT	1	7.99	.02	.00**
Group	2	1.53	.01	.21
AOT * Group	2	0.95	.01	.38
error	264			
		A & M		
AOT	1	9.29	.03	.00**
Group	2	2.58	.01	.07
AOT*Group	2	2.38	.01	.09
error	264			

*$p \leq .05$. **$p \leq .01$.

Table 4-6. Analysis of variance for mastery goals as a function of ITI and group (N = 276)

Source	*df*	*F*	η^2	*p*
		PALS		
ITI	1	2.04	.00	.15
Group	2	.97	.00	.37
ITI*Group	2	.40	.00	.66
error	271			
		A & M		
ITI	1	5.44	.02	.02*
Group	2	2.09	.01	.12
ITI*Group	2	.81	.00	.44
error	271			

*$p \leq .05$. **$p \leq .01$.

orientation) or an easy task on which they could do well (three performance-goal options). The frequency of mastery-goal orientation responses (see Table 4-7) was highest in the anecdotal group followed by the control group. Of interest, the participants who read the empirical essay chose performance-goal responses more than those in both the anecdotal and control groups.

A binary logistic regression that compared the three groups on their responses to the task-choice question revealed that participants in the empirical group, as compared to the control group, chose the mastery-goal response significantly less often (*B* = -.66, *p* = .03, Exp(B) = .52). These results indicate that participants in the empirical group were approximately half as likely to choose the mastery-goal response as those in the control group.

Table 4-7. Frequency of mastery vs. non-mastery responses on task choice question by group (*N* = 277)

Group	Mastery count	% Mastery	Non-mastery count	% Non-mastery	Total count (*n*)
Anecdotal	55	36.7	38	29.9	93
Empirical	41	27.3	53	41.7	94
Control	54	60.0	36	40.0	90

Ratings of Essay Quality

Participants responded to four questions related to the essays they read. They rated their essay on whether they thought it was *interesting, enjoyable, useful,* and *persuasive* on a Likert-type scale ranging from *1*(*not at all)* to *5(extremely)* (See Table 4-9). I conducted a one-way ANOVA (see Table 4-10) to test for group differences among the three message groups for each of the four questions. The participants found the control essay to be significantly more interesting and enjoyable than either of the manipulation essays (i.e., anecdotal, *M* = 3.26, control, *M* = 3.67, empirical, *M* = 3.2; *enjoyable* (i.e., anecdotal, *M* = 2.94, control, *M* = 3.28, empirical, *M* = 2.86). No significant differences among the three groups were found on their ratings of the essay as useful or persuasive.

Comprehension questions

Each participant responded to five questions designed to assess their understanding of the text that they read. The means and standard deviations for the three groups are reported in Table 4-8.

The ANOVA analysis that compared group means on comprehension score showed a significant difference among groups, $F(2, 278) = 7.92$, $p = .00$. The Scheffe post hoc test revealed that the anecdotal group's comprehension score mean was significantly lower than that in the control group ($p = .00$). No other contrasts reached significance.

Table 4-8. Means and standard deviations for comprehension scores by group.

Group	*M*	*SD*	*N*
Anecdotal	3.42	1.35	93
Empirical	3.82	1.22	94
Control	4.12	1.02	92

Interrelationships Among the Variables by Condition

Anecdotal Condition

The correlation between the two mastery goal measures, PALS and A & M was significant ($r = .83$, $p = .00$). The correlation between the two performance-approach scales were also significant at the .01 level ($r = .81$). The relationship between the PALS mastery scale and PALS performance approach scale was not significant at the .05 level ($r = .08$, $p = .43$). Moreover, the PALS did correlate significantly at the .05 level with the performance-approach version of the A & M scale ($r = .25$, $p = .02$). In this group, the PALS correlated significantly with all four text features, interest, enjoyment, usefulness, and persuasiveness ($p < .01$). The A& M mastery scale also correlated significantly with the A & M performance-approach scale ($r = .27$, $p = .01$). The A & M mastery scale only reached significance for two of the text features, interest and enjoyment.

The correlation between AOT and ITI was moderate ($r = -.33$). Because a high score on the ITI indicated an entity view of intelligence, the negative correlation indicates that a high score on the AOT is associated with a low score on the ITI or high AOT is associated with an

incremental view of intelligence. Of interest, AOT is negatively associated with the perception of persuasiveness for those participants who read the anecdotal essay (r = -.27).

Several of the correlations among the ratings of text features were noteworthy. Interest was significantly related to enjoyment (r = .75), usefulness (r = .54), and persuasiveness (r = .39). Persuasiveness was associated with enjoyment (r = .47) and usefulness (r = .47).

Empirical Condition

For those participants who read the empirical essay, the two mastery goal measures correlated strongly (r = .72, p < .01) as were the two performance approach scales (r = .85, p < .01). However, for this group, the mastery goal measures, PALS or A & M, did not correlate significantly with their own performance-approach scales. The PALS Mastery-goal Scale correlated r = -.10 with the PALS Performance-goal scale (A & M r = -.04). The A & M Mastery-goal Scale correlated r = .07 with the A & M Performance-goal Scale, r = .12 (PALS r = .07). For this group, the PALS mastery-goal scale correlated significantly with GPA at the .05 level (r = .26). The A& M Mastery-goal scale correlated with the interest text feature (r = .31, p = .00) but not with any other variables.

Actively open-minded thinking did not correlate significantly with an implicit theory of intelligence for this group (r = -.11). In this group, AOT correlated negatively with their comprehension score (r = -.26). Interest in the empirical essay was significantly correlated with enjoyment (r = .62, p < .01), usefulness (r = .48, p < .01), and persuasiveness (r = .35, p < .01). The participants in this group associated usefulness with persuasiveness (r = .50, p < .01).

Control Condition

The two mastery-goal measures were strongly associated at the .01 level of significance (r = .81) as were the two performance approach scales (r = .78). In this group, the mastery-goal scales were significantly correlated to actively open-minded thinking (PALS, r = .43 p = .00); A

& M, $r = .44$, $p = .00$). The mastery-goal scales correlated positively with enjoyment of the essay ($r = .40$, 44, $p < .01$). The A& M mastery-goal scale was associated with the A & M Performance-approach scale ($r = .30$, $p < .01$) and with the PALS performance approach scale ($r = .21$, $p < .05$).

The control essay text features correlated significantly with each other (see Table 4-11). Actively open-minded thinking scores correlated positively with enjoyment of the control essay ($r = .22$, $p < .05$). Comprehension was significantly associated with interest ($r = .25$, $p < .05$) and enjoyment of the essay ($r = .23$, $p < .05$).

Table 4-9. Means and standard deviations for text features by group (N = 279

Group	*M*	*SD*	*N*
	Interesting		
Anecdotal	3.26	0.76	93
Empirical	3.2	0.71	94
Control	3.67	0.89	92
Total	3.38	0.82	279
	Enjoyable		
Anecdotal	2.94	0.88	93
Empirical	2.86	0.74	94
Control	3.28	1.02	92
Total	3.03	0.9	279
	Useful		
Anecdotal	3.32	0.82	93
Empirical	3.12	0.77	94
Control	3.24	0.98	92
Total	3.23	0.86	279
	Persuasive		
Anecdotal	2.74	0.95	93
Empirical	2.83	1.00	94
Control	2.89	0.99	92
Total	2.82	0.98	279

Table 4-10. Analysis of variance for text features by group (N = 279)

Source	*df*	*F*	η^2	*p*
		Interesting		
Group	2	9.8	‘.07	.00**
error	276			
		Enjoyable		
Group	2	5.94	‘.04	.00**
error	276			
		Useful		
Group	2	1.3	‘.01	.27
error	276			
		Persuasive		
Group	2	‘.54	‘.00	.58
error	276			

*$p \leq .05$. **$p \leq .01$.

Table 4-11. Pearson correlations for anecdotal condition (N = 94)

	MPALS	MAM	PPALS	PAM	AOT	ITI	COMP	INT	ENJ	USE	PER	AGE	GPA
MPALS	1.00												
MAM	.83**	1.00											
PPALS	.08	.17	1.00										
PAM	.25*	.27**	.81**	1.00									
AOT	.11	.11	-.17	-.19	1.00								
ITI	-.17	-.17	.07	.04	-.33**	1.00							
COMP	-0.01	.01	-.14	-.13	.01	-.04	1.00						
INT	.30**	.27**	-.14	-.05	.07	-.04	-.06	1.00					
ENJ	.28**	.22**	-.12	-0.04	.05	-.05	-.11	.75**	1.00				
USE	.31**	.19	-.17	.02	-.06	-.03	-.17	.54**	.58**	1.00			
PER	.27**	.10	-.21*	-.03	-.27**	.01	-.13	.39**	.47**	.47**	1.00		
AGE	-.03	-.01	-.09	-.08	.00	-.05	-.06	.04	.01	.08	.09	1.00	
GPA	.19	.06	.01	.10	.10	-.11	-.04	.02	-.01	.06	-.03	.28**	1.00

Note. MPALS = mastery goal PALS. MAM = mastery goal Attenweiler and Moore. PPALS = performance approach PALS. PAM = performance approach Attenweiler and Moore. AOT = actively open-minded thinking. ITI = incremental theory of intelligence. COMP = comprehension. INT – interesting. ENJ = enjoyment. USE = useful. PER = persuasive. AGE = age in years. GPA = grade point average:

* $p \leq .05$. ** $p \leq .01$

Table 4-12. Pearson correlations for empirical condition (N = 93)

	MPALS	MAM	PPALS	PAM	AOT	ITI	COMP	INT	ENJ	USE	PER	AGE	GPA
MPALS	1.00												
MAM	.72**	1.00											
PPALS	-.10	.07	1.00										
PAM	-.04	.12	.85**	1.00									
AOT	.05	.06	-.16	-.20	1.00								
ITI	-.15	-.17	-.23*	-.13	-.11	1.00							
COMP	-.08	-.17	.06	.01	-.26*	-.09	1.00						
INT	.18	.31**	-.07	.01	.02	-.06	.04	1.00					
ENJ	.20	.23	.11	.09	-.12	-.05	.19	.62**	1.00				
USE	.07	.18	.07	.07	-.02	.01	-0.02	.48**	.42**	1.00			
PER	.07	.17	.01	-.01	-.17	.14	-.04	.35**	.14	.50**	1.00		
AGE	.19	.17	-.28**	-.27	.16	-.05	-.15	.21*	.15	.12	.10	1.00	
GPA	.26*	.16	.11	.08	-.12	.09	.21*	-.01	.08	-.13	-.10	-.24*	1.00

Note. MPALS = mastery goal PALS. MAM = mastery goal Attenweiler and Moore. PPALS = performance approach PALS. PAM = performance approach Attenweiler and Moore. AOT = actively open-minded thinking. ITI = incremental theory of intelligence. COMP = comprehension. INT – interesting. ENJ = enjoyment. USE = useful. PER = persuasive. AGE = age in years. GPA = grade point average.
* $p \leq .05$. ** $p \leq .01$

Table 4-13. Pearson correlations for control condition (*N* = 92)

	MPALS	MAM	PPAL	PAM	AOT	ITI	COMP	INT	ENJ	USE	PER	AGE	GPA
MPALS	1.00												
MAM	.81**	1.00											
PPAL	.17	.21*	1.00										
PAM	.27	.30**	.78**	1.00									
AOT	.43**	.44**	.07	-.02	1.00								
ITI	-.12	-.19	.16	.09	-.11	1.00							
COMP	.21*	.19	-	-.02	.15	-.11	1.00						
INT	.18	.26*	-	.02	.03	-.20	.25*	1.00					
ENJ	.40**	.44**	-	.06	.22*	-.13	.23*	.72**	1.00				
USE	.14	.14	.05	.05	.09	-.13	.14	.55**	.54**	1.00			
PER	-.07	-.11	-.26*	-.19	-.12	-.15	.18	.40**	.25*	.46**	1.00		
AGE	.07	.06	-.08	-.10	.22*	-.07	.01	-.09	.05	.03	-.01	1.00	
GPA	.20	.18	.11	.16	.06	-.01	.08	.09	.16	.09	.02	-.26*	1.00

Note. MPALS = mastery goal PALS. MAM = mastery goal Attenweiler and Moore. PPALS = performance approach PALS. PAM = performance approach Attenweiler and Moore. AOT = actively open-minded thinking. ITI = incremental theory of intelligence. COMP = comprehension. INT – interesting. ENJ = enjoyment. USE = useful. PER = persuasive. AGE = age in years. GPA = grade point average.

* $p \leq .05$. ** $p \leq .01$

CHAPTER 5
DISCUSSION AND CONCLUSION

According to social-cognitive models of learning (e.g., Bandura, 1986; Dweck & Leggett, 1988), the interaction between context and learners' psychological characteristics affect thoughts, and in some cases, resultant behavior. In keeping with those models, the purpose of this study was to examine the interaction of type of persuasive message (context) and two psychological characteristics—actively open-minded thinking and incremental theory of intelligence—on mastery goals. Various methods have been employed to modify similar beliefs (e.g., incremental theory of intelligence—Aronson et al., 2001), but none have addressed the endorsement of goal orientations. In this study, persuasive text was proposed as a means to enhance the adoption of mastery goals. Persuasive argument has been found to be effective in altering other motivational beliefs (e.g., need for cognition) (Petty & Wegener, 1997). For this study, two types of persuasive messages were created to persuade students to adopt mastery goals in an academic setting.

The two persuasive messages were identical except for the manipulation of a single text feature—evidentiary support. Persuasive arguments in each message were supported by evidence presented as an anecdote (anecdotal message) or empirical data (empirical message). The anecdotal message contained a single illustrative example and the empirical message contained statistical support for each argument in their essay. These messages were expected to interact differentially with the two learner psychological characteristics, actively open-minded thinking and an incremental theory of intelligence.

In this chapter, I summarize the findings in terms of the hypothesized interactions and other effects for the proposed relationships among persuasive messages, actively open-minded

thinking, and mastery goals. I then discuss the implications of the study for theory and practice. Finally, I identify the limitations of the study and suggest a line of future research in this area.

Discussion of Findings

Interaction of Persuasive Messages and Learner Characteristics

Actively open-minded thinking

My first question was "Is the effect of type of persuasive message (anecdotal, empirical, or control) on mastery goals moderated by actively open-minded thinking immediately after reading the text?" On the basis of previous research that examined the effectiveness of message type, psychological characteristics, and belief change, I hypothesized that for participants who are high in actively open-minded thinking, the empirical manipulation will be more effective than the anecdotal manipulation and the anecdotal manipulation will be more effective than the control manipulation and (b) for participants who are low in AOT the anecdotal manipulation will be more effective than the empirical manipulation and the empirical manipulation will be more effective than the control manipulation. The findings in this study did not support this hypothesis. No interaction was obtained between actively open-minded thinking and the type of message read by participants when their scores on a measure of mastery goal orientation were compared.

However, results indicated that actively open-minded thinking did predict participants' endorsement of mastery goals. Those participants who showed a tendency toward actively open-minded thinking scored significantly higher on one of the two measures of mastery goal orientation than those who were low in actively open-minded thinking irrespective of the message that was read. This result provides preliminary evidence that the learner characteristic of actively open-minded thinking is associated with the endorsement of mastery goals.

Incremental theory of intelligence

My second question was "Is the effect of a persuasive message (anecdotal, empirical) on mastery goals moderated by incremental beliefs about intelligence immediately after reading the text?" Because people who hold an incremental belief about intelligence tend to be more open to experience and therefore more likely to respond to a persuasive message, it was hypothesized that the effects of both types of persuasive messages will be larger for participants who score high in incremental theory of intelligence than for participants who score low. Further, within each condition participants who are high in incremental theory of intelligence will score higher on a measure of mastery goals than will participants who are low in incremental theory of intelligence. However, the results did not support this hypothesis. No significant differences were found for participants' scores on a measure of mastery goal orientation based on their implicit theory of intelligence and the message that they read. On the Attenweiler and Moore (2005) mastery scale, participants who were identified as holding an incremental view of intelligence scored significantly higher than participants who held an entity view of intelligence. However, the effect size was small ($\eta^2 = 0$). Therefore, no meaningful differences were found on mastery goal scores due to implicit beliefs about intelligence.

Persuasive Message Type and Mastery Goal Change

My last question was "If the effect of the type of persuasive message on mastery goals is not moderated by actively open-minded thinking or an incremental theory of intelligence, then does type of persuasive message (anecdotal vs. empirical) affect endorsement of mastery goals immediately after reading the text?" The two experimental groups did not differ on a measure of mastery goal orientation. Results indicated that the persuasive essays designed for this study did not affect participants' endorsement of mastery goals.

In summary, the two hypotheses predicting interactions of persuasive messages and actively open-minded thinking and incremental theories of intelligence on endorsement of mastery goals were not supported. Type of message did not affect mastery goal endorsement. However, incremental theory predicted endorsement of mastery goals on one instrument but not the other.

Additional Findings

Relationships Among Variables

Mastery goals

The association between the two mastery goal measures was strong and in the expected direction. The PALS (Midgley et al. (1998) and Attenweiler and Moore (2006) mastery goal scales correlated positively (r = .78, p < .01). Inspection of the correlations between actively open-minded thinking and the mastery goal measures revealed small, positive relationships in the two experimental conditions groups (Anecdotal – r = .11 PALS, r = .10 A&M; Empirical – r = .04 PALS, r = .05 A&M). However, for the control condition, the correlations between actively open-minded thinking and mastery goal measures were moderate and significant at the .01 level (r = .43 PALS, r = .44 A&M). Thus, for participants who read the control essay, higher scores on the AOT measure were associated with higher scores on the mastery goal measures more than in the two experimental groups.

On the question that asked respondents about the type of task they preferred to work on (Task-Choice Question), more than half of the overall sample (53.8%) chose the challenging task. This ratio was similar in the anecdotal and control groups (59.1% and 58.7% respectively) but was lower in the empirical group (44.6%). The results of the binary logistic regression showed that participants in the empirical groups favored the unchallenging response options more than the other two groups.

An interesting finding related to the pattern of mastery goal scores was that the mean scores for participants who read the control essay were higher on both mastery goal measures than in either of the experimental conditions (see Table 4-3). These participants also rated their essay as significantly more interesting and enjoyable than the two experimental groups (see Table 4-9). This result highlights the association between intrinsic motivation (i.e., enjoyment and interest in the task or activity) and the endorsement of mastery goals.

Persuasive messages

The three manipulation essays read by participants were constructed to be similar in length (anecdotal – 970; empirical – 992; control – 970 words) and readability (anecdotal 10.7, empirical, 10.7; control 10.4 on the Flesch-Kincaid reading scale). Participants' responses to comprehension questions related to the essays indicated that the participants found the essays equivalently understandable (anecdotal – $M = 3.42$; empirical – $M = 3.82$; control – $M = 4.12$).

Four text qualities that have been found to support belief change in persuasive messages—interest, enjoyment, utility, and persuasiveness—were examined for manipulation effects. The results indicated that participants who read the control essay rated it as significantly more interesting and enjoyable than participants who read and rated either of the experimental messages. No significant manipulation effects were found for the participants' ratings of the essays as useful, most important, or persuasive.

Implications of the Study

Theoretical Significance

Although researchers have proposed social cognitive theories (e.g., Bandura, 1986' Dweck, 1999) that posit that the interaction of contextual factors and personal characteristics interact to affect thinking and behavior, few studies have explored the effect of the interaction between contextual factors in an academic setting and learner characteristics that might affect

motivational variables. For this study, the contextual factor (type of persuasive text) was hypothesized to interact with learner characteristics, actively open-minded thinking and an incremental theory of intelligence, to influence the endorsement of mastery goals. However, the expected interactions were not found. However, it was found that those participants who exhibited a tendency toward actively open-minded thinking (high AOT) endorsed mastery goals significantly more than those who were less likely to engage in actively open-minded thinking (low AOT), and participants who scored higher on the measure of incremental theory of intelligence scored significantly higher (p = .02) on the Attenweiler and Moore (2006) mastery goal scale. This finding supports Dweck and Leggett's (1986) conjecture that implicit theories of intelligence are associated with goal orientations and is consistent with other studies that have obtained a similar relationship in the college student population.

In summary, the interaction of contextual and personal characteristics on motivation posited by social cognitive theorists was not supported in this study. However, limitations of the study (to be discussed in a later section) may account for the results.

Practical Significance

It is important to further understand achievement motivation at the college level and how students' motivation can be supported by those entrusted to serve them. It was hypothesized that the type of persuasive message (whether it was anecdotal or empirical) interacts with the personal characteristics of actively open-minded thinking and incremental theory of intelligence to affect the endorsement of mastery goals. However, the hypothesized interactions were not found. An incremental view of intelligence was not found to be associated with mastery goals. Based on the results from this study, this learner characteristic may not hold any real utility for practitioners.

Limitations of the Study and Suggestions for Future Research

Persuasive Messages

The type of evidence, specifically anecdotal and empirical, within a persuasive argument did not interact with personal characteristics (i.e., actively open-minded thinking and an incremental theory of intelligence) and did not modify goal orientation differentially. It is reasonable that some other element or combination of elements in the experimental essays (e.g., refutational text, affective content) may be a more successful means to affect personal characteristics sufficiently to affect the endorsement of mastery goals.

Hynd (2001) summarized factors that have been successful in increasing the effectiveness of persuasive messages with respect to conceptual change. Texts need to be "(a) moderately discrepant with belief, (b) understandable, (c) credible, (d) useful, (e) repeated, and (f) related"(p. 705). Participants rated the texts for the present study equivalently useful and persuasive but found those in the control condition more interesting and more enjoyable than participants who read the experimental essays. Mastery goals have been associated with the components of intrinsic motivation, interest (Hulleman, Durik, Schweigert, & Harackiewicz, 2008) and course enjoyment (e.g., Lee, Sheldon, &Turban, 2003). It is possible that the participants' stronger response to the control text could have increased their intrinsic motivation that, in turn, stimulated a preference for learning that was reflected in their slightly higher (than experimental conditions) scores on the mastery goal scales (PALS control M = 4.43; anecdotal M = 4.25; empirical M = 4.30) across all learner characteristics conditions.

One possible method to increase persuasiveness of the experimental texts would be to write them in a more compelling manner so that interest and enjoyment are increased for the reader. Participants who have a tendency to consider and reflect on new information (high AOT) might be more receptive to an argument that is relatively interesting or enjoyable and that also

contained statistical evidence as hypothesized in this study. Similarly, participants who believed that intelligence is malleable (high ITI) might seize an opportunity to increase theirs and thus respond favorably to persuasive message arguments if those arguments were presented in a more enjoyable or interesting manner.

Group comparisons, with respect to the experimental essays, may have been more distinct had an additional control condition been employed. A second control essay, one that described mastery goals in a factual way (i.e., information-only) may have illuminated the effectiveness of the individual components within persuasive messages. Further research is needed to explore other elements of persuasive texts that may interact with personal characteristics to determine the optimal method for promoting mastery goals.

Learner Characteristics

Actively open-minded thinking was found to relate to mastery goals. Further study is needed to better understand this relationship and whether it has any implications for the development of mastery goals. Although the persuasive messages designed for this study were ineffective in interacting with the propensity to engage in actively open-minded thinking, it is likely that other contextual influences may perform this function and optimize the adoption of mastery goals. Implicit theory of intelligence was weakly related to goal orientation in this study. Clearly, the search for other learner characteristics and moderators of mastery goals is desirable.

One potential limitation is related to the analysis of scores on the measures of actively open-minded thinking and implicit theory of intelligence. If the scores are not distributed with sufficient variance (i.e., a leptokurtic frequency distribution) then a median split may not reveal the hypothesized interaction. That is, if too many scores are clustered near the median then those participants who were categorized as high in actively open-minded thinking (or high in incremental theory of intelligence) may not be all that different from those participants who were

categorized as low in actively open-minded thinking (or low in incremental theory of intelligence). In that case, responses on a measure of mastery goal orientation may not differ significantly between manipulation groups. Further, insufficient range in response options (e.g., 1 to 4) may cause scores to cluster near the median resulting in the same problem (i.e., high similarity between participants categorized as high and low on those measures). However, results in this study indicated near normal frequency shape for the measure of AOT (kurtosis = -.01) and somewhat platykurtic on the measure for ITI (kurtosis = -.395).

Conclusion

In this dissertation, on the basis of a social cognitive model, I explored whether a contextual factor, type of persuasive messages, interacted with a psychological factor, actively open-minded thinking or an incremental theory of intelligence, to foster the endorsement of mastery goals in an academic setting. It was found that the type of persuasive messages (anecdotal or statistical) that argued in favor of mastery goals did not interact with either of the psychological factors. However, the psychological factor of actively open-minded thinking was found to be related to mastery goals.

APPENDIX A
MASTERY GOAL ORIENTATION SCALES

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree

PALS Midgley, Kaplan, Middleton, & Maehr, Urdan, & Roeser (1998)

Task Goal Orientation Scale

1. I like schoolwork that I'll learn from, even if I make a lot of mistakes.

2. An important reason why I do my school work is because I like to learn new things.

3. I like school work best when it really makes me think.

4. An important reason why I do my schoolwork is because I want to get better at it.

5. I do my school work because I'm interested in it.

6. An important reason I do my school work is because I enjoy it.

Attenweiler and Moore (2006)

Learning/Mastery Goal Orientation Scale

1. I enjoy challenging and difficult tasks where I learn new skills.

2. I want to learn as much as possible.

3. The opportunity to learn new skills and knowledge is important to me.

4. I prefer to work on tasks that force me to learn new things.

5. The opportunity to extend the range of my abilities is important to me.

6. I like best when something I learn makes me want to find out more.

7. When I fail to complete a difficult task, I plan to try harder the next time I work on it.

8. The opportunity to learn new things is important to me.

APPENDIX B
ACTIVELY OPEN-MINDED THINKING SCALE

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree

1. Even though freedom of speech for all groups is a worthwhile goal, it is unfortunately necessary to restrict the freedom of certain political groups. (Reverse Scored)

2. What beliefs you hold have more to do with your own personal character than the experiences that may have given rise to them. (Reverse Scored)

3. I tend to classify people as either for me or against me. (Reverse Scored)

4. A person should always consider new possibilities.

5. There are two kinds of people in this world: those who are for the truth and those who are against the truth. (Reverse Scored)

6. Changing your mind is a sign of weakness. (Reverse Scored)

7. I believe we should look to our religious authorities for decisions on moral issues. (Reverse Scored)

8. I think there are many wrong ways, but only one right way, to almost anything. (Reverse Scored)

9. It makes me happy and proud when someone famous holds the same beliefs that I do. (Reverse Scored)

10. Difficulties can usually be overcome by thinking about the problem, rather than through waiting for good fortune.

11. There are a number of people I have come to hate because of the things they stand for. (Reverse Scored)

12. Abandoning a previous belief is a sign of strong character.

13. No one can talk me out of something I know is right. (Reverse Scored)

14. Basically, I know everything I need to know about the important things in life. (Reverse Scored)

15. It is important to persevere in your beliefs even when evidence is brought to bear against them. (Reverse Scored)

16. Considering too many different opinions often leads to bad decisions. (Reverse Scored)

17. There are basically two kinds of people in this world, good and bad. (Reverse Scored)

18. I consider myself broad-minded and tolerant of other people's lifestyles.

19. Certain beliefs are just too important to abandon no matter how good a case can be made against them. (Reverse Scored)

20. Most people just don't know what's good for them. (Reverse Scored)

21. It is a noble thing when someone holds the same beliefs as their parents. (Reverse Scored)

22. Coming to decisions quickly is a sign of wisdom. (Reverse Scored)

23. I believe that loyalty to one's ideals and principles is more important than "open-mindedness." (Reverse Scored)

24. Of all the different philosophies which exist in the world there is probably only one which is correct. (Reverse Scored)

25. My beliefs would not have been very different if I had been raised by a different set of parents. (Reverse Scored)

26. If I think longer about a problem I will be more likely to solve it.

27. I believe that the different ideas of right and wrong that people in other societies have may be valid for them.

28. Even if my environment (family, neighborhood, schools) had been different, I probably would have the same religious views. (Reverse Scored)

29. There is nothing wrong with being undecided about many issues.

30. I believe that laws and social policies should change to reflect the needs of a changing world.

31. My blood boils over whenever a person stubbornly refuses to admit he's wrong. (Reverse Scored)

32. I believe that the "new morality" of permissiveness is no morality at all. (Reverse Scored)

33. One should disregard evidence that conflicts with your established beliefs. (Reverse Scored)

34. Someone who attacks my beliefs is not insulting me personally.

35. A group which tolerates too much difference of opinion among its members cannot exist for long. (Reverse Scored)

36. Often, when people criticize me, they don't have their facts straight. (Reverse Scored)

37. Beliefs should always be revised in response to new information or evidence.

38. I think that if people don't know what they believe in by the time they're 25, there's something wrong with them. (Reverse Scored)

39. I believe letting students hear controversial speakers can only confuse and mislead them. (Reverse Scored)

40. Intuition is the best guide in making decisions. (Reverse Scored)

41. People should always take into consideration evidence that goes against their beliefs.

APPENDIX C
IMPLICIT THEORIES OF INTELLIGENCE SCALE

This questionnaire has been designed to investigate ideas about intelligence. There are no right or wrong answers. We are interested in your ideas.
Using the scale below, please indicate the extent to which you agree or disagree with each of the following statements by writing the number that corresponds to your opinion in the space next to each statement.

1	2	3	4	5	6
Strongly Agree	Moderately Agree	Slightly Agree	Slightly Disagree	Moderately 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. No matter who you are, you can significantly change your intelligence level.

_____ 4. To be honest, you can't really change how intelligent you are.

_____ 5. You can always substantially change how intelligent you are.

_____ 6. You can learn new things, but you can't really change your basic intelligence.

_____ 7. No matter how much intelligence you have, you can always change it quite a bit.

_____ 8. You can change even your basic intelligence considerably.

APPENDIX D
ANECDOTAL MESSAGE

Motivation in an Academic Setting
An Essay

Educational researchers have always tried to understand and solve learning problems. Recently, a popular area of study is the problem of motivating students. To persuade students to work and study hard, on a daily basis, can be a challenge. Bribing students with rewards, cheering them on with "pep talks" or heaping praise on them can be just a short term quick fix. One way that researchers try to help is to develop the strategies teachers might use to boost motivation. They believe that if students could be inspired to control their own motivation, then progress could be made to solve the problem. In that way, students by themselves would, *unprompted*, put forth effort, keep on through difficulties, and complete the tasks from which they will ultimately benefit.

Motivational skills can assist parents, coaches, counselors, and others who work in educational settings. One theory that may help unlock the mysteries of motivation is achievement goal theory. Achievement goal theory is a web of related ideas. These ideas help explain how personal beliefs enter into and affect learning. This theory came from researchers who were interested in the reasons students gave for quitting or not even attempting assignments. The next step was to consider the opposite. That is, they decided to look into the reasons motivated and successful students give for persisting even when the tasks are difficult.

One group of students, when asked why they willingly completed assignments, reported that they wanted to make every effort to learn and improve themselves. This group was described as having *learning goals*. A second but different group, when presented with assignments, tended to favor *performance goals*. They were more concerned about showing their abilities and outdoing others. Some theorists have explored the relationships between learning goals,

performance goals, and classroom behaviors. They have found important differences. These differences include regulation of their own learning, deep processing of content, persistence, and enjoyment of learning. Even though useful findings have resulted from such research, goal theorists now believe that such distinct groups are unlikely. Realistically, we all hold multiple goals in schools.

First, people who prefer learning goals engage in *self-regulation*. Self-regulation occurs when people control their mental resources like willpower, skills, and knowledge. They use them to plan carefully. They exert extra effort. For example, Jon, a business administration major, found his first accounting course to be far more difficult than he had imagined so he decided to take careful notes, focus on understanding the text, and assess his progress as he studied. In fact, he reported that "I spent more time on that course than all of my other courses combined and it really benefited me in the future."

Second, people who prefer learning goals engage in d*eep processing*. Deep processing occurs when people seek understanding and search for fuller meaning. When engaged in deep processing, people think about the material, relate it to what they already know, and concentrate on it. In contrast, surface processing occurs when people try to memorize rather than understand the information. For example, Kristen, an English Literature major, took a Shakespeare course. Using a traditional teaching approach, the professor lectured on ten plays during the semester. Even though the amount of content to learn was overwhelming and the basic plot and cast of characters were the focus of the course, Kristen was determined to learn more. She invested study time in interpreting the symbolism and searching for hidden themes. So, in addition to learning the famous lines and stories, Kristen focused on developing deeper understanding of Shakespeare's plays.

Third, learning goals are linked to *persistence.* Persistence refers to the tendency of people to continue working even when the academic task is difficult. Amy's ultimate vocational goal was to teach elementary students, and her teacher education program included a child development course. That course required analysis and evaluation of case studies. On the first test Amy received a D on her analysis of the case study. In preparing for the next test, Amy was determined that she would learn to write a thorough analysis so that she would be able to apply this skill in working with children in her own classes. It was a struggle, but gradually Amy gained analytical skill in identifying behaviors in the descriptions of children's behavior that enabled her to use developmental theory to propose appropriate strategies to promote children's development.

Fourth, people with learning goals enjoy learning purely for the sake of learning. For example, Joe took a computer programming course (e.g., Basic). He became intrigued with the subject and enrolled in increasingly difficult programming courses (e.g., Advanced Basic, FORTRAN, Pascal). These courses became electives because they couldn't be applied to his major. However, he enjoyed every minute! He still fantasizes about inviting the inventors of those programming languages to an imaginary dinner.

In some instances, a preference for performance goals is more highly related to achievement than are learning goals. People who like to demonstrate their abilities may earn high grades. For example, Carol enrolled in the same Shakespeare course that Kristen took, though her approach was different. Her focus was on earning high grades. She attended the lectures, took thorough notes, memorized the characters and plots, and studied diligently for the tests. She received a higher grade in the course than Kristen. However, at the end of the term, when asked whether she enjoyed the class, Carol reported less interest in the information than Kristen did.

In summary, as illustrated by the people described in this essay, a pattern of relationships connecting learning goals to positive educational outcomes is emerging. By engaging in such strategies as self-regulation in the pursuit of learning, deep processing of information, and persistence in the face of difficult academic tasks, those who prefer learning goals are likely to enjoy learning while gaining useful knowledge and skills.

APPENDIX E
EMPIRICAL MESSAGE

Motivation in an Academic Setting
An Essay

Educational researchers have always tried to understand and solve learning problems. Recently, a popular area of study is the problem of motivating students. To persuade students to work and study hard, on a daily basis, can be a challenge. Bribing students with rewards, cheering them on with "pep talks," or heaping praise on them can be just a short term quick fix. One way that researchers try to help is to develop the strategies teachers might use to boost motivation. They believe that if students could be inspired to control their own motivation, then progress could be made to solve the problem. In that way, students by themselves would, *unprompted*, put forth effort, keep on through difficulties, and complete the tasks from which they will ultimately benefit.

Motivational skills can assist parents, coaches, counselors, and others who work in educational settings. One theory that may help unlock the mysteries of motivation is achievement goal theory. Achievement goal theory is a web of related ideas. These ideas help explain how personal beliefs enter into and affect learning. This theory came from researchers who were interested in the reasons students gave for quitting or not even attempting assignments. The next step was to consider the opposite. That is, they decided to look into the reasons motivated and successful students give for persisting even when the tasks are difficult.

One group of students, when asked why they willingly completed assignments, reported that they wanted to make every effort to learn and improve themselves. This group was described as having *learning goals*. A second but different group, when presented with assignments, tended to favor *performance goals*. They were more concerned about showing their abilities and outdoing others. Some theorists have explored the relationships between learning goals,

performance goals, and classroom behaviors. They have found important differences. These differences include regulation of their own learning, deep processing of content, persistence, and enjoyment of learning. Even though useful findings have resulted from such research, goal theorists now believe that such distinct groups are unlikely. Realistically, we all hold multiple goals in schools.

Researchers have studied the relationship between achievement goals and students' behaviors in classrooms. They found that learning goals are more closely related to some motivation behaviors than are performance goals. For example, in a study of 384 undergraduates in psychology classes, Day and colleagues (2003) found that learning goals were clearly related to self-regulation, deep processing, persistence, and enjoyment (see Table 1 below).

Table 1 Behaviors Related to Learning and Performance Goals (Day et al., 2003)

Behavior	Learning Goal	Performance Goal
Self-Regulation	$r = .49$	$r = .13$
Deep Processing	$r = .44$	$r = .15$
Persistence	$r = .42$	$r = .05$
Enjoyment	$r = .68$	$r = .06$

First, people who prefer learning goals engage in *self-regulation*. Self-regulation occurs when people control their mental resources like willpower, skills, and knowledge. They use them to plan carefully. They exert extra effort. In a study of college students, Bouffard and colleagues (1995) compared their learning goals and performance goals with a key element of self-regulation, cognitive strategies. Cognitive strategies are methods used to "learn, memorize, and understand." They found a link between the students' learning goals and their cognitive strategies ($r = .51$ for males; .52 for females). In contrast, the relationship between students' performance goals and cognitive strategies was only $r = .09$ and .07 respectively for males and

females. These results suggest that students who select learning goals also tend to choose the strategies needed to learn the content.

Second, people who prefer learning goals engage in d*eep processing*. *Deep processing* occurs when people seek understanding and search for fuller meaning. When deep processing people think about the material, relate it to what they already know, and concentrate on it. In contrast, surface processing occurs when people try to memorize rather than understand the information. In a study with college students, Elliot and colleagues (1999) compared learning goals and performance goals with respect to deep processing. The researchers found that learning goals were linked to deep processing (r = .36). Performance goals were more closely related to surface processing (r = .27). This study shows that when students choose learning goals they are more likely to develop greater understanding than when they choose performance goals.

Third, learning goals are linked to *persistence*. Persistence refers to the tendency of people to continue working even when the academic task is difficult. In a study in a college-level statistics class, Miller and colleagues (1993) found that learning goals were related to persistence (r = .55). In contrast, performance goals were unrelated to persistence (r = -.07). These findings suggest that students who hold learning goals may have the willpower to meet the challenge of difficult learning tasks.

Fourth, people with learning goals *enjoy learning* purely for the sake of learning. For example, Pekrun and colleagues (2006) studied 167 undergraduates. They found that learning goals were related to enjoyment (r = -.29) and negatively related to boredom (r = -.33). In contrast, performance goals were not related to enjoyment (r = .11) or boredom (r = .04).

In some instances, a preference for performance goals is more highly related to achievement than are learning goals. People who like to demonstrate their abilities may earn

high grades. In a study of 648 students in an intro psychology class, Harackiewicz and colleagues (2000) found a small relationship (r = .14) between performance goals and final grades. Learning goals were not related to grades (r = .03). However, learning goals were related to course interest (r = .42). Performance goals were not related to interest (r = -.04).

In summary, a pattern of relationships connecting learning goals to positive educational outcomes is emerging. By engaging in self-regulation in the pursuit of learning, deep processing of information, and persistence in the face of difficult academic tasks, those who prefer learning goals are likely to enjoy learning while gaining useful knowledge and skills.

APPENDIX F
CONTROL MESSAGE

How the Mind Forgets and Remembers
Adapted from an Article by Daniel Schacter

In Kawabata's unsettling story, a novelist receives an unexpected visit from a woman that he does not recognize. She says she knew him 30 years earlier and explains that they met when he visited her town during a festival. But the novelist can remember neither her nor the festival. Bothered recently by other annoying memory lapses, Kawabata interprets this latest incident as a distressing sign of mental decline. His discomfort turns to alarm when the woman describes more surprises about their meeting. "You don’t remember? You asked me to marry you," she recalls wistfully. The novelist is amazed at how extensive his memory loss is. The woman explains that she has never forgotten their time together; she felt continually distressed by memories of him.

After the woman finally leaves, the shaken novelist searches maps for her town in hope of triggering remembrance of the place and his reason for being there. But no maps or books list her town, leaving the novelist baffled. Then he realizes that he could not have been in the part of the country the woman described at the time she remembered. Her detailed and convincing memories were entirely false.

Kawabata's story dramatically demonstrates different ways in which memory misleads us. Sometimes we forget the past and sometimes we distort it. Some disturbing memories haunt us forever. Yet we depend on memory to perform an astonishing variety of tasks in our everyday lives: Recalling conversations with friends, recollecting family vacations, remembering appointments and errands we need to complete, remembering words that allow us to speak and understand others. Until an incident of forgetting or distortion demands our attention, memory plays such a pervasive role in our daily lives that we often take memory for granted.

The magnitude of the woman's memory distortion in this narrative seems to stretch beyond the bounds of credulity. Consider the story of Binjimin Wilkomirski whose 1996 Holocaust memoir received worldwide acclaim. In his memoir Wilkomirski recounted events of life in a concentration camp from the viewpoint of a child. Even more remarkable, Wilkomirski had spent much of his adult life unaware of these traumatic childhood memories. He only became aware of them as a result of therapy. He became a sought-after speaker and a hero to Holocaust survivors.

His story began to unravel in late August 1998 when a stunning newspaper article revealed that Wilkomirski is actually Bruno Dossekker. A Swiss native, born in 1941, Bruno was later adopted from an orphanage. Young Bruno spent the war years in the safety of his native Switzerland. Whatever the basis for his "memories" of horrors, they did not come from childhood experiences in a concentration camp. Is he simply a liar? Probably not. He still strongly believes his memories are real.

Memory's errors can be divided into seven fundamental "sins." I call them transience, absentmindedness, blocking, misattribution, suggestibility, bias and persistence. Just like the seven ancient deadly sins, the memory sins occur in everyday life with potentially serious consequences for everyone.

Transience, absentmindedness and blocking are sins of omission. They occur when we fail to remember desired facts, events, or ideas. Transience refers to a weakening or loss of memory over time. Transience is a basic characteristic of memory and the culprit in many memory malfunctions. Absentmindedness involves a breakdown somewhere between attention and memory. Absentminded memory errors are like misplacing your keys or eyeglasses. Typically,

they occur because we are distracted with other concerns or we don't focus on what we need to remember.

The third sin, blocking, entails a search for information we may be desperately trying to retrieve but cannot. We've all had the experience of failing to match a name to a face even though we are paying careful attention. It may happen even if the desired name has not faded from our minds.

The next four sins of misattribution, suggestibility, bias and persistence are all sins of commission, that is, some form of memory is present but it is either incorrect or unwanted. The sin of misattribution involves assigning a memory to the wrong source. It may include incorrectly remembering that a friend told you a piece of trivia that you actually read elsewhere. The related sin of suggestibility refers to memories that are implanted as a result of comments or suggestions. Suggestibility occurs when a person is trying to call up a past experience.

The sin of bias reflects the powerful influences of our current knowledge and beliefs on how we remember. We often edit or entirely rewrite our previous experiences--unknowingly--in light of what we now know or believe, resulting in a distorted rendering of a specific incident, or even a period in our lives. It may reveal more about how we feel now than about what happened then.

The seventh sin is persistence. It entails repeated recall of disturbing information or events that we would prefer to forget. It is remembering what we cannot forget even though we wish that we could. Recall the last time you suddenly awoke at 3 am unable to keep out of your mind a disappointing exam result. In more extreme cases persistence can be disabling.

New discoveries in neuroscientific research have allowed us to observe the brain in action as it learns and remembers. These studies provide us with a new perspective on what's happening

inside our heads during incidents of memory failure. But to understand the seven sins better, we also need to ask why our memory systems have come to exhibit these bothersome properties. Do the seven sins represent mistakes that Mother Nature made during evolution? Is human memory so flawed that our species has been placed in unnecessary jeopardy? I don't think so. To the contrary, I contend that each of the seven sins is a byproduct of otherwise adaptive features of the human mind.

APPENDIX G
COMPREHENSION QUESTIONS

Anecdotal Essay

Based on your reading of the essay, please write the letter of the BEST answer on the line provided:

_____1. Jon engaged in self-regulation. One result from that choice was that he:
1) earned a high grade in the course
2) felt the knowledge "really stuck" with him
3) could self-teach the material and miss classes
4) became a problem solver and critical thinker

_____2. Kristen engaged in deep processing. One result from that choice was that she:
1) disliked and avoided biology lectures
2) spent a lot time studying for math tests
3) participated in study groups that discussed issues
4) really liked and experienced her Shakespeare class

_____3. Amy persisted in one of her courses. One result from that choice was that she:
1) learned a lot about child development
2) received an "A" on the class project
3) was excused from the final exam
4) gained greater understanding of children's literature

_____4. Joe really enjoyed which subject area?
1) European history
2) Microbiology
3) Computer languages
4) Recreational sports

_____5. According to the essay, which of the following is true about *performance goals*?
1) They are helpful in the fine arts
2) They support strategy choices in certain subjects
3) They distract from other goals such as social goals
4) They can sometimes result in high achievement or good grades

Empirical Essay

Based on your reading of the essay, please write the letter of the BEST answer on the line provided:

_____1. Bouffard and her colleagues studied learning goals and self-regulation. They found that:

1) learning goals are related to cognitive strategies
2) learning goals are related to emotional control
3) learning goals are related to performance goals
4) learning goals are related to critical thinking

_____2. Elliot, McGregor, and Gable studied learning goals and deep processing. They found that:

1) learning goals are strongly related to SAT math scores
2) learning goals are not related to SAT math scores
3) performance goals are related to deep processing
4) performance goals are related to surface processing

_____3. Miller, Behrens, and Greene studied learning goals and persistence. They found that:

1) learning goals are unrelated to persistence
2) learning goals are related to persistence
3) performance goals interfere with persistence
4) performance goals augment persistence

_____4. Pekrun and his colleagues studied learning goals and enjoyment. They found that:

1) learning goals were related to enjoyment but only for certain subjects
2) learning goals were unrelated to enjoyment
3) learning goals were positively related to boredom
4) learning goals were negatively related to boredom

_____5. According to the essay, which of the following is true about *performance goals*?

1) They are helpful in the fine arts
2) They support strategy choices in certain subjects
3) They distract from other goals such as social goals
4) They can sometimes result in high achievement or good grades

Control Essay

Based on your reading of the essay, please write the letter of the BEST answer on the line provided:

_____1. According to the essay, memory is important because:
1) we rely on it everyday
2) we need it for emotional support
3) we understand others better
4) we can be misled by it

_____2. Errors in memory are:
1) Common occurrences
2) Indications of disease
3) Universal for the elderly
4) Improbable events

_____3. The story by Wilkomirski shows that people can:
1) Recall events that happened to them but many years later
2) Recall events that never happened to them
3) Inaccurately recall recent events
4) Accurately recall recent events

_____4. The four memory sins of *commission* involve:
1) Religious experiences
2) Illegal sales actions
3) Presence of a memory that is incorrect (remembering wrong)
4) Absence of a memory that is important (forgetting)

_____5. The author of the essay concluded that:
1) Remembering is more important than forgetting
2) Memory errors may serve a purpose and be adaptive
3) Forgetting is the main sin of memory
4) There are more sins of memory than seven

LIST OF REFERENCES

Alderman, M. K. (2004). *Motivation for Achievement: Possibilities for teaching and learning*. Mahwah, NJ: Lawrence Erlbaum Associates.

Alexander, P. A., Buehl, M. M., & Sperl, C. T. (2001). The persuasiveness of persuasive discourse. *International Journal of Educational Research, 35*(7-8*)*, 651-674.

Allen, M., & Priess, R. W. (1997). Comparing the persuasiveness of narrative and statistical evidence using meta-analysis. *Communication Research Reports, 14*(2), 125-131.

Ames, C. A. (1990). Motivation: What teachers need to know. Teachers College.

Ames, C. A. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*(3), 261-271.

Ames, C. A., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80*(3), 260-267.

Anderman, E. M., Austin, C. C., & Johnson, D. M. (2002). The development of goal orientation. In A. Wigfield & J.S. Eccles (Eds.), Development of achievement motivation (pp. 197-220). San Diego, CA: Academic Press.

Anderman, E. M., Griesinger, T., & Westerfield, G. (1998). Motivation and cheating during early adolescence. *Journal of Educational Psychology, 90*(1), 84-93.

Anderman, E. M., & Midgley, C. **(**1997). Changes in achievement goal orientations, perceived academic competence, and grades across the transition to middle-level schools. *Contemporary Educational Psychology, 22*(3), 269-298.

Arnold, J. J. (1991). *Implicit theories, goal orientations and attributional style.* Unpublished doctoral dissertation. University of Kansas.

Aronson, J., Fried, C. B., & Good, C. (2002). Reducing the effects of stereo-type threat on African-American college students by shaping theories of intelligence. *Journal of Experimental Social Psychology, 38*(2), 113-125.

Attenweiler, W., & Moore, D. (2006). Goal orientations: Two, three, or more factors? *Educational and Psychological Measurement, 66*(2), 342-352.

Baesler, E. J. (1997). Persuasive effects of story and statistical evidence. *Argumentation and Advocacy, 33*(4), 170-203.

Baesler, E. J., & Burgoon, J. K. (1994). The temporal effects of story and statistical evidence on belief change. *Communication Research, 21*(5), 582-602.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (2008). Toward an agentic theory of the self. In H. Marsh, R. Craven, & D. McINerney (Eds.), *Self-Processes, learning and enabling human potential: Dynamic new approaches.* (pp. 15-49). Charlotte, NC: Information Age Publishing.

Baron, J. (1985). *Rationality and intelligence*. New York: Cambridge University Press.

Baron, J. (1988). *Thinking and deciding*. Cambridge, England: Cambridge University Press

Baron, J. (1994). Nonconsequentialist decisions. *Behavioral Brain Sciences, 17(1),* 1-42.

Barron, K.E., & Harackiewicz, J. M. (2001). Achievement goals and optimal motivation: Testing multiple goal models. *Journal of Personality and Social Psychology, 80*(5), 706-722.

Bell, B. S., & Kozlowski, S. W. (2002). Goal orientation and ability: Interactive effects on self-efficacy, performance, and knowledge. *Journal of Applied Psychology, 87*(3), 497-505.

Bergen, R. S. (1991). *Beliefs about intelligence and achievement-related behaviors.* Unpublished dissertation, University of Illinois, Urbana, IL.

Bergin, D. A. (1995). Effects of a mastery versus competitive motivation situation on learning. *Journal of Experimental Education, 63*(4), 303-314.

Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development, 78*(1), 246-263.

Boekaerts, M. (1995). Self-regulated learning: Bridging the gap between metacognitive and metamotivation theories. *Educational Psychologist, 30*(4), 195-200.

Boster, F., Cameron, K. A., Campo, S., Liu, W., Lillie, J. K., Baker, E. M., & Ah Yun, K. (2000). The persuasive effects of statistical evidence in the presence of exemplars. *Communication Studies, 51*, 296-306.

Bouffard, T., Boisvert, J., Vezeau, C., & Larouche, C. (1995). The impact of goal orientation on self-regulation and performance among college students. *British Journal of Educational Psychology, 65*(3), 317-329.

Bouffard, T., Bouchard, M. Goulet, G., Denoncourt, I., & Couture, N. (2005). Influence of achievement goals and self-efficacy on students' self-regulation and performance. *International Journal of Psychology, 40*(6), 373-384.

Braten, I., & Olaussen, B. S. (1998). The relationship between motivational beliefs and learning strategy use among Norwegian college students. *Contemporary Educational Psychology, 23*(2), 182-194.

Braten, I., & Stromso, H. I. (2004). Epistemological beliefs and implicit theories of intelligence as predictors of achievement goals. *Contemporary Educational Psychology*, *29*(4), 371-388.

Braten, I., & Stromso, H. I. **(**2005).The relationship between epistemological beliefs, implicit theories of intelligence, and self-regulated learning among Norwegian postsecondary students. *British Journal of Educational Psychology, 75*(4), 539-565.

Brett, J. & VandeWalle, D. (1999). Goal orientation and goal content as predictors of performance in a training program. *Journal of Applied Psychology, 84*(6), 863-873.

Brophy, J. (2005). Goal theorists should move on from performance goals. Educational Psychologist, *40*(3), 167-176.

Button, S. B., Mathieu, J. E., & Zajac, D. M. (1996). Goal orientation in organizational research: A conceptual and empirical foundation. *Organizational Behavior and Human Decision Processes, 67*(1), 26-48.

Cacioppo, J. T., & Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology*, *42*(1), 116-131.

Cacioppo, J. T., Petty, R. E., Feinstein, J. A., & Jarvis, W. B. (1996). Dispositional differences in cognitive motivation: The life and times of individuals varying in the need for cognition. *Psychological Bulletin*, *119*(2), 197-253.

Cacioppo, J. T., Petty, R. E., & Morris, K. J. (1983). Effects of need for cognition on message evaluation, recall, and persuasion. *Journal of Personality and Social Psychology, 45*(4), 805-818.

Church, M. A., Elliot, A. J., & Gable, S. L. (2001). Perceptions of classroom environment, achievement goals, and achievement outcomes. *Journal of Educational Psychology, 93*(1), 43-54.

Cacioppo, J. T., Petty, R. E., Feinstein, J. A., & Jarvis, W. B. (1996). Dispositional differences in cognitive motivation: The life and times of individuals varying in the need for cognition. *Psychological Bulletin*, *119*(2), 197-253.

Costa, P. T. Jr., & McCrae, R. R. (1978). Objective personality assessment. In M. Storandt, I. C. Siegler & M. F. Elias (Eds.), *The clinical psychology of aging* (pp. 119-143). New York: Plenum Press.

Covington, M. V., & Omelich, C. L. (1984). Task-oriented versus competitive learning structures: Motivational and performance consequences. *Journal of Educational Psychology*, *76*(6), 1038-1050.

Cron, W. L., Slocum, J. W., VandeWalle, D., & Fu, Q. (2005). The role of goal orientation on negative emotions and goal setting when initial performance falls short of one's performance goal. *Human Performance, 18*(1), 55-80.

Csikszentmihalyi, M., & Nakamura, J. (1989). The dynamics of intrinsic motivation. In R. Ames & C. Ames (Eds.), *Handbook of motivation theory and research* (Vol. 3, pp. 45-71). New York: Academic.

Cury, F., Elliot, A. J., DaFonseca, D., & Moller, A. C**.** (2006). The social-cognitive model of achievement motivation and the 2 x 2 acheivement goal framework. *Journal of Personality and Social Psychology*, *90*(4), 666-679.

Das, E., Kerkhof, P., & Kuiper, J. (2008). Improving the effectiveness of fundraising messages: The impact of charity goal attainment, message framing, and evidence on persuasion. *Journal of Applied Communication Research, 36*(2), 161-175.

Davis, S. L., Pastor, D. A., & Barron, K.E. (2004, April). *Goal orientations among college majors.* Paper presented at the annual meeting of the American Educational Research Association, San Diego, CA.

Day, E. A., Radosevich, D. J., & Chasteen, C. S. (2003). Construct- and criterion-related validity of four commonly used goal orientation instruments. *Contemporary Educational Psychology*, *28*(4), 434-464.

deCharms, R. (1976). *Enhancing motivation: Change in the classroom*. New York: Wiley.

DeShon, R. P., & Gillespie, J. Z. (2005). A motivated action theory account of goal orientation. *Journal of Applied Psychology, 90*(6), 1096-1127.

Diaz, J. (2005). *Tiger Woods*. Retrieved May 15, 2007, from http://www.golfdigest.com/features/index.ssf?/features/gd200501tigerdiaz1.html

DeShon, R. P., & Gillespie, J. Z. (2005). A motivated action theory account of goal orientation. *Journal of Applied Psychology*, *90*(6), 1096-1127.

Dickson, P. R. (1982). The impact of enriching case and statistical information on consumer judgments. *The Journal of Consumer Research, 8*(4), 398-406.

Diener, C. I., & Dweck, C. S. (1980). An analysis of learned helplessness:II. The processing of success. *Journal of Personality and Social Psychology*, *39*(5), 940-952.

Dole, J. A., & Sinatra, G. M. (1998). Reconceptualizing change in the cognitive construction of knowledge. *Educational Psychologist, 33*(2-3), 109-128.

Duda, J., & Nicholls, J. (1992). Dimensions of achievement motivation in schoolwork and sport. *Journal of Educational Psychology, 84*(3), 290-299.

Dupeyrat, C., & Marine, C. (2005). Implicit theories of intelligence, goal orientation, cognitive engagement, and achievement: A test of Dweck's model with returning to school adults. *Contemporary Educational Psychology, 30*(1), 43-59.

Dweck, C. S. (1986). Motivational processes affect learning. *American Psychologist, 41*(10), 1040-1048.

Dweck, C. S. (1999). *Self-theories: Their role in motivation, personality, and development*. Philadelphia, PA: Taylor & Francis.

Dweck, C. S., Chiu, C., & Hong, Y. (1995a). Elaboration and Extension of the Model. *Psychological Inquiry, 6*(4), 322-333.

Dweck, C. S., Chiu, C., & Hong, Y. (1995b). Implicit theories and their role in judgments and reactions: A world from two perspectives. *Psychological Inquiry, 6*(4). 267-286.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*(2), 256-273.

Dweck, C. S. & Master, (2008). Self-theories motivate self-regulated learning. In D. H. Schunk & B. J. Zimmerman (Eds.), *Motivation and self-regulated learning: Theory, research, and applications* (pp. 31-52). New York: Erlbaum.

Elliot, A. J. (1997). Integrating the "classic" and "contemporary" approaches to achievement motivation: A hierarchical model of approach and avoidance achievement motivation. In M. L. Maehr & P. R. Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 10, pp. 143-179). Greenwich, CT: JAI Press.

Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34*(3), 169-189.

Elliot, A. J. (2005). A conceptual history of the achievement goal construct. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 52-72). New York: Guilford Press.

Elliot, A. J., & Church, M. (1997). A hierarchical model of approach and avoidance achievement goals and intrinsic motivation. *Journal of Personality and Social Psychology, 72*(1), 218-232.

Elliot, A. J., & Harackiewicz, J. M. (1996). Approach and avoidance achievement goals and intrinsic motivation: A meditational analysis. *Journal of Personality and Social Psychology, 70*(3), 461-475.

Elliot, A. J., & McGregor, H. A. (1999). Test anxiety and the hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 76*(4), 628-644.

Elliot, A. J., & McGregor, H. A.(2001). A 2 X 2 achievement goal framework. *Journal of Personality and Social Psychology, 80*(3), 501-519.

Elliot, A. J., & Murayama, K. (2008). On the measurement of achievement goals: Critique, illustration, and application. *Journal of Educational Psychology, 100*(3), 613-628.

Elliot, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology, 54*(1), 5-12.

Finney, S. J., Pieper, S.L., & Barron, K. E. **(**2004). Examining the psychometric properties of the achievement goal questionnaire in a general academic context. *Educational and Psychological Measurement, 64*(2), 365-382.

Feeley, T. H., Marshall, H. M., & Reinhart, A. M. (2006). Reactions to narrative and statistical written messages promoting organ donation. *Communication Reports, 19*(2), 89-100.

Fisher, S.L., & Ford, J. K. (1998). Differential effects of learner effort and goal orientation on two learning outcomes. *Personnel Psychology, 51*(2), 397-420.

Fives, H., & Alexander, P. A. (2001). Persuasion as a metaphor for teaching: A case in point. *Theory into Practice, 40*(4), 242-248.

Grant, H., & Dweck, C. S. (2003). Clarifying achievement goals and their impact. *Journal of Personality and Social Psychology, 85*(3), 541-553.

Green, K., & Brinn, L. S. (2003). Messages influencing college women's tanning bed use: Statistical versus narrative evidence format and a self-assessment to increase perceived susceptibility. *Journal of Health Communication, 8*(5), 443-461.

Greene, B., Miller, R., Crowson, H. M., Duke, B., & Akey, K. **(**2004). Predicting high school students' cognitive engagement and achievement: Contributions of classroom perceptions and motivation. *Contemporary Educational Psychology, 29*(4), 462-482.

Haard, J., Slater, M. D., & Long, M. (2004). Scientese and ambiguous citations in the selling of unproven medical manipulations. *Health Communication, 16*(4), 411-426.

Harackiewicz, J. M., Barron, K. E., Carter, S. M., Lehto, A. T., & Elliot, A. J. (1997). Determinants and consequences of achievement goals in the college classroom: Maintaining interest and making the grade. *Journal of Personality and Social Psychology, 73*(6), 1284-1295.

Harackiewicz, J. M., Barron, K.E., & Elliot, A. J. (1998). Rethinking achievement goals: When are they adaptive for college students and why? *Educational Psychologist, 33*(1), 1-21.

Harackiewicz, J. M., Barron, K.E., Tauer, J.M., Carter, S. M., & Elliot, A. J. (2000). Short-term and long-term consequences of achievement goals: Predicting interest and performance over time. *Journal of Educational Psychology, 92*(2), 316-330.

Harackiewicz, J. M., Barron, K. E., Pintrich, P. R., Elliot, A. J., & Thrash, T. M. (2002). Revision of achievement goal theory: Necessary and illuminating. *Journal of Educational Psychology, 94*(3), 638-645.

Harackiewicz, J. M., & Elliot, A. J. (1993). Achievement goals and intrinsic motivation. *Journal of Personality and Social Psychology, 65*(5), 904-915.

Harackiewicz, J. M. & Linnenbrink, E. A. (2005). Multiple achievement goals and multiple pathways for learning: The agenda and impact of Paul R. Pintrich. *Educational Psychologist, 40*(2), 75-84.

Heyman, G. D., & Dweck, C. S. (1992). Achievement goals and intrinsic motivation: Their relation and their role in adaptive motivation. *Motivation and Emotion, 16*(3), 231-247.

Hidi, S., & Harackiewicz, J. M. (2000). Motivating the academically unmotivated: A critical issue for the 21st century. *Review of Educational Research, 70*(2), 151-179.

Hong, Y., Chiu, C., Dweck, C. S., Lin, D. M., & Wan, W. (1999). Implicit theories, attributions, and coping: A meaning system approach. *Journal of Personality and Social Psychology, 77*(3), 588-599.

Horvath, M., Scheu, C. & DeShon, R. (2001, April). *Goal orientation: Integrating theory and measurement.* Paper presented at the annual conference of the Society for Industrial and Organizational Psychology, San Diego, CA.

Howell, A. J., & Watson, D. C. (2007). Procrastination: Associations with achievement goal orientation and learning strategies. *Personality and Individual Differences, 43*(1), 167-168.

Hsieh, P., Sullivan, J., & Guerra, N. (2007). A closer look at college students: Self-efficacy and goal orientation. *Journal of Advanced Academics, 18*(3), 454-476.

Hulleman, C. S., Durik, A. M., Schweigert, S. A., & Harackiewicz, J. M. (2008). Task values, achievement goals, and interest: An integrative analysis. *Journal of Educational Psychology, 100*(2), 398-416.

Hynd, C. R. (2001). Persuasion and its role in meeting educational goals. *Theory into Practice, 40*(4), 270-277.

Hynd, C. R. (2003). Conceptual change in response to persuasive messages. In G. M. Sinatra, and P. R. Pintrich (Eds.). *Intentional conceptual change*, Erlbaum, Mahwah, NJ, pp. 291–315.

Hynd, C., & Alvermann, D. E. (1986). The role of refutation text in overcoming difficulty with science concepts. *Journal of Reading, 29*(5), 440–446.

Jagacinski, C., & Duda, J. (2001). A comparative analysis of contemporary achievement goal orientation measures. *Educational and Psychological Measurement, 61*(6), 1013-1039.

Kaplan, A. (2004). Achievement goals and intergroup relations. In P. R. Pintrich & M. L. Maehr (Eds.), *Advances in motivation and achievement: Motivating students, improving schools: The legacy of Carol Midgley* (Vol. 13, pp. 97-136). Greenwich, CT: Elsevier-JAI.

Kaplan, A., & Maehr, M. L. **(**1999). Achievement goals and student well-being. *Contemporary Educational Psychology, 24*(4), 330-358.

Kaplan, A., & Maehr, M. L. (2007). The contributions and prospects of goal orientation theory. *Educational Psychology Review, 19*(2), 141-184.

Kaplan, A., & Middleton, M. J. (2002). Should childhood be a journey or a race? Response to Harackiewicz et al. (2002). *Journal of Educational Psychology, 94*(3), 646-648.

Kardash, C. M., & Scholes, R. J. (1996). Effects of preexisting beliefs, epistemological beliefs, and need for cognition on interpretation of controversial issues. *Journal of Educational Psychology, 88*(2), 260-271.

Kardash, C. M., & Sinatra, G. M. (2003, April). *Epistemological beliefs and dispositions: Are we measuring the same construct?* Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL.

Karabenick, S. A. (2003). Seeking help in large college classes: A person-centered approach. *Contemporary Educational Psychology, 28*(1), 37-58.

Kazoleas, D. C. (1993). A comparison of the persuasive effectiveness of qualitative versus quantitative evidence: A test of explanatory hypotheses. *Communication Quarterly, 41*(1), 40-50.

Kennett, D., & Keefer, K. (2006). Impact of learned resourcefulness and theories of intelligence on academic achievement of university students: An integrated approach. *Educational Psychology, 26*(3), 441-457.

Koballa, T. R. (1986). Persuading teachers to reexamine the innovative elementary science programs of yesterday: the effect of anecdotal versus data-summary communications. *Journal of Research in Science Teaching, 23*(5), 437-449.

Kokis, J. V., Macpherson, R., Toplak, M. E., West, R. F., & Stanovich, K. E. (2002). Heuristic and analytic processing: Age trends and associations with cognitive ability and cognitive styles. *Journal of Experimental Child Psychology, 83*(1), 26-52.

Kopfman, J. E., Smith, S. W., Ah Yun, J. K., & Hodges, A. (1998). Affective and cognitive reactions to narrative and statistical evidence organ donation messages. *Journal of Applied Communication Research, 26*(3), 279-300.

Lee, F. K., Sheldon, K. M., & Turban, D. B. (2003). Personality and the goal-striving process: The influence of Achievement goal patterns, goal level, and mental focus on performance and enjoyment. *Journal of Applied Psychology, 83*(2), 256-265.

Lindsey, L. M., & Ah Yun, J. K. (2003). Examining the persuasive effect of statistical messages: A test CN7of mediating relationships. *Communication Studies, 54*(3), 306-321.

Linnenbrink, E. A. (2004). Person and context: Theoretical and practical concerns in achievement goal theory. In P. R. Pintrich & M. L. Maehr (Eds.), *Advances in motivation and achievement: Motivating students, improving schools: The legacy of Carol Midgley* (Vol. 13, pp. 159-184). Greenwich, CT: Elsevier-JAI.

Linnenbrink, E. A., & Pintrich, P.R. (2000). Multiple pathways to learning and achievement: The role of goal orientation in fostering adaptive motivation, affect, and cognition. In C. Sansone and J. Harackiewicz (Eds.) *Intrinsic and extrinsic motivation: The search for optimal motivation and performance.* Academic Press.

Linnenbrink, E. A., & Pintrich, P. R. (2001). Multiple goals, multiple contexts: The dynamic interplay between personal goals and contextual goal stresses. In S. Volet, & S. Jarvela (Eds.). *Motivation in learning contexts: Theoretical advances in methodological implications* (pp. 251-269). Elmsford, NY: Pergamon Press.

Linnenbrink, E. A., & Pintrich, P.R. (2002a). The role of motivational beliefs in conceptual change. In M. Limon & L. Mason (Eds.). *Reconsidering conceptual change: Issues in theory and practice* (pp. 115-135). Dordrecht, Netherlands: Kluwer Academic.

Linnenbrink, E.A., & Pintrich, P.R. (2002b). Motivation as an enabler for academic success. *School Psychology Review, 31*(3), 313-327.

Linnenbrink, E. A., Ryan, A. M., & Pintrich, P. R. (1999). The role of goals and affect in working memory function. *Learning and Individual Differences, 11*(2), 213-230.

Lyke, J. A., & Kelaher Young, A. J. (2006). Cognition in context: Students' perceptions of classroom goal structures and reported cognitive strategy use in the college classroom. *Research in Higher Education, 47*(4), 477-490.

MacGyvers, V. L. (1992). *Implicit beliefs about the self and real world outcomes in children and adolescents.* Unpublished doctoral dissertation, University of Illinois, Urbana-Champaign.

MacPherson, R., & Stanovich, K. E. (2007). Cognitive ability, thinking dispositions, and instructional set as predictors of critical thinking. *Learning and Individual Differences, 17*(2), 115-127.

Maehr, M. L., & Kaplan, A. (2007). The contributions and prospects of goal orientation theory. *Educational Psychology Review, 19*(2), 141-184.

Mangels, J. A., Butterfield, B., Lamb, J., Good, C., & Dweck, C. S. (2006). Why do beliefs about intelligence influence learning success? A social cognitive neuroscience model. *Social Cognitive and Affective Neuroscience, 1*(2), 75-86.

Martin, A. J., Marsh, H. W., & DeBus, R. L. (2003). Self-handicapping and defensive pessimism: A model of self-protection from a longitudinal perspective. Contemporary Educational Psychology, *28*(1), 1-36.

Mason, L. (2001). The process of change through persuasion: A commentary. *International Journal of Educational Research, 35*(7-8), 715-729.

Mattern, R. A. **(**2005). College students' goal orientation and achievement. *International Journal of Teaching and Learning in Higher Education, 17*(1), 27-32.

Middleton, J. A., & Toluk, Z. **(**1999). First steps in the development of an adaptive theory of motivation. *Educational Psychologist, 34*(2), 99-112.

Midgley, C., Kaplan, A., Middleton, M. J., Maehr, M. L., Urdan, T., Anderman, E., & Roeser, R. (1998). The development and validation of scales assessing students' achievement goal orientations. *Contemporary Educational Psychology, 23(2)*, 113-131.

Midgley, C., Kaplan A., & Middleton, M. J. (2001). Performance-approach goals: Good for what, for whom, under what circumstances, and at what cost? *Journal of Educational Psychology, 93*(1), 77-86.

Miller, R. B., Behrens, J. T., Greene, B. A., & Newman, D. (1993). Goals and perceived ability: Impact on student valuing, self-regulation, and persistence. *Contemporary Educational Psychology, 18*(1), 2-14.

Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: Reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review, 102*(2), 246-268.

McGregor, H. A., & Elliot, A. J. (2002). Achievement goals as predictors of achievement-relevant processes prior to task engagement. *Journal of Educational Psychology, 94*(2), 381-195.

Morgan, S. E., Cole, H. P., Struttman, T., & Piercy, L. (2002). Stories or statistics? Farmers' attitudes toward messages in an agricultural safety campaign. *IEEE Transactions on Engineering Management, 45*(2), 153-162.

Murphy, P. K. (2001). What makes a text persuasive? Comparing students' and experts' conceptions of persuasiveness. *International Journal of Educational Research, 35*(7-8), 675-698.

Murphy, P. K., & Alexander, P.A. (2000). A motivated exploration of motivation terminology. *Contemporary Educational Psychology, 25*(1), 3-53.

Murphy, P. K., & Alexander, P. A. (2004). Persuasion as a dynamic, multidimensional, process: An investigation of individual and intraindividual differences. *American Educational Research Journal, 41*(2), 337-362.

Murphy, P. K., Long, J. F., Holleran, T. A., & Esterly, E. (2003). Persuasion online or on paper: A new take on an old issue. *Learning and Instruction, 13*(5), 511-532.

National Center for Higher Education Management Systems, Information Center for State Higher Education Policymaking and Analysis. (n.d.). Completion. Retrieved September 21, 2008, from http://www.higheredinfo.org

Ng, C. C. (2008). Multiple-goal learners and their differential patterns of learning. *Educational Psychology*, *28*(4), 439-456.

Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review, 91*(3), 328-346.

Nicholls, J. G. (1989). T*he competitive ethos and democratic education*. Cambridge, MA: Harvard University Press.

Niiya, Y., Crocker, J., & Bartmess, E. N. (2004). From vulnerability to resilience: Learning orientations buffer contingent self-esteem from failure. *Psychological Science, 15*(12), 801-805.

Nolen, S. B., & Haladyna, T. M. (1990). Personal and environmental influences on students' beliefs about effective study strategies. *Contemporary Educational Psychology, 15*(2), 116-130.

Okeefe, D. J. (2003). Message properties, mediating states, and manipulation checks: Claims, evidence, and data analysis in experimental persuasive message effects research. *Communication Theory, 13*(3), 251-274.

Ommundsen, Y., Haugen, R., & Lund, T. (2005). Academic self-concept, implicit theories of ability, and self-regulation strategies. *Scandinavian Journal of Educational Research, 49*(5), 461-474.

Patrick, H., Anderman, L. H., Ryan, A. M., Edelin, K. C., & Midgley, C. (2001). Teachers' communications of goal orietnations in four fifth-grade classrooms. *The Elementary School Journal, 102*(1), 35-58.

Payne, S. C., Youngcourt, S. S., & Beaubien, J. M. **(**2007). A meta-analytic examination of the goal orientation nomological net. *Journal of Applied Psychology, 92*(1), 128-150.

Pekrun, R., Elliot, A. J., & Maier, M. A. (2006). Achievement goals and discrete emotions: A theoretical model and prospective test. *Journal of Educational Psychology, 98*(3), 583-597.

Perloff, R. M. (2003). *The dynamics of persuasion: Communication and attitudes in the 21st century*. Mahwah, NJ: Erlbaum.

Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol.19, pp. 123-205). New York: Academic Press.

Petty, R. E., & Cacioppo, J. T. (1990). Involvement and persuasion: Tradition versus integration. *Psychological Bulletin, 107*(3), 367-374.

Petty, R. E., & Cacioppo, J. T. (1996). Attitudes and persuasion: Classic and contemporary approaches. Boulder, CO: Westview Press.

Petty, R. E., Wegener, D. T. (1997). Attitude change: Multiple roles for persuasion variables. In D Gilbert, S Fiske, G Lindzey (Eds.). *Handbook of Social Psychology*, 4th ed. New York, McGraw-Hill

Petty, R. E., Wegener, D. T., & Fabrigar, L. R. (1997). Attitudes and attitude change. *Annual Review of Psychology, 48*(1), 609-647.

Phillips, J. M., & Gully, S. M. (1997). Role of goal orientation, ability, need for achievement, and locus of control in the self-efficacy and goal-setting process. *Journal of Applied Psychology, 82*(5), 792-802.

Pintrich, P. R. (1989). The dynamic interplay of student motivation and cognition in the college classroom. In C. Ames & M. L. Maehr *(Eds.), Advances in motivation and achievement: Motivation enhancing environments* (Vol. 6, pp. 117-160). Greenwich, CT: JAI Press.

Pintrich, P. R. (1999). The role of motivation in promoting and sustaining self-regulated learning. *International Journal of Educational Research, 31*(6), 459-470.

Pintrich, P. R. (2000a). An achievement goal theory perspective on issues in motivation terminology, theory, and research. *Contemporary Educational Psychology, 25*(1), 92-104.

Pintrich, P. R. (2000b). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology, 92*(3), 544-555.

Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology, 95*(4), 667-686.

Pintrich, P. R., & Garcia, T. (1991). Student goal orientation and self-regulation in the college classroom. In P. R. Pintrich & M. L. Maehr (Eds.), *Advances in motivation and achievement* (Vol. 7, pp. 371-402). Greenwich, CT: JAI.

Pintrich, P. R., Marx, R. W., & Boyle, R. B. (1993). Beyond cold conceptual change: The role of motivational beliefs and classroom contextual factors in the process of conceptual change. *Review of Educational Research, 63*(2), 167-199.

Pintrich, P. R., & Schrauben, B. (1992). Students' motivational beliefs and their cognitive engagement in classroom contextual factors in the process of conceptual change. In D. Schunk & J. Meece (Eds.), *Student perceptions in the classroom* (pp. 149-183). Hillsdale, NJ: Erlbaum.

Pintrich, P. R., & Zusho, A**.** (2002). Student motivation and self-regulated learning in the college classroom. In J. C. Smart (Ed.), *Higher Education: Handbook of theory and research* (Vol. XVII, pp. 55-128). New York: Agathon Press.

Rawsthorne, L. J., & Elliot, A. J. (1999). Achievement goals and intrinsic motivation: A meta-analytic review. *Personality and Social Psychology Review, 3*(4), 326-344.

Reinard, J. C. (1988). The empirical study of the persuasive effects of evidence: The status after fifty years of research. *Human Communication Research, 15*(1), 3-59.

Reinhart, A. M. (2006). Comparing the persuasive effects of narrative versus statistical messages: A meta-analytic review. *Dissertation Abstracts International,* 67 (03), 103A. (UMI No. 3213634)

Riveiro, J.M., Cabanach, R. G., & Arias, A. V. (2001). Multiple-goal pursuit and its relation to cognitive, self-regulatory, and motivational strategies. *British Journal of Educational Psychology, 71*(4), 561-572.

Robins, R. W., & Pals, J. L. (2002). Implicit self-theories in the academic domain: Implications for goal orientation, attributions, affect, and self-esteem change. *Self and Identity, 1*(4), 313-336.

Roedel, T. D., & Schraw, G. (1995). Beliefs about intelligence and academic goals. *Contemporary Educational Psychology, 20*(4), 464-468.

Roedel, T. D., Schraw, G., & Plake, B. S. (1994). Validation of a measure of learning and performance goal orientations. *Educational and Psychological Measurement, 54*(4), 1013-1021.

Roeser, R., Midgley, C., & Urdan, T. (1996). Perceptions of the school psychological environment and early adolescents' psychological and behavioral functioning in school: The mediating role of goals and belonging. *Journal of Educational Psychology, 88*(3), 408-422.

Ross, M. E., Shannon, D. M., Salisbury-Glennon, J. D., & Guarino, A. (2002). The patterns of adaptive learning survey: A comparison across grade levels. *Educational and Psychological Measurement, 62*(3), 483-497.

Schacter, D. (2001). *The seven sins of memory: How the mind forgets and remembers*. New York: Houghton Mifflin.

Schraw, G., Horn, C., Thorndike-Christ, T., & Bruning, R. (1995). Academic goal orientations and student classroom achievement. *Contemporary Educational Psychology, 20*(3), 359-368.

Shim, S., & Ryan, A. (2005). Changes in self-efficacy, challenge avoidance, and intrinsic value in response to grades: The role of achievement goals. *The Journal of Experimental Education, 73*(4), 333-349.

Silva, T., & Nicholls, J. G. (1993). College students as writing theorists: Goals and beliefs about the causes of success. *Contemporary Educational Psychology, 18*(3), 281-293.

Sinatra, G. M., Southerland, S. A., McConaughy, F., & Demastes, J. W. (2003). Intentions and beliefs in students' understanding and acceptance of biological evolution. *Journal of Research in Science Teaching, 40*(5), 510-528.

Smith, M., Duda, J., Allen, J., & Hall, H. (2002). Contemporary measures of approach and avoidance goal orientations: Similarities and differences. *British Journal of Educational Psychology, 72*(2), 155-190.

Sorrentino, R. M. (1995). A world from two perspectives: E Pluribus Duo? *Psychological Inquiry, 6*(4), 314-318.

Stanovich, K. E., & West, R. F. (1997). Reasoning independently of prior belief and individual differences in actively open-minded thinking. *Journal of Educational Psychology, 89*(2), 342-357.

Stanovich, K. E., & West, R. F. (1998). Individual differences in rational thought. *Journal of Experimental Psychology: General, 127*, 161-188.

Stanovich, K. E., & West, R. F. (2007a). Natural myside bias is independent of cognitive ability. *Thinking and Reasoning*, *13*(3), 225-247.

Stanovich, K. E., & West, R. F. (2007b). *Composite actively open-minded thinking scale*. Retrieved 10/19/ 2007 from kstanovich@oise.utoronto.ca.

Stanovich, K. E., & West, R. F. (2008). On the failure of cognitive ability to predict myside bias and one-sided thinking biases. *Thinking and Reasoning*, *14*(2), 129-167.

Steele-Johnson, D., Heintz, P., & Miller, C. E. (2008). Examining situationally induced state goal orientation effects on task perceptions, performance, and satisfaction: A two-dimensional conceptualization. *Journal of Applied Social Psychology, 38*(2), 334-365.

Strange, J. J. (2002). How fictional tales wag real-world beliefs: Models and mechanisms of narrative influence. In M. C. Green, J. J. Strange & T. C. Brock (Eds.), *Narrative impact: Social and cognitive foundations* (pp. 263-286). Mahwah, NJ: Erlbaum.

Urdan, T. (2001). Contextual influences on motivation and performance: An examination of achievement goal structures. In f.l Salili, C. Chiu, & Y. Hong (Eds.), *Student motivation: The culture and context of learning* (pp. 171-201). New York: Kluwer Academic.

Urdan, T. (2004). Using multiple methods to assess students' perceptions of classroom goal structures. *European Educational Psychologist, 9*(4), 222-231.

Urdan, T., & Midgley, C. (2003). Changes in the perceived classroom goal structure and pattern of adaptive learning in during early adolescence. *Contemporary Educational Psychology, 28*(4), 524-551.

Valle, A., Cabanach, R. G., Nunez, J. C., Gonzalez-Pienda, J., Rodriguez, S., & Pineiro, I. (2003). Multiple goals, motivation and academic learning. *British Journal of Educational Psychology*, *73*(1), 71-88.

Vandewalle, D. (1997). Development and validation of a work domain goal orientation instrument. *Educational and Psychological Measurement*, *57*(6), 995-1015.

Vandewalle, D., Cron, W., & Slocum, J. W. (2001). The role of goal orientation following feedback. *Journal of Applied Psychology, 86*(4), 629-640.

Vidrine, J. I., Simmons, V. N., & Brandon, T. H. (2007). Construction of smoking-relevant risk perceptions among college students: The influence of need for cognition and message content. *Journal of Applied Social Psychology, 37*(1), 91-114.

Vosniadou, **S.** (2001). What can persuasion research tell us about conceptual change that we did not know already? *International Journal of Educational Research, 35*(7-8), 731-737.

Vrugt, A., & Oort, F. J**.** (2008). Metacognition, achievement goals, study strategies and academic achievement: Pathways to achievement. *Metacognition and Learning, 3*(2), 123-146.

Was, C. (2006). Academic achievement goal orientation: Taking another look. *Electronic Journal of Research in Educational Psychology, 4*(3), 529-550.

Weber, K., Martin, M. M., Comm 401, & Corrigan, M. (2006). Creating persuasive messages advocating organ donation. *Communication Quarterly, 54*(1), 67-87.

West, R. F., Toplak, M. E., & Stanovich, K. E. (2008). Heuristics and biases as measures of critical thinking: Associations with cognitive ability and thinking dispositions. *Journal of Educational Psychology, 100*(4), 930-941.

Wolters, C. A. (2004). Advancing achievement goal theory: Using goal structures and goal orientations to predict students' motivation, cognition, and achievement. *Journal of Educational Psychology, 96*(2), 236-250.

Wolters, C. A., Yu, S. L., & Pintrich, P. R. (1996). The relation between goal orientation and students' motivational beliefs and self-regulated learning. *Learning and Individual Differences, 8*(3), 211-238.

Woods, B. S., & Murphy, P. K. (2001). Separated at birth: The shared lineage of research on conceptual change and persuasion. *International Journal of Educational Research, 35*(7-8), 633-649.

Yalch, R. F., & Elmore-Yalch, R. (1984). The effect of numbers on the route to persuasion. *Journal of Consumer Research, 11*(1), 522-527.

Young, J. W. (2007). Predicting college grades: The value of achievement goals in supplementing ability measures. *Assessment in Education, 14*(2), 233-249.

Zhao, W., & Dweck, C. S. (1994). *Implicit theories and vulnerability to depression-like responses*. Unpublished manuscript, Columbia University.

Zweig, D., & Webster, J. (2004). What are we measuring? An examination of the relationships between the big-five personality traits, goal orientation, and performance intentions. *Personality and Individual Differences, 36*(7), 1693-1708.

BIOGRAPHICAL SKETCH

Judith Ladd grew up in New York's Hudson Valley, not far from the haunts of Rip Van Winkle and the Headless Horseman. Upon graduation from high school, she entered the University of Michigan at Ann Arbor. There, she received a bachelor's of science degree from the college of literature, science, and the arts. She majored in math, but she also seized the opportunity to take a wide variety of elective courses that resulted in minors in both general science and social science.

She married her college sweetheart, Jon Ladd, and began a teaching career. During those early years, she taught secondary math and science. She quickly realized that a liberal arts education was insufficient to fully serve as a foundation for effective teaching. Consequently, she looked to educational psychology for answers. She entered Eastern Michigan University, attending classes in the evening after work and during summer breaks and earned an M. A. degree in educational psychology. She found this course of study fascinating and invaluable.

In the mid-eighties, events would place her career on hold. She and Jon left for a three-year sojourn abroad; two years in Tokyo followed by one year in Mexico City. Upon returning to Michigan, she resumed her teaching career. She again taught secondary math and science, participated in professional organizations, coached Science Olympiad, taught Adult Ed., tutored, and mentored a variety of students.

Judith left K-12 teaching in 1999 and chose a somewhat different path for the second part of her life. In 2002, and with the assistance of an alumni fellowship, she enrolled in an educational psychology doctoral program at the University of Florida. This fellowship allowed her to further explore an enduring interest in educational psychology and achievement motivation.