MILLER, JOYLENN T. Understanding the Relations Among Students’ Beliefs about Intelligence, Academic Goals, Study Behavior, and Achievement in the Context of a College Course: A Test of Predictions from Dweck’s Academic Motivation Model. (Under the direction of Ann Schulte, PhD.)

The purpose of this dissertation study was to examine the components of academic motivation in a college population in the context of a semester-long course within Dweck’s motivation model. Dweck maintains that students’ academic motivation is best explained by examining students’ theory of intelligence, the academic goals they set, their perceptions of academic ability, and academic behaviors (Dweck, 1999). Specifically, this study sought to gain a better understanding of each component of Dweck’s model and tested for the interrelationships predicted in her model, particularly the relationship between theory of intelligence and the remaining components. The sample consisted of 152 undergraduate students were recruited from an introductory psychology courses at North Carolina University (NCSU). It was hypothesized that (a) incremental theorists would be more likely to endorse mastery goals rather than performance approach or performance avoidance goals; (b) entity theorists would be more likely to endorse performance avoidance goals rather than mastery or performance approach goals; (c) entity theorists would be more likely to endorse self-handicapping behaviors; (d) students classified as having a performance avoidance orientation would be more likely to utilize self-handicapping strategies than students with mastery or performance approach goal orientations; (e) and incremental theorists would have higher mean class grades than entity theorists. None of the hypotheses were confirmed.
However, additional analyses were done where theory of intelligence was treated as two continuous variables rather than a categorical variable to see if some of the predicted relationships would be found. Results revealed a significant relationship between the incremental theory of intelligence and the mastery goal orientation and student effort. Additionally, there was a significant relationship between student grades and the performance approach and performance avoidance goal orientations. Considerations for interpreting results, limitations, directions for future research, and implications for practice are discussed.
Understanding the Relations Among Students’ Beliefs about Intelligence, Academic Goals, Study Behavior, and Achievement in the Context of a College Course: A Test of Predictions from Dweck’s Academic Motivation Model

by
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DEDICATION

This dissertation is dedicated to my grandfather (the late Phillip C. Alston) who always encouraged me to “study hard.” Without his prayers and constant light shining upon my life, I would not have been able to accomplish this task and would not be who I am today.
BIOGRAPHY

Joylynn Tenee Miller was born on January 17, 1977 in Durham, North Carolina. Her younger sister Jenelle and her parents, Jerry and Joan, also have their roots in North Carolina where Joylynn graduated from Northern Durham High School in 1995. Joylynn completed her undergraduate work at the University of North Carolina at Greensboro in Greensboro, NC. She received a Bachelor of Arts degree in Psychology in May of 1999. Following her college graduation, she moved to Raleigh, NC to attend graduate school at North Carolina State University. She earned a Master of Science degree in Psychology in 2004. Joylynn enjoys her work as a school psychologist within the Wake County Schools.
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CHAPTER ONE: INTRODUCTION

Much of the research concerning individual differences observed in students’ academic achievement has focused on the way in which cognitive skills influence academic performance (Dweck & Elliott, 1983). However, there are other aspects of the learner that influence academic outcomes. Students with similar ability levels completing the same academic task can vary in terms of the goals they set, the effort they put in, and the way they study. These student-initiated behaviors and cognitions collectively comprise academic motivation (Dweck, 1986; Dweck & Leggett, 1988).

Student motivation is an academic enabler (DiPerna, Volpe, & Elliott, 2002). That is, student motivation helps to predict the degree to which students participate in, and ultimately benefit from academic instruction. Learners who engage with to-be-learned academic material and persist when they do not immediately experience success typically achieve better outcomes than similar students who do not show these characteristics (Stipek & Gralinski, 1996). Particularly for students who enter academic situations with less developed skills than typical students, academic motivation may determine whether they ultimately succeed or fail. For example, the student who initially has difficulty learning to read may decide he or she is “not a reader,” and resist additional instruction and avoid reading. This response further decreases his or her chances of developing strong reading skills (Stanovich, 1986). Similarly, the college student who initially has difficulty adjusting to the high academic demands placed in many college courses may decide that he or she is “not college material” and avoid adequately preparing for exams and seeking additional help from
professors. These behaviors further decrease the student’s chances for academic success (Dweck, 1999). In contrast, the student who seeks help in response to academic difficulty, increases effort when he or she does poorly, and actively seeks out challenging tasks is more likely to succeed academically.

The present study examined components of academic motivation in a college population in the context of a semester-long course. The study is framed within Dweck’s social cognitive model of academic motivation (Dweck, 1986) with later modifications to it by her colleagues (Elliot, 1997). Her model is used as the basis of the proposed study for three reasons. First, the empirical work supporting the model is promising (Dweck, 1999). Second, the model grows from the social learning approach to understanding human behavior (Dweck & Elliott, 1983), a framework that has considerable research to support it (Bandura, 1977) and has generated productive models and interventions in other areas of human functioning (Crick & Dodge, 1994; Patterson, 1986). Third, the motivation model has led to the development of interventions that have improved academic persistence and achievement in both laboratory and real world settings (Aronson, Fried, & Good, 2002; Good, Aronson, & Inzlicht, 2003; Hong & Dweck, 1992).

The literature review that precedes the description of the proposed research has two major sections. The first section is a short description of Dweck’s model of academic motivation, including its four components and the hypothesized relations among the components. The second section summarizes existing research supporting the model and modifications to the model based on this research. In most cases, individual research studies
did not examine the whole model, but only one or two components. For this reason, this second section is divided into four major subsections, each summarizing research focused primarily on a single component of Dweck’s model. The literature review concludes with an evaluation of the weaknesses in the research supporting the model. This literature review is followed by a chapter that summarizes the issues this study sought to address and the hypotheses that were tested.
CHAPTER TWO: REVIEW OF THE LITERATURE

Current research on the cognitive and motivational factors influencing learning has stressed the role of students’ academic beliefs and their approach to learning situations. One of the most researched models related to students’ academic motivation is Dweck’s motivation model (Dweck, 1986; Dweck & Leggett, 1988). Dweck maintains that students’ academic motivation is best explained by examining students’ theory of intelligence, the academic goals they set, their perceptions of academic ability, and academic behaviors (Dweck, 1999).

The Four Components of Dweck’s Model

Dweck’s model of achievement motivation grows out of the social cognitive approach to motivation (Dweck & Bempechat, 1983; Dweck & Leggett, 1988). Within this framework, learners use information from their social environment to appraise their situation and make judgments that then determine their academic behavior.

Four Components Defined

Dweck’s achievement motivation model consists of three cognitive constructs that are linked to the final component, students’ study behavior. Thus, the four major components of the model are students’ (a) theory of intelligence, (b) goal orientation, (c) perception of ability, and (d) pattern of behavior. Each component is briefly described below.
Figure 1. Dweck & Elliot (1986)’s Original Motivation Model.

* Adapted from (Dweck & Elliot, 1983)
**Theory of intelligence** refers to the beliefs that students hold about the nature of intelligence. Students are generally characterized as holding either an incremental or entity theory of intelligence. Students who are incremental theorists believe that intelligence is malleable and can be increased through effort and new experiences. In contrast, students who are entity theorists believe that intelligence is predetermined and cannot be changed with experience or effort. The differences observed between incremental and entity theorists seem to be the most pronounced when students encounter academic setbacks.

**Goal orientation** refers to the types of goals students set in learning situations (Dweck & Elliot, 1983). In Dweck’s model, students are generally characterized as holding a mastery goal orientation or a performance goal orientation. Students with a mastery goal orientation pursue academic tasks to increase their competence. Students with a performance goal orientation pursue academic tasks to receive a positive evaluation or avoid looking incompetent.

**Perception of ability** refers to students’ beliefs about their academic ability or competence in a particular academic subject. Students make global judgments of their overall capability as students, and specific judgments about whether they are likely or unlikely to be able to complete a particular academic task.

**Pattern of behavior** refers to a students’ overall approach to learning tasks. Students with an adaptive pattern of study behaviors seek challenging academic tasks and increase effort during academic setbacks. Students with a maladaptive pattern of study behaviors tend to avoid challenging tasks and decrease effort during academic setbacks (Dweck, 1986).
Hypothesized Relationships among Model Components

Dweck and others researching the model have discussed the ways in which the four major components of her model are interrelated. The interrelationship between theory of intelligence, goal orientation, perceived ability, and achievement behavior in Dweck’s motivation model is best described by three potential study orientations (Dweck & Leggett, 1988). The study orientations are patterns of student cognitions and behavior that co-occur. In each of these study orientations, the particular theory of intelligence a student holds orients them toward certain learning goals that then set the stage for particular cognitions and behaviors.

Incremental. The first study orientation is most likely to be displayed by students identified as incremental theorists. Students who believe that intelligence is malleable tend to set learning or mastery goals because they are most concerned with developing their intelligence through hard work and use of varied strategies. When students adopt mastery goals, they seek challenging learning opportunities whether they perceive their ability to be high or low. For these students, academic challenges are met with persistence and viewed as an opportunity to gain knowledge (Dweck, 1999).

Entity/high perceived ability and entity/low perceived ability. The second and third study orientations are both typically displayed by students identified as entity theorists. Given that entity theorists do not believe intelligence can be increased, their goals in completing academic tasks generally tend to center around their performance, they seek
either to receive a positive evaluation or not be perceived as incompetent. However, the type of performance goal entity theorists adopt depends on whether or not they see themselves as having adequate ability relative to the task (Elliott & Dweck, 1983; Dweck, 1999).

If entity theorists have a high perception of their ability relative to a particular academic task, they are more likely to increase effort when approaching a difficult academic task. In this case, entity theorists may use their preoccupation with positive evaluation to their advantage. Thus, they are able to avoid negative academic outcomes due to a strong need for external academic validation.

In contrast, if entity theorists have low perceptions of their ability when approaching an academic task, their main objective is to choose easy tasks in an effort to avoid failure and negative evaluation. If they encounter academic challenges, they may respond with avoidance because failure may signal low academic ability to others, and failure with a high level of effort is even more indicative of low ability. In comparison to entity theorists with high perceptions of ability, students with low perceptions of ability are more likely to utilize maladaptive study strategies (e.g., procrastination prior to an exam or withdrawal of effort) in the face of academic obstacles (Elliott & Dweck, 1983; Dweck, 1999). It is important to note that in Dweck’s model perception of ability does not affect goal orientation and study behavior for incremental theorists because low ability may be less threatening.

Dweck’s Motivation Model: Supporting Research

Dweck’s model has stimulated considerable research. The following sections will elaborate on aspects of Dweck’s motivation model, as well as present research examining the
specific components and their interrelations. Each subsection begins by further explaining each of the four components in Dweck’s model, and then presenting research that provides support for that component. The review will also identify gaps in the research literature and the need for the present study.

*Theories of Intelligence*

As stated earlier, students generally hold one of two theories of intelligence. Students who hold an “incremental” or malleable view of intelligence believe that intelligence is expandable and can be improved or changed. In contrast, students who hold an “entity” or fixed view of intelligence consider intelligence to be a fixed internal trait that cannot be changed (Dweck, 1986).

Which of these two global views students hold affects how they interpret any learning task. For incremental theorists, the intellectual ability that they possess is malleable and can be improved through effort and varied strategies. Thus, failure on an intellectual task is not threatening, it simply signals the need for increased effort or the use of a different strategy. If one succeeds, it means that one’s increased effort was needed to accomplish the challenging academic task. If one fails after working hard, it does not signal a deficit in one’s competence, but rather an academic challenge from which one can gain knowledge and experience.

For entity theorists, the intellectual ability that they possess is fixed and can only be demonstrated but not improved. Thus, failure on an intellectual task is very threatening because it signals an intellectual deficit that cannot be changed. Furthermore, there is a high
cost for putting forth effort if one believes that ability is fixed. High effort signals low ability. If one works hard and succeeds, it means that one was at the boundaries of one’s academic competence. If one works hard and fails, it means one looks even less competent than if he or she had not tried.

As is evident from these descriptions, students’ theories of intelligence are thought to be critical determinants of their cognitions and behaviors in a given academic situation. If the model is correct, then students’ global theory of intelligence should be correlated with specific academic cognitions and behavior. Furthermore changing students’ global view of intelligence should change student cognitions, behaviors, and ultimately, their learning outcomes. In this section, research related to the critical role of students’ theory of intelligence in determining students’ academic goals choice and study behavior is examined. First, correlational studies related to theory of intelligence are summarized, followed by experimental studies that demonstrate that manipulating theory of intelligence can change academic outcomes.

**Correlational studies.** One of the earliest studies examining children’s theories of intelligence was conducted by Bandura and Dweck (1981) and is described in Paris, Olson, and Stevenson (1983). The study assessed the different academic goals and beliefs reported by elementary-aged children when asked to complete a problem solving task. The authors hypothesized that children’s entity or incremental beliefs about intelligence would be related to their goals and cognitions when faced with a problem solving task.
First, the authors measured students’ theories of intelligence by asking the children to rate their level of agreement with the following three statements: “You have a certain amount of intelligence and you really cannot do much to change it,” “Your intelligence is something that you can’t change very much,” and “You can learn new things, but you can’t really change your basic intelligence” on six-point Likert scales, ranging from 1 (strongly agree) to 6 (strongly disagree). Students were classified as entity theorists if they obtained a mean score of 3.0 or lower on the three items and incremental theorists when they obtained a mean score of 4.0 or higher. Using this classification strategy, 15 percent of students were excluded from either classification and the remaining 85 percent were evenly distributed among the entity and incremental groups. Other authors have reported similar distributions in subsequent studies (Dweck et. al, 1995).

After classifying them as entity or incremental theories, the children were trained to perform problem-solving tasks that increased in difficulty level. Following the training, the children were asked a series of questions about the upcoming problem solving tasks including questions about their performance expectations, goals, academic concerns, and potential reactions to different outcomes.

As expected, Bandura and Dweck (1981) found that incremental and entity theorists differed in their responses. Incremental theorists were more concerned that the problems might be too easy and whether they would learn from the problems. In contrast, entity theorists were more concerned with making mistakes and the way in which the experimenter might perceive their mistakes. The authors also asked students how they would feel if the
problems could be completed quickly and required little effort. The authors found that children who were incremental theorists more often reported that they would feel disappointed and bored if the problems were easy. In contrast, entity theorists more often reported that they would feel proud or relieved if the problems were easy.

In another question posed to students, the authors described two types of children and what makes them feel smartest. Some children were described as feeling smartest when problems were easy for them, but hard for other children. Other children were described as feeling smartest when they worked hard and made mistakes, but learned something. The authors then asked students what would make them feel smartest. Incremental theorists were more likely to report that they would feel smartest when given a challenging task or learning something new. Entity theorists were more likely to report that they would feel smartest when they were better at a task than other children.

The findings are important to the present study because the results support Dweck’s contention that students can be classified as incremental or entity theorists, and that these classifications are related to their goal orientation, concerns about failure, and preference for challenging tasks.

Another study by Bempechat, London, and Dweck (1991) examined the relationship between students’ theory of intelligence and their recovery from failure on an academic task. As in the previous study, the authors measured students’ theory of intelligence using Dweck’s three-item theory of intelligence measure and classified them as entity or incremental theorists. Students were then trained to perform problem-solving tasks of
increasing levels of difficulty. The problem solving stimuli consisted of two sets of cans that rested on wood pegs. While being timed, the child’s task was to move the cans to match the configuration of the experimenter’s cans. After completing progressively harder, but still solvable configurations, children were then given three configurations that were virtually impossible to solve. Following this failure experience, students were again given solvable tasks. The authors found that entity theorists took significantly longer than incremental theorists to complete the solvable tasks following a failure experience. Thus, failing proved to be more debilitating for entity theorists than incremental theorists, just as predicted in Dweck’s model (Dweck & Leggett, 1988).

In another study, Dweck, Hong, & Chiu (1993) investigated whether college students' classified as either entity or incremental theorists could have their beliefs about their own ability manipulated following academic failure. Again, students were classified as entity or incremental theorists using Dweck’s measure of students’ theory of intelligence. They were then randomly assigned to a failure or control condition. In the failure condition, students completed a logical reasoning task followed by negative feedback, and then completed a computerized reaction time task. In the control condition, students were only asked to complete the computerized reaction time task. The computerized task required students to quickly choose adjectives that could be used to describe an individual's personal characteristics. The authors used ability adjectives (e.g., smart, stupid), non-ability adjectives (e.g., brave, greedy), or adjectives not typically used to describe a person (e.g., spacious, melodic). Results indicated that entity theorists’ response time to ability adjectives
differed significantly from incremental theorists, but only when they had experienced failure on the reasoning task. Thus, following failure feedback entity theorists’ beliefs about the fixed nature of intelligence were made salient. The authors’ findings further support Dweck’s contention that academic setbacks may be experienced differently depending on one’s beliefs about the nature of intelligence.

More recently, researchers have investigated how students' implicit theories of intelligence influence the perceptions that they hold about ability and effort. For example, Hong, Chiu, Dweck, Lin, and Wan (1999) examined college students' responses to negative feedback on a task that experimenters had told the participants was a measure of their intelligence. The study examined whether students' confidence in their own intellectual ability influenced their responses to negative academic feedback. The authors administered a 90-item abstract reasoning task to 97 undergraduate students. Following the ability task the students were provided with the same negative feedback regardless of their actual academic performance. The students were then given questionnaires that measured their perception of competence and intellectual ability as well as whether students tended to attribute poor performance to a lack of intelligence or effort. Finally, the students were classified as entity or incremental theorists based on their responses to Dweck’s three-item questionnaire.

Results indicated that participants' attributions about their negative performance on the academic task were predicted by the theory of intelligence they held. Students with a more malleable view of intelligence were more likely to attribute their poor performance to a lack of effort than students with a fixed view of intelligence. Students identified as entity
theorists placed more emphasis on ability when explaining poor performance on the academic task.

In terms of students' beliefs about their own intelligence, there were no significant differences between the entity theorists with high or low-intellectual confidence. The entity theorists with high intellectual confidence were just as likely to attribute failure to a lack of ability as the entity theorists with low intellectual confidence.

The results suggest that a student's view of intelligence may help to create a specific view such that incremental theorists attribute failure to effort, while entity theorists attribute failure to ability. The results provide additional support to Dweck’s motivation model given that incremental theorists viewed academic failure as a temporary experience, and entity theorists viewed failure as a more permanent experience that could be attributed to their ability. In terms of intellectual confidence, the results run counter to the previously described study orientations. Entity theorists classified as having high or low perceptions of ability experienced similar outcomes. Recall that in Dweck’s model, one would expect different reactions in entity theorists based on whether they had high or low perceptions of ability. A modification made to Dweck’s motivation model that accounts for these conflicting results will be discussed in a subsequent section.

In a follow-up study, Hong et al. (1999) also examined the differences between incremental and entity theorists with a sample of 168 university freshmen from the University of Hong Kong. The authors predicted that entity theorists would be less likely
than incremental theorists to take a remedial course when provided with negative academic feedback, due to the possibility of confirming inferior intelligence.

The participants were told that English proficiency was an important factor in their academic success. The students were then asked if they would take a remedial course shown to improve students’ English proficiency. The authors then identified each student as either a high-previous-performer (grade of A or B on exam) or a low-previous-performer (grade of C or below on exam) based on grades students' received on the English portion of a recent proficiency exam given to all high school graduates. Finally, all of the participants were asked to fill out Dweck’s three-item questionnaire.

Results indicated a significant previous performance main effect, with low-previous-performers being more willing to seek out a remedial course than high-previous-performers, and a significant implicit theory by previous performance interaction. Incremental and entity groups did not differ in terms of their willingness to seek out a remedial course when they were previous high-performers. However, among the low-previous-performers, the incremental theorists were more likely to consider taking remedial action than the entity theorists.

These findings further support the Dweck’s model in that students identified as entity theorists were less likely to take remedial action. In contrast to the first study described by Hong et al. (1999), differences between entity theorists with high or low perceptions of ability were found, as Dweck’s model predicts. It is not clear why contradictory results were found; however, the authors speculated that the differences found between the two studies
may have been due to the focus on student attributions in the first study and academic behavior in the second study. It is possible that high confidence may not change entity theorists’ attributions about the nature of ability, but may increase the likelihood that entity theorists will change their academic behavior (e.g., taking a remedial course) when they perceive themselves to be competent in an academic area. Thus, additional research is needed to explore the ways in which students’ perceptions of ability influence their beliefs about the nature of intelligence and academic behavior, an issue the present study was designed to explore.

When interpreting the results of the Hong et al. (1999) studies, it should be noted that the sample consisted of students in Hong Kong. Research indicates that Asian students may endorse more effort-oriented beliefs than American students (Stevenson, 1990). Thus, one must be cautious when generalizing these results across cultures, particularly when the two cultures differ in their attributions about the role of effort and intelligence in academic success.

*Experimental studies.* More recently, researchers have begun to investigate the potential impact that altering students’ implicit theories of intelligence can have on their motivation and performance, particularly during transitional academic periods. These studies offer particularly strong support for the importance of students’ theories of intelligence in determining academic motivation because they show that manipulating students’ theories of intelligence results in changes in their academically-related cognitions and behaviors.
In one study, Good, Aronson, and Inzlicht (2003) developed an intervention manipulating adolescent students’ theories of intelligence in order to increase their academic performance in areas of achievement where the participants are at risk of academic difficulty. More specifically, a major goal of the study was to raise the test scores of female students who may be more susceptible to academic difficulty and negative beliefs in the area of math, and minority students who may be susceptible to negative beliefs in the area of reading. The authors hypothesized that an intervention addressing students’ maladaptive beliefs about the nature of intelligence and negative explanations for academic difficulty would improve students’ academic performance on standardized math and reading tests. The authors randomly assigned 138 seventh grade students to one of four experimental conditions corresponding to whether college mentors would convey an incremental, attribution, combination, or anti-drug message. Of the 138 participants in the study, 67 percent were Hispanic, 15 percent were African American, and 22 percent were White students. In addition, 45 percent of the students were female and 55 percent were male.

Twenty-five college students served as mentors, participating in a three-hour training session during which they completed a mentor-training course and learned how to convey each experimental message to the seventh grade students. The mentors then explicitly taught the students one of the four experimental messages. In one condition (incremental condition), the students learned about the expandable nature of intelligence with increased mental effort. In the second condition (attribution condition) the students learned about the tendency for many junior high students to experience difficulty in a new academic
environment, but then bounce back. In the third condition (combined condition), the students were taught a combination of the incremental and attribution messages. In the fourth condition (anti-drug control condition), the students were taught the disadvantages of drug use. Mentors engaged in two 90 minute sessions in November and January with their students. The mentors also communicated with students through an e-mail program designed for the program. The mentors ended the program by helping the students to design a web page that conveyed the message taught by the mentor throughout the year.

At the end of the school year, the researchers assessed students’ math and reading scores on a statewide administered test. Results indicated a significant main effect for condition and for gender, with the experimental conditions (incremental, attribution, and combined) increasing the boys’ and girls’ math scores when compared to students in the control condition. Additionally, females in the incremental, attribution, and combined conditions achieved significantly higher math scores than females in the control condition. Thus, the gender gap in math lessened for students learning about the expandability of intelligence and encouraged to make less negative academic attributions. This study provides support for further investigation and application of Dweck’s motivation model in that all students who were taught about the expandable nature of intelligence improved academically. It is also important to note that the gender gap in math lessened for students exposed to the experimental conditions.

Although another important purpose of the study was to assess the ways in which the intervention influenced minority students’ reading scores in comparison to White students,
the authors reported that there were not enough White students in the sample to perform comparisons. However, when the authors compared the reading performance of all the students in the four conditions, results indicated a significant effect of condition, with students in the incremental and attribution conditions receiving significantly higher reading scores than students in the control condition. There were no differences found between the combined condition and the incremental and attribution conditions. Thus, students receiving an incremental or attribution messages outperformed students receiving the anti-drug message. Although the authors were unable to compare the achievement scores of the minority and White students, the results are promising considering 80 percent of the participants were either Black or Hispanic and susceptible to negative beliefs about their academic ability in the area of reading. These findings indicate that it is possible to teach the incremental theory of intelligence, which may have important implications for the academic success of students from stigmatized groups. Furthermore, that manipulating theory of intelligence changed academic outcomes strengthens the evidence to support Dweck’s claim that theory of intelligence is an important determinant of student motivation and performance. Although the authors provide evidence for the link between theory of intelligence and students’ academic performance, they failed to include measures which assessed the intermediate links between theory of intelligence and student outcomes. Thus, it is not possible to know if the intermediate components described in Dweck’s motivation model operated in the predicted way to account for the change in academic outcomes. Although not an intervention study, the proposed study will integrate the intermediate
measures of students’ achievement goal orientation, perceptions of academic ability, and study behavior to examine the hypothesized links among model components.

Dweck (1999) has suggested that students may have an increased vulnerability to academic difficulty during transitional periods such as entering high school or college. Academic transitions may expose students to additional negative academic experiences which may cause a more negative interpretation of their academic ability. For example, many students experience more rigorous coursework and an increased emphasis on grades during transitions to high school and college. In an attempt to explain negative academic evaluations, students may attribute their difficulty to limited ability rather than inadequate effort or poor choice of study strategy, and these attributions could place them at a higher risk for poor academic outcomes. Students entering high school or college may be an important high risk population to utilize when investigating the effectiveness of interventions that shape students’ implicit theories of intelligence due to their exposure to new and increased academic demands. The fact that entering freshmen in college may be an important target population for intervention is part of the basis for selecting this population for the present study.

In another intervention study linking theory of intelligence and academic outcomes in college students, Aronson, Fried and Good (2002) examined the impact of manipulating African American students’ view of intelligence in order to improve academic achievement. In this case, the authors were interested in conducting research with at-risk students. The authors hypothesized that encouraging students to adopt an incremental view of intelligence
would lead to increased academic engagement and achievement. Forty-two African
American and 37 White students were asked to participate in a long distance pen pal program
in which they would mentor an “at-risk” middle school student. Additionally, they were
asked to participate in an unrelated study examining the relationship between psychology
measures and grades. In reality, the “unrelated study” was a technique to obtain permission
to examine students’ grades and SAT scores without communicating to them that the first
study was intended to have an impact on their academic achievement.

Each participant received a mock letter from a middle school student who was having
difficulties in school and was asked to write a reply (although the college students did not
know the middle school student did not exist). In one condition (malleable pen pal),
participants were asked to encourage their pen pals to work harder in spite of their setbacks.
The participants were provided with written information and a video that supported the
expandability of intelligence with information that could be used in their letter. In the second
condition (control pen pal), the materials provided to the participants encouraged them to
view intelligence as a set of strengths and weaknesses. Thus, their pen pal letters were to
encourage the middle school student to focus on their strengths. In the third condition (non
pen pal), participants were simply asked to complete measures concerning beliefs about the
malleability of intelligence, enjoyment and identification with academics.

The letter writing task was actually implemented to persuade the college students in
the malleable pen pal group about the expandability of intelligence. Additionally, to increase
the possibility of attitude change, participants from the malleable pen pal and control pen pal
groups were asked to include personal examples in their letters asserting their view of intelligence, write to a second pen pal, and turn their letters into brief speeches in order to increase their belief and commitment to their view of intelligence. These activities were carried out in three sessions lasting one hour, spaced about ten days apart. Several days after writing their last pen pal letters, then nine weeks after completing their letters, participants from the malleable pen pal and control pen pal groups were asked to complete measures assessing their belief in the malleability of intelligence, and enjoyment and identification with academics.

Although the authors randomly assigned students to the experimental conditions, initial results revealed that the mean SAT scores of the students in the malleable pen pal condition were lower than the scores of students in both the control pen pal and non pen pal conditions. Additionally, African American participants had lower SAT scores than White participants. To correct for these differences, all analyses were conducted using SAT as a covariate.

Results indicated a significant main effect for ethnicity and experimental condition, but no ethnicity by condition interaction. There was a tendency for African American students in all three conditions to view intelligence as more malleable than White students. The authors speculated that African American students may be more likely to endorse an incremental theory of intelligence in order to shield themselves from negative stereotypes about intelligence. Students in the malleable pen pal condition viewed intelligence as more
malleable than the students in the control conditions. Thus, the malleable pen pal intervention had a lasting impact on student beliefs.

Another important goal of this study was to examine the ways in which views of intelligence influenced students’ academic enjoyment. Results indicated a significant main effect of ethnicity and condition, with African American students enjoying academics less than White students and basing their self-worth less upon academic achievement than White students. However, results indicated that African American students in the malleable pen pal condition were significantly more likely to endorse enjoying academics than African American and White students in the control conditions.

Finally, the authors investigated whether the intervention would actually lead to academic performance gains. Results indicated that across conditions White students tended to have higher grades than African American students even when controlling for SAT scores. However, it is interesting to note that African American students in the malleable pen pal condition received significantly higher grades at the end of the year than African American students in the other two conditions. Additionally, the pen pal interventions led to gains in the academic performance of White students in the malleable pen pal condition.

In conclusion, the results showed that it is possible to teach aspects of Dweck’s model in order to influence students’ personal views of intelligence. Additionally, changing African American students’ view of intelligence led to lasting positive changes in terms of their academic performance, identification with academics, and academic enjoyment.
Summary. When examined together, the research findings seem to point to different patterns of cognitive and academic behaviors among students identified as entity or incremental theorists (Dweck, 1999, 1986; Dweck & Leggett, 1988) that affect their response to difficult tasks and ultimately academic outcomes. The studies indicating that theory of intelligence can be manipulated to improve academic performance provide strong support for Dweck’s model. To date, however, few studies addressing the incremental view of intelligence have assessed students' view of intelligence upon entering an academic setting. Research examining students’ theory of intelligence early in the semester, prior to, and following course grades may provide a clearer picture of the ways in which student outcomes are influenced by students’ beliefs about the nature of intelligence and how beliefs are influenced by performance feedback. Many of the studies to date have measured or manipulated students' theory of intelligence in the laboratory or a contrived setting (Aronson et al, 2002; Good et al., 2003; Hong et al., 1999). More research is needed that actually measures students' theory of intelligence within a naturalistic academic setting.

Additionally, previous studies have not always linked theory of intelligence to the other components of Dweck’s model, so that the hypothesized links in the model among theory of intelligence, students’ goal orientation, perception of ability, and academic behavior are largely untested (Dweck, 1999). However, there is evidence that theory of intelligence is causally linked to academic performance.
Achievement Goal Orientation

The second component of Dweck’s motivation model is goal orientation. The following section provides a review of studies conducted by researchers to better understand the behavior patterns and academic outcomes observed in students with different achievement goal orientations. First, Dweck’s earlier work, which characterized students’ goal orientation as dichotomous, will be described. Second, preliminary evidence provided by Elliot another researcher, suggesting students’ goal orientations may be better characterized by a trichotomous framework will be described (Elliot, 1997; Elliot & Church, 1997; Elliot & Harackiewicz, 1996). The section will conclude with summaries of a series of more recent studies conducted by Elliot in naturalistic settings that provide strong evidence of the utility of the trichotomous framework over Dweck’s initial dichotomous framework for achievement goals.

In Dweck’s motivation model, students’ theory of intelligence determines the goal orientation they adopt. Although a few studies have linked theory of intelligence and goal orientation (see previous section), goal orientation itself has been a primary focus in the academic motivation literature, independent of theory of intelligence (Dweck & Elliott, 1988; Kaplan & Maehr, 1999; Middleton & Midgley, 1997). As a result, the research summarized here largely concerns the links between students’ goal orientation, academic behavior, and academic outcomes. That is, the studies only examine the link between the goal orientation and academic behavior components of Dweck’s model, and how goal orientation affects academic outcomes, and do not address theory of intelligence.
Early research. In early work, Dweck and others conceptualized goal orientation in a dichotomous framework, where students hold either a mastery or performance goal orientation (Dweck & Elliott, 1983; Dweck & Leggett, 1988). Thus, mastery students approach tasks with a desire to learn new skills, and performance students seem more driven by the desire to appear smart to themselves and others (Dweck, 1999).

One early study conducted by Dweck and Leggett (1988), examined the differences between students holding a mastery or performance achievement goal orientation. To classify students’ goal orientation, the authors asked a group of eighth grade students to choose between two tasks, one reflecting a mastery goal and one reflecting a performance goal. The mastery goal task was characterized as a difficult task which would allow students to learn new skills, but had a high risk of failure. In contrast, the performance goal task was characterized as an easy task with a low risk of failure. Students were then allowed to complete the task of their choice. The authors recorded students’ verbalizations and strategy choice. The authors found that students who chose the mastery task were more likely to utilize problem-solving strategies and were highly persistent in the face of a difficult task. In contrast, students who chose the performance-oriented task made more negative attributions about their ability and were less persistent when completing the task.

The findings are important to the present study because they support Dweck’s contention that students can be classified with a mastery or performance goal orientation and that these classifications are related to their strategy use when completing an academic task and concerns about failure.
In another study, Elliott and Dweck (1988) manipulated students’ goal orientation by randomly placing fifth grade students into a mastery goal condition or a performance goal condition. Mastery goal students were told that they would be given an academic task teaching valuable skills, and performance goal students were told they would be given a task to evaluate their ability. The students were actually provided with the same academic assignment that provided all students with a series of tasks that they could easily solve, followed by a series of more difficult tasks. The authors monitored students’ thoughts, feelings, and academic performance after completing the academic tasks. The authors found that the students in the mastery and performance groups performed equally well on easier tasks. However, the more difficult academic tasks evoked differences between the two groups. Students in the mastery goal condition were able to stay focused on each task, maintained effective problem-solving strategies, and were less preoccupied with ability. Students in the performance goal orientation condition were less focused on the task, decreased their use of problem-solving strategies, and had more negative feelings about their academic ability.

The findings provide support for Dweck’s motivation model in that goal orientation was related to strategy use, students’ ability to stay focused, and feelings about academic ability. The results also suggest that a mastery goal orientation can be induced by task instructions to create a more advantageous learning environment (Maher & Midgley, 1991). It is important to note that the differences between the two groups were only observed when students encountered a difficult academic task, as predicted by Dweck’s motivation model.
In a follow-up study conducted by Dweck and Leggett (1988), the authors provided additional information about the differences that can be observed between mastery and performance-oriented students by examining students’ perception of academic ability. The authors found that students with a performance goal orientation coupled with low perceptions of their own ability were more likely to utilize maladaptive learning strategies, avoid academically challenging tasks, and have a more negative view of academic tasks. In contrast, students with a performance-approach orientation and high perceptions of their own ability tended to display more positive academic behaviors and performance (e.g., use of study strategies and graded performance). The differences found when students’ perceptions of academic ability were high or low led Elliot to modify Dweck’s goal orientation component.

*Preliminary evidence for a trichotomous framework.* As noted earlier in the chapter, within Dweck’s model (1986), holding a performance goal orientation has different effects depending on a student’s perception of ability. The research just described seems to support this interpretation. However, Elliot hypothesized that perception of ability was not the key determinant of whether a performance orientation had a positive or negative impact on study strategies, academic behavior and outcomes. Rather, he suggested that there were two separate performance orientations, and one had a more negative impact than the other. He termed these two orientations the *performance-approach* and *performance-avoidance* orientations. Performance-approach oriented students seek to achieve a positive academic evaluation relative to their peers. Performance-avoidance students are simply seeking to not
look incompetent (Elliot, 1999; Elliot & Church, 1997; Elliot & Thrash, 2001; Middleton & Midgley, 1997). Thus, Elliot proposed replacing Dweck’s dichotomous framework with a trichotomous framework consisting of the mastery, performance-approach, and performance-avoidance orientations (Elliot, 1997; Elliot & Church, 1997; Elliot & Harackiewicz, 1996).

Elliot has described some of the academic behaviors associated with each goal orientation. As previously mentioned, the mastery goal orientation applies to students who want to gain new information and increase their academic competency (Anderman & Midgley, 1997; Maehr & Midgley, 1991). As a result, mastery oriented students tend to display academic persistence, increased effort, and seek out academic challenges in the face of academic setbacks (Ames & Archer, 1988; Elliott & Dweck, 1988; Maehr & Midgley, 1991). Thus, mastery students seem to display the most advantageous academic behaviors, which in turn results in positive graded performance on academic tasks. Elliot’s portrayal of these students does not differ from Dweck’s.

The performance-approach orientation applies to students who seek to gain positive evaluation relative to other students in their academic setting. The performance-approach orientation has been associated with both positive and negative academic outcomes with some students displaying increased effort and positive graded performance on academic tasks (Elliot et. al, 2005; Senko & Harackiewicz, 2005), but lower levels of motivation and persistence in the face of academic setbacks (Ames & Archer, 1988; Elliott & Dweck, 1988; Maehr & Midgley, 1991).
The performance-avoidance orientation applies to students who tend to be most concerned with academic failure; therefore they tend to withdraw effort when faced with challenging academic tasks (Elliott & Church, 1997; Elliott & Thrash, 2001). Thus, the performance-avoidance orientation is associated with more debilitating academic outcomes than the performance-approach orientation including distraction, anxiety, and self protective academic withdrawal (Elliot, 1999).

Thus, where Dweck maintained that the impact of the performance orientation differs depending on perception of ability, Elliot has simply divided the performance orientation into two separate approaches, with one approach appearing to produce more positive outcomes. However, Elliot has not provided an explanation for the way in which perception of ability fits within the trichotomous framework. However, the proposed study will examine the ways in which perception of ability may fit within the trichotomous framework, as well as Dweck’s overall model.

To test his hypothesis that there were actually two performance orientations, Elliot and Harackiewicz (1996) conducted two preliminary studies that examined the predictive utility of the performance-approach and performance-avoidance goal orientations. The authors studied college students’ intrinsic motivation or enjoyment in an activity when manipulating their goal orientation. Participants in the performance-approach condition were told that the purpose of the study was to compare their ability to solve puzzles to that of other college students. The students were told that in the researchers’ previous work with the task, most students performed similarly, but a few students stood out because they tended to
perform quite well on the puzzles. Thus, the task would allow students to distinguish themselves from others only by being good problem solvers. Students in the performance-avoidance condition were told that most students performed similarly, but a few students stood out because they tended to perform very poorly. Thus, this task would allow students to distinguish themselves from others only by being poor puzzle solvers. Students in the mastery goal condition were told that the purpose of the task was to measure their reactions to puzzles. Students were then given the puzzles to solve and assessed on their level of intrinsic motivation.

No differences were observed in terms of students’ intrinsic motivation in the performance-approach and mastery goal orientation conditions. However, students in the performance-avoidance condition showed lower intrinsic motivation. These findings support the possibility that differential outcomes may be observed when separating the performance orientation into the performance-approach and performance-avoidance goal orientations.

In another study, Elliot and Church (1997) examined the validity of the proposed trichotomous framework by providing 204 college students with a newly developed measure of their achievement goal orientation in order to test whether student achievement goals could be separated into three distinct goal orientations and whether these three goal orientations were associated with different patterns of behavior. The authors hypothesized that the mastery, performance-approach and performance-avoidance goals occur prior to certain antecedents (e.g., achievement motivation and competence expectancy) which facilitate certain consequences (e.g., level of intrinsic motivation and students’ graded
performance on academic tasks). More specifically, the authors hypothesized that the mastery goals would be related to achievement motivation and high competence expectancies, which would lead to increased intrinsic motivation, but have no reliable effect on students’ graded performance on academic tasks. Performance goals were expected to be related to achievement motivation, fear of failure, and high competence expectancies, which would not affect intrinsic motivation, but have a positive effect on graded academic tasks. Finally, performance-avoidance goals were expected to be related to fear of failure and low competence expectancies, which could undermine intrinsic motivation and lower graded performance on academic tasks.

The authors assessed the students multiple times over the course of a semester. Students’ achievement motivation, competence expectancies, and fear of failure were assessed during the first week of the semester. Students’ achievement goals were assessed during the second week of the semester. Intrinsic motivation was assessed near the end of the semester. Finally, students’ final grades were obtained from their professor at the end of the course.

Results provided support for Elliot’s trichotomous framework. The new achievement goal measure yielded three achievement goal factors consistent with the mastery, performance-approach, and performance-avoidance goal orientations. Additionally, results provided support for the hypothesized behavioral profile of each goal orientation. When assessing the antecedents of each goal orientation, the authors found that mastery goals were associated with achievement motivation, performance-approach goals were associated with
achievement motivation and fear of failure, and performance-avoidance goals were associated with fear of failure. In terms of competency expectancies, mastery and performance goals were associated with high expectancies, while performance-avoidance goals were associated with low competency expectancies. In terms of the consequences of students’ goal orientations, mastery goals resulted in increased intrinsic motivation, but had no effect on graded performance. Performance-approach goals resulted in lowered intrinsic motivation, but increased graded performance. Performance-avoidance goals resulted in lowered intrinsic motivation and graded performance.

When examined together, these studies by Elliot and his colleagues (Elliot & Church, 1997; Elliot & Harackiewicz, 1996) provide support for the validity of separating the performance orientation into the approach and avoidance orientations as described in his trichotomous framework. Additionally, both studies support the hypothesized way in which students seem to approach academic situations based on their goal orientation. Mastery goals were associated with intrinsic motivation. Performance-approach goals were associated with higher graded performance. Performance-avoidance goals were negatively related to students’ intrinsic motivation and graded performance on academic tasks.

Recent studies incorporating the trichotomous goal orientation framework. Based upon the preliminary research that was just described, Elliot has made an important contribution to Dweck’s motivation model (Kaplan & Maehr, 1999; Midgley & Urdan, 1995; Roeser, Midgley, & Urdan, 1996). The trichotomous goal orientation framework appears to better fit the data than Dweck’s original dichotomous framework. Students’ with the
performance goal orientation can be better differentiated from the mastery goal orientation with the more distinct performance-approach and performance-avoidance goal orientations. As a result, for the present study, as in most contemporary work using Dweck’s model (1986), Elliot’s trichotomous framework was incorporated into Dweck’s motivation model to provide a more complete explanation of students’ achievement motivation. Few studies have been conducted which explore the relationship between students’ goal orientation as described by Elliot and the major components of Dweck’s motivation model such as theory of intelligence, perception of ability, and academic behavior. In this section, several research studies related to Elliott’s trichotomous framework of students’ goal orientation will be presented. For this reason when discussing Dweck’s model with the addition of Elliot’s trichotomous framework, her model will be referred to as “Dweck’s modified motivation model.” The studies will examine the role of the three goal orientations may play in determining students’ task choice, academic cognitions, and academic behavior.

In one study, Harackiewicz, Barron, Carter, Lehto, and Elliot (1997) conducted a multi-session study to investigate the personality predictors of college students’ achievement goals in a psychology course. Additionally, the authors explored the consequences of students’ achievement goals on their graded performance and intrinsic interest in a college course.

First, the authors assessed the global personality traits that they thought might determine students’ academic beliefs in certain academic situations by administering personality scales which measured students’ general (versus academic) achievement
orientation in terms of work-mastery (“If I am not good at something, then I will struggle to master it rather than moving onto something I may be good at”), competitiveness (I feel that winning is important in both work and games”) and test anxiety at the beginning of the semester. Second, the authors assessed students’ academic achievement goal orientation 2-3 weeks into the semester. During the third session the authors assessed students’ intrinsic interest in the course near the end of the semester. Finally, the authors assessed students’ final grades.

When examining whether students’ personality traits predicted their general goal orientation, the authors found that students high in work-mastery were more likely to endorse mastery achievement goals for academics. Students high in competitiveness were more likely to endorse performance-approach goals or performance-avoidance goals for academics. However, students high in test anxiety were less likely to endorse performance-avoidance goals. These findings support aspects of Dweck’s modified motivation model in that students mainly concerned with working hard to master an academic task were also more likely to have a mastery goal orientation. Although Dweck’s modified model predicts that students high in competitiveness or the need for external evaluation would be more likely to endorse a performance-approach orientation, her model does not predict an association between students high in competitiveness and a performance-avoidance orientation (Dweck, 1986). The authors hypothesized that these findings supported Dweck’s modified model in that performance avoidance students are more likely to be motivated by external factors such as the need to avoid appearing incompetent in comparison to other students. In terms of test
anxiety, students with a performance-avoidance orientation were less likely to experience test anxiety, which is inconsistent with Dweck’s modified motivation model. Her model predicts that performance-avoidance students would be more likely to experience maladaptive patterns of behavior such as anxiety prior to an exam. The authors presented two limitations of their study that may account for findings inconsistent with Dweck’s modified model. First, the authors speculated that perhaps they should have administered a measure of performance-avoidance that had additional items, in that their measure had only two items. Second, test anxiety was the only area of student functioning measured by the authors that one would expect to be associated with the performance-avoidance orientation.

The authors also examined the way in which students’ general goal orientation may relate to academic outcomes. In terms of course interest, students who adopted mastery goals were more likely to endorse higher levels of interest in their psychology course. The authors did not find a relationship between students’ academic interest and the performance-approach or performance-avoidance orientations. Dweck’s modified motivation model would predict that mastery students would be more likely to have an intrinsic interest in an academic course than students with performance-approach or performance-avoidance orientations. In terms of academic grades, the authors found that high performing students were more likely to endorse a performance-approach orientation, while low performing students were more likely to endorse a performance-avoidance orientation. The relationship between students’ academic grades and their goal orientation is somewhat consistent with the goal orientation component as described in Dweck’s modified motivation model. One might expect
performance-avoidance students to receive lower grades because they seem to display the most debilitating academic behaviors (e.g., withdrawal of effort, procrastination, and poor performance) as predicted by Dweck’s motivation model. However, it is surprising that the results did not support Dweck’s claim that mastery students should experience the most positive academic outcomes in terms of increased academic grades when compared to students with performance-approach and performance-avoidance orientations. Although the mastery goal orientation did not display the most advantageous outcomes in terms of grades, perhaps the study did not account for some of the other positive outcomes that have been associated with the mastery orientation such as deep processing of information or long-term retention of information (Elliot & Church, 1997). The authors seem to provide evidence that student grades may be influenced by the academic goals that they set. Additional research is needed which examines the links between student grades and their academic goal orientation.

In a series of studies published in one article, McGregor and Elliot (2002) investigated the impact of goal orientation on students’ affective, cognitive, and behavioral processes prior to taking an undergraduate exam. To help the reader, Table 1 lists the academic processes and their definitions as described by the authors in the next three studies that will be presented.

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In the first study by McGregor and Elliot (2002), the authors tested the influence of achievement goals on students' challenge appraisals, threat appraisals, and grade aspirations prior to taking an exam. The authors defined challenge appraisals as whether students perceived an academic task as an opportunity for growth and mastery. The authors defined

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<td>Challenge appraisal</td>
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threat appraisals as students’ perceptions of the potential harm in a given academic situation. Additionally, grade aspiration was defined as the minimum grade that students would find acceptable on their exam.

The authors predicted that mastery goals would be positively related to challenge appraisals and negatively related to grade aspirations prior to the first exam because these goals seem to be positively associated with seeking out academic challenges, but negatively associated with focusing on graded outcomes. In the case of performance-approach goals, the authors predicted that performance-approach goals would be positively related to challenge appraisals and grade aspirations. The predictions were based on the possibility that performance-approach goals are related to students' focus on achievement relative to their peers. They also predicted that performance-avoidance goals would be positively related to threat appraisals due to students' fear of possible failure in academic situations.

To test these hypotheses, a sample of 150 college students enrolled in an introductory psychology class were informed that exam grading criteria would be based on normative grading including multiple-choice and short answer questions. Two weeks prior to the first exam, the authors assessed the students' past SAT scores and achievement goals. Then, one week prior to the exam students completed an exam specific measure that assessed challenge appraisals, threat appraisals, and grade aspirations. When controlling for SAT scores, results indicated that mastery goals were positive predictors of challenge appraisals as predicted, but unrelated to threat instead of negatively related. Performance-approach goals were positive predictors of challenge appraisals, grade aspirations as predicted, but unrelated to perceived
threat. Additionally, performance-avoidance goals were positively related to threat appraisals as predicted and negatively related to grade aspirations.

The results supported aspects of Dweck’s modified motivation model. For instance, mastery goal adoption seemed to promote the need for academic challenges, but was unrelated to feelings of threat or anxiety as predicted. In the case of performance-approach goals, the authors’ predictions that performance goals would be positively related to challenge and grade aspirations were supported. This pattern of findings further supports Elliot’s assertion that performance-approach students seem to be driven by external factors such as grades. The authors also found that the performance-avoidance goals seem to be related to threat due to students’ need to avoid failure and comparison. Elliot’s description of the performance-avoidance orientation would suggest that these students would be most concerned with the potential threat in a given academic situation. This study provided additional support for Elliot’s differentiation of the performance orientation into the performance-approach and performance-avoidance goal orientations in order to provide a more complete explanation of the goal orientation component. In order to examine the influence of achievement goals on additional academic outcomes such as academic absorption and procrastination prior to taking an exam, the authors conducted a follow-up study.

In this study, 174 undergraduates enrolled in an introductory psychology class participated in the present study for extra credit in the course. Again students were informed that exam grades would be based on normative grading including multiple-choice and short
answer questions. Two weeks prior to the first exam, the authors assessed students' past SAT scores, and gave students an achievement goal measure. Students were asked to complete the questionnaires when they had completed the majority of their study preparation for the exam. Then, one week prior to the first exam and when the majority of their exam preparation was completed, students completed an exam specific measure that assessed their challenge appraisals, threat appraisals, academic absorption, and perceived controlledness while studying. Immediately following the exam, students were asked to complete measures of procrastination while preparing for the exam and level of calmness due to preparation.

When controlling for past SAT scores, mastery goals were found to be positive predictors of challenge appraisals, absorption when studying, and calmness due to preparation and negatively related perceived controlledness. The mastery goal orientation was associated with the most positive academic outcomes as predicted by both Dweck and Elliot (Dweck, 1986; Elliot, 1997). In terms of performance-approach goals, they were found to be positive predictors of challenge appraisals and calmness due to preparation. Performance-approach goals were unrelated to academic absorption, perceived controlledness, and procrastination. Although performance-approach goals were associated with several positive outcomes, they were unrelated to academic absorption, which may indicate less advantageous academic achievement in comparison to the mastery goal orientation. Performance-avoidance goals were positively related to threat, perceived controlledness, and procrastination. The performance-avoidance goals were also negatively related to absorption and calmness due to preparation. Thus, performance-avoidance goals
were associated with the most negative academic outcomes in terms of students’ tendency to feel internal academic pressure and to procrastinate. Thus, results provide further support Elliot’s trichotomous framework and the some of the academic outcomes that have been associated with the three goal orientations.

In their final study, Elliot and McGregor (2002) conducted a short-term longitudinal analysis of the influence of students’ achievement goals on their achievement-relevant affect, cognition, and behavior prior to an examination a college course. The study was designed to investigate how students’ achievement attributions and behavior might change over time. First, students’ achievement goal orientations were assessed during the third class session. Second, students’ achievement-relevant affect, cognitions, and behaviors were measured at two time periods, two weeks prior to the exam and immediately before administering the exam.

Results indicated that mastery and performance-approach goals predicted early exam preparation at both Time 1 and Time 2. Mastery and performance-approach goals were positively related to early study preparation prior to an exam. Also mastery and performance-approach goals were negatively related to the amount of time spent studying the day of the exam and the desire to escape two weeks prior to the exam. Performance-avoidance goals were positive predictors of anticipatory test anxiety, the desire to escape the exam, and studying the day of the exam. Although similar results were found for mastery and performance-approach students, the results support some of the links between students’ goal orientation and study behavior as described by Dweck’s modified motivation model.
Additionally, students who adopted a performance-avoidance orientation displayed the most debilitating study behaviors such as procrastination and task avoidance as predicted by Dweck’s modified model.

In sum, the results of Elliot and McGregor (2002) support most of the past empirical research that predicts differences in students’ behavior and cognition based on their achievement goal orientation as described by Dweck’s motivation model and later expanded upon by Elliot. Results support the importance of Dweck’s performance goal orientation in motivational theories, but her work led to Elliot’s revision of her original goal orientation framework. Mastery goals were associated with the most positive outcomes in terms of students' need for challenges and students' perceptions of academic absorption or processing of information. This finding supports past research documenting that students with a mastery orientation may be more focused on academic material and have a deeper processing of study material which is associated with academic absorption.

The performance-approach goals were also associated with positive academic behaviors such as students' need for challenges and calmness due to preparation. It is important to note that again performance-approach goals were not associated with negative outcomes such as lack of internal control and procrastination. This finding supports research that seems to assert the positive aspects of performance-approach goal orientation, but does not support some of the more negative outcomes that have been associated with the performance-approach orientation (e.g., test anxiety, shallow processing of information, and unwillingness to seek academic help). However, it is important to note that the performance-
approach goals were not associated with students' perceptions of academic absorption which may point to a more negative aspect of the performance-approach orientation. Although the performance-approach goal orientation was mainly associated with more positive academic behaviors, more research is needed to thoroughly assess both the positive and negative academic behaviors that may be associated with performance-approach goals.

Finally, the performance-avoidance goals were associated with the most negative outcomes such as procrastination, lack of internal control, and lack of absorption. This further supports Elliot’s revision of Dweck’s motivation model in that avoidance goals have a distinct set of academic outcomes. Thus, the performance-avoidance goals may impede academic study behavior leading up to an academic task, which may in turn lead to negative academic performance.

The authors provide some insight into the way in which goal orientation predicts students’ achievement behavior prior to an exam. The results suggest that the mastery, performance-approach, and performance-avoidance goal orientations are associated with different patterns of behavior as predicted by Elliot’s trichotomous framework. Although the authors did provide a short-term longitudinal study of students’ goal orientation, the study fails to account for the ways in which students’ goal orientation could change in response to academic success or failure after completing an exam. The present study was designed to deal with this issue by assessing students’ goal orientation and study behavior during the semester after receiving feedback about an exam as well as their academic behavior leading up to students’ next exam. In addition, the studies examined fail to account for the links that
have been described by Dweck’s motivation model in terms of the process by which students’ goal orientations are related to their theory of intelligence and perception of ability.

Studies conducted in naturalistic settings provide interesting information about students’ goal orientations and the influence goals have on students’ course interest, academic behavior, and graded performance in a naturalistic setting. The research presented seems to indicate that although mastery students experience more positive outcomes such as academic interest and academic absorption, they may not receive higher grades. When examining the academic outcomes for performance-approach students, perhaps students’ preoccupation with external evaluation may actually help students to achieve higher grades than mastery or performance-avoidance students. Although performance-approach students were not found to display many negative study behaviors, they did experience less academic absorption or a more superficial processing of course material when compared to mastery students. Performance-avoidance students seem to encounter the most debilitating academic outcomes in terms of their study behavior, academic absorption, intrinsic interest, and graded performance.

It is not clear why the authors found that performance-approach students received higher grades than mastery students as would be predicted by Dweck’s model, but the authors speculated that many college courses test students’ knowledge through the use of multiple choice exams which require more memorization, rather than absorbing academic material on a deeper level (Pintrich, 2000). The way in which student knowledge is typically tested in a college course may account for the inconsistencies between Dweck’s motivation
model and the authors’ findings that performance-approach students received higher grades than mastery students. More research is needed to provide a more complete explanation for the distinctions that can be made between students with a mastery, performance-approach, or performance-avoidance orientation in terms of their academic outcomes. Additionally, research is needed to address the ways in which goal orientation relates to students’ theory of intelligence, perception of ability, and academic behavior within the context of an academic course which would help to describe the process by which goal orientations is connected to other components of Dweck’s model, an issue the present study was designed to address.

**Perception of Ability**

Students’ perception of their academic ability is the third component of Dweck’s motivation model. According to Dweck’s modified motivation model, perception of ability plays a less central role. This section begins by summarizing earlier research where the authors provided a more complete explanation of the role of perception of ability. The section will conclude with a research study which utilizes Elliot’s trichotomous framework and examines students’ perception of ability and its connection to students’ theory of intelligence, achievement goals, and academic achievement.

Students’ perceived ability in a particular academic domain is determined by previous school performance and feedback from teachers (Marsh & Yeung, 1997). Development of student beliefs about their academic competence is important to student achievement, motivation, and self-esteem (Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002). According to Eccles and Wigfield (1995), students’ perceived ability within an academic domain is
important to motivation and task choice within that domain. For example, students may be more likely to seek academically challenging tasks when they believe in their ability to complete a particular task (Eccles & Wigfield, 1989).

Students’ perception of ability can be conceptualized in two ways. One group of students may judge their ability in terms of specific academic domains. For example, students can believe that they have strong or weak abilities in the area of math. Another group of students may judge their ability in terms of specific academic tasks. For these students, there are certain academic tasks within a domain where the students feel very confident in their abilities, and other tasks where they feel less confident in their abilities.

Researchers have examined the ways in which students’ perceptions of ability influence their academic outcomes in an academic domain. For example, students with high perceptions of ability seem to possess more adaptive patterns of behavior such as an increased interest and value for academic tasks within an academic domain. Thus, students are likely to spend more time on the academic task, are more willing to improve their skills, which results in greater long-term engagement over time (Jacobs & Eccles, 1994; Wigfield, 1994). When controlling for students’ intellectual ability, the degree to which students value and feel competent in their academic ability seems account for some of the variation observed in students’ academic performance.

As previously mentioned, in Dweck’s earlier work, perception of ability played a critical role in determining achievement behavior, but only for students who set performance goals. Students with a performance orientation must maintain a high perception of ability in
order to seek and engage in challenging task. However, students’ with a performance orientation and low perceptions of ability may avoid challenging academic tasks in order to avoid negative evaluation.

In an attempt to increase the empirical research on the perception of ability component of student motivation, Miller, Behrens, Greene, and Newman (1993) utilized a sample of 117 undergraduate students to test hypotheses in Dweck’s original motivation model. First, the authors assessed the students’ perceived ability and goal orientations toward learning in a statistics course. Then the students were provided with measures of persistence, their valuing of statistics, and use of academic strategies two weeks before their final exam. Students’ perception of ability was measured by asking students to rate their level of agreement with eight statements such as: “I have a good understanding of the statistical concepts that I’ve been taught,” “I am confident I have the ability to understand the ideas taught in this course,” and “Relative to others in this class, I think I am good at statistics” on five-point Likert scales, ranging from 1 (strongly agree) to 5 (strongly disagree). Similarly, students’ academic persistence was measured by asking students to rate their level of agreement with eight statements such as: “If I have trouble understanding a problem, I go over it again until I understand it,” “When I run into a difficult homework problem, I keep working at it until I think I’ve solved it,” and “When I run into a difficult homework problem, I usually give up and go on to the next problem” on five-point Likert scales, ranging from 1 (strongly agree) to 5 (strongly disagree).
In the case of mastery oriented students with high perceptions of ability, students utilized more adaptive learning behaviors than mastery and performance-oriented students with low perceptions of ability. Again, these results run counter to Dweck’s motivation model in that differences were observed between mastery students with high and low perceptions of ability. However, it is important to note that the authors utilized Dweck’s earlier conception of the goal orientation component as a dichotomous framework.

The authors found that performance-oriented students with high perceptions of ability in statistics exhibited less adaptive behaviors than performance-oriented students with low perceptions of ability. These results run counter to what would have been expected based on Dweck’s motivation model in that perception of ability did not influence the behavior of students with a performance orientation. Additionally, students with a performance orientation and high perceptions of ability utilized fewer study strategies such as help-seeking and academic planning in comparison to students with low perceptions of ability. The authors expected performance-oriented students with higher perceptions of ability to utilize more positive study strategies.

To account for some of the inconsistencies identified in the previous study, Kaplan and Midgley (1997) conducted a follow-up study. The authors replicated Miller’s (Miller et al., 1993) study, but in this case they utilized middle school students. Again the authors measured students’ goal orientation, perceptions of ability, use of adaptive and maladaptive learning strategies. It is interesting to note that the authors also included two subjects, English and math to test the generalizability of the findings across academic domains. The
authors asked 126 students about the English domain and 103 students about the math domain.

The authors found that a performance-orientated student with high perceptions of ability did not display an increase in the use of adaptive learning strategies when compared to students with low perceptions of ability in both the English and math domains. The authors suggested that high perceptions of ability did not serve as a buffer from the use of maladaptive learning strategies for performance-oriented students.

As for mastery-oriented students within the math and English domains, the results did not support Dweck’s model in that students’ perception of ability did influence their use of adaptive learning strategies. Dweck’s model predicts that perception of ability should not influence students use adaptive learning strategies within the mastery goal orientation.

In sum, the authors’ findings suggest that high perceptions of ability may not serve to increase the use of adaptive learning strategies among students with a performance orientation. The authors speculated that it is possible that students’ performance orientation is not influenced by perception of ability as hypothesized. However, it is possible that because the authors did not utilize Elliot’s trichotomous framework, they were not able to tease apart the influence perception of ability may have on students’ academic behavior. It is also important to note that both studies were conducted in a naturalistic setting, but the measures were administered only once at the end of the semester. Although the authors provide preliminary information about academic behavior across domains, the results should be interpreted with caution in that the subject domains were tested across two different
samples. The authors raise interesting questions about students’ perceptions of academic ability and the need for subsequent studies exploring the differences between academic domains. Dweck and others have typically discussed this issue in terms of students’ perceptions of ability when approaching specific academic tasks rather than examining more general differences between academic domains.

Based upon the preliminary research that has been described, more research is needed examining students’ perception of ability including the additions to the goal orientation component as described by Elliot (1997). In this section, one additional research study related to perception of ability which includes other components of Dweck’s modified motivation model will be presented. As previously mentioned, Elliot (1997) has redefined the performance goal orientation to include both the performance-approach and performance-avoidance orientations. The final study presented in this section includes Elliot’s later conception of the goal orientation component as a trichotomous framework. The final study provides additional examination of the perception of ability component due to the lack of consensus regarding the influence of perception of ability on students’ goal orientation and academic behavior. Additionally, few studies have been conducted which explore the relationship between perception of ability and other aspects of Dweck’s motivation model such as students’ theory of intelligence and goal orientation in a naturalistic setting.

In another study, Leondari and Gialamas (2002) tested the relationships among theory of intelligence, goal orientations, perceptions of ability, and graded performance in 221 elementary aged students and 230 high school aged students. The authors incorporated
Elliot’s trichotomous framework to account for gaps in previous research by including measures of all three goal orientations. The students completed measures of their theory of intelligence, goal orientation, perception of ability, and reported their final grades in math and language arts.

Results indicated an incremental theory of intelligence was positively correlated with mastery goals, but had no relationship to the performance-approach and performance-avoidance goal orientations. These findings provide support for Dweck’s motivation model in that one would expect students with a malleable view of intelligence to adopt the most adaptive academic goals.

The authors also found that the three goal orientations helped to predict differences in students’ perceptions of academic ability. Students with mastery or performance-approach goal orientations tended to perceive themselves as more academically competent. In contrast, students with a performance-avoidance orientation tended to perceive themselves as less academically competent. The authors concluded that goal orientation seems to be an important factor in determining students’ perceptions of academic competence.

In terms of academic achievement, the authors did not find a direct relationship between students’ theory of intelligence and their final grades. The authors speculated that theory of intelligence may influence academic achievement indirectly through the adoption of a specific goal orientation. However, the authors found that students’ perceptions of academic competence moderated the relationship between goal orientation and academic achievement. Mastery and performance-approach goals had a positive indirect effect on
academic achievement, while performance-avoidance goals had a negative indirect effect on students’ academic achievement. The authors’ findings seem to provide additional support for some of the advantageous academic outcomes that have been associated with the mastery and performance-approach orientations.

The authors also found that the elementary students were more likely to endorse an incremental theory of intelligence than the high school students. The authors speculated that older students tend to develop a more fixed view of intelligence due to an increased exposure to society’s emphasis on the stability of intelligence. Students entering high school also encounter an emphasis on graded performance, increased academic demands, and a less supportive learning environment which might also explain why older students are more susceptible to attributing academic difficulty to limited ability based on negative academic evaluation (Midgley & Urdan, 1996).

In sum, the authors’ findings seem to point to importance of identifying students’ theory of intelligence, goal orientation, and perception of academic ability when predicting their academic achievement. This study provided some preliminary information about the way in which older students’ academic experiences may negatively influence their beliefs about the nature of intelligence. Although the results add some support for Dweck’s model, the present study assessed students’ perceptions of ability in response to academic success and failure in an academic course. The present study helps describe the process by which students’ perception of ability is connected to students’ theory of intelligence, goal orientation, and academic behavior (Dweck, 1999). Additional research is needed which
includes Elliot’s trichotomous framework of goal orientation in order to better examine the
influence of perception of ability on students’ academic outcomes.

Pattern of Behavior

As previously mentioned, in Dweck’s original model, the pattern of behavior
component was described in terms of adaptive and maladaptive behaviors. According to
Dweck (1986), students respond to academic setbacks differently depending upon the way in
which they view intelligence, which in turn influences the academic goals that they set. For
example, past studies have described the behaviors displayed by students depending upon
their theory of intelligence or goal orientation. For example, some students increase effort
and display more adaptive patterns of academic behavior (i.e. persistence when solving tasks,
using varied strategies, and seeking help), while other students display more maladaptive
patterns of behavior (i.e., procrastination and avoiding difficult tasks) in response to
academic challenges (Bempechat, et al., 1991; Dweck & Leggett, 1988; Kaplan & Midgley,
1997).

More recently, a separate line of research has merged with Dweck’s original model to
operationalize her adaptive and maladaptive pattern of behavior component as level (high vs.
low) of use of self-handicapping strategies. Self-handicapping strategies are defined as
maladaptive strategies that may be used by students to provide an excuse for poor
performance other than lack of ability (Thompson & Richardson, 2001). Thus, students
engage in avoidance strategies or create situations which divert attention away from their
ability if an academic setback might occur. Self-handicapping strategies may be utilized by
students prior to or during a threatening academic task (Urdan & Midgley, 1997). Self-handicapping behavior can operate in two ways: (a) behavioral self-handicapping or (b) claimed self-handicapping (Ferrari & Tice, 2000). Behavioral self-handicappers actively create obstacles to academic success (e.g., not practicing prior to a test, reducing effort, or staying up late prior to an exam). In contrast, claimed self-handicappers are more likely to report life circumstances as obstacles to academic success (e.g., test anxiety, illness, or fatigue).

In this section before describing the relationship between self-handicapping and Dweck’s model, studies describing self-handicapping will be briefly described.

*Studies examining self-handicapping*. In one study Rhodewalt et al. (1991) examined the effects of self-handicapping on students’ academic outcomes by using the self-handicapping scale. The authors identified a group of college students as either high or low self-handicappers based on the Self-Handicapping Scale. Students’ level of self-handicapping was measured by asking students to rate their level of agreement with 25 statements such as: “When I do something wrong, my first impulse is to blame circumstances,” “I tend to put things off until the last moment,” and “When something important is coming up, like an exam or job interview, I try to get as much sleep as possible the night before” on six-point Likert scales, ranging from 0 (disagree very much) to 5 (agree very much). High self-handicappers who were given failure feedback on an academic task tended to attribute failure to a lack of ability and had lower levels of self-esteem. Thus, when students were not able to
use alternate excuses for failure, they attributed their poor performance to lack of ability and had lower levels of self-esteem.

In another study, Zuckerman, Kieffer, and Knee (1998) conducted a longitudinal study which examines self-handicappers’ study behavior, use of coping strategies, and academic performance. They found that high self-handicappers were more likely to utilize poor coping strategies (e.g., denial, withdrawal of effort, or mental disengagement) when they encountered threatening academic tasks. Additionally, high self-handicappers had poor study habits and lower grades when they were compared to low self-handicappers. Self-handicapping behavior can create a cycle of poor academic performance in that high self-handicappers have lower academic achievement and self-esteem, thus these students continue to utilize maladaptive strategies in an effort to create additional excuses for future academic failure (Garcia, 1995).

In another study, researchers have explored the way in which self-handicapping influences students’ academic achievement. Thompson and Richardson (2001) investigated whether high self-handicappers would claim more handicaps and withdraw or reduce study strategies prior to receiving evaluative academic feedback. High and low self-handicappers were randomly assigned to three performance feedback conditions (failure, high task importance; failure, low task importance; or success). In the failure/high task importance condition, participants were told they failed a pretreatment academic task that was a reliable indicator of ability. In the failure/low task importance group, participants were told they failed a pretreatment academic task that was not a good indicator of ability. In the success
group, the participants were told that they successfully completed a pretreatment task. All participants were then given the opportunity to provide handicaps prior to the pretreatment task. Finally, participants could provide handicaps following the evaluative feedback (e.g., failure/high task importance, failure/low task importance, or success) and prior to completing a second academic task.

The authors found when compared to low self-handicappers, high self-handicappers from all three feedback groups were more likely to provide handicaps prior to completing the second task. Additionally, when given the opportunity to do practice items prior to the second academic task, high self-handicappers in the failure/high importance condition were less likely to do practice items when compared to high self-handicapper in the success condition. Also results suggested that low self-handicappers across all three conditions were more likely to practice additional items when compared to high self-handicappers. Thus, high self-handicappers were more likely generate handicaps prior to completing academic tasks and to utilize maladaptive study strategies especially when their academic ability was made salient. The authors have provided additional support for the more advantageous study strategies utilized by low self-handicappers when compared to high self-handicappers. The present study seems to provide additional evidence that the maladaptive study behaviors observed in high self-handicappers are most pronounced in academically threatening situations.

Study linking self-handicapping and Dweck’s modified model. More recently, in an effort to further examine the range of behaviors that may be exhibited by students during
academic success or failure, researchers have shifted their focus on students’ use of self-handicapping strategies within Dweck’s modified model. For the purposes of the present study, self-handicapping will be used to describe Dweck’s pattern of behavior component for several reasons. First, self-handicapping is conceptualized to be connected to Dweck’s motivation model when students are uncertain about their academic ability which in turn triggers the use of self-handicapping strategies in some students (Thompson, 2004). Second, differences among students who typically utilize self-handicapping strategies in comparison to students who do not utilize self-handicapping strategies students’ helps to explain some of the differences observed in students’ pursuit of academic goals. Third, self-handicapping provides an operationalization of Dweck’s pattern of behavior that is linked to a measure with strong psychometric qualities.

In an effort to examine the connection between Dweck’s model and self-handicapping, Rhodewalt (1994) conducted a study to provide evidence for the links between the theory of intelligence, goal orientation, and pattern of behavior components as presented in Dweck’s motivation model. The author predicted that students identified as high self-handicappers would be more likely to endorse beliefs associated with an entity theory of intelligence and adopt performance goals, while low handicappers would be more likely to endorse behaviors associated with an incremental theory of intelligence and adopt mastery goals. Rhodewalt administered a 25-item Self-handicapping Scale (SHS) to 80 undergraduate students at the beginning of an academic semester. The SHS was designed to measure students’ tendency to utilize self-handicapping strategies. The students were then given
Dweck’s theory of intelligence measure as well as a follow-up measure designed by the author to provide convergent evidence of students’ theory of intelligence. The follow-up measure of theory intelligence students were given seven attributes (e.g., verbal, math, special ability) and asked to rate the extent to which each attribute could be improved through the individual’s effort. Finally, the author measured students’ goal orientation using the Personal Goals in School Scale, a measure designed to measure students’ mastery, performance-approach, and performance-avoidance goals.

Results were consistent with Dweck’s Motivation Model in that performance goals were found to be associated with the belief in the fixed nature of intelligence. The author also found that positive correlations between mastery goals and students’ belief that effort could improve academic ability. However, theory of intelligence was found to be unrelated to students’ performance-avoidance goals. The initial results are promising in that they support Dweck’s earlier work that there is a positive association between incremental beliefs and mastery goals as well as a positive association between entity beliefs and performance-approach goals. The current study does not seem to provide any evidence of the association between entity theory and performance-avoidance goals as described by Elliott (1997). However, given that the questionnaires were only administered at the beginning of the semester it is not clear whether students were actually experiencing any academic setbacks. According to Dweck, the differences observed in entity students may be more pronounced when they experience academic difficulty which may lead to more performance-avoidance behaviors.
In terms of self-handicapping and theory of intelligence, the results suggest a positive association between students that self-handicap and entity theorists or students who view ability as an innate quality. As expected, the author found self-handicapping to be negatively related to students’ belief in the malleability of intelligence. In terms of self-handicapping and goal orientation, the author found that high levels of self-handicapping were positively associated with performance-approach goals and performance-avoidance goals. In contrast, high levels of self-handicapping were negatively related to mastery goals. The author’s findings seem to provide additional support for the belief that students who endorse mastery goals are more likely to endorse an adaptive pattern of behavior, while entity theorists are more likely to endorse a maladaptive pattern of behavior.

Currently, there is a limited amount of research on the use of self-handicapping strategies in a naturalistic setting (Midgley & Urdan, 2001). The present study provides a real-world context to examine self-handicapping behavior because the academic feedback provided by instructors has important consequences for college students (e.g., grades, graduation, and job possibilities). It also adds to the body of studies examining links between self handicapping and components of Dweck’s model.

With the use of SHS as the operational description of Dweck’s original adaptive and maladaptive patterns of behavior, this chapter’s description of the current state of Dweck’s model is complete. Figure 2 illustrates the components of Dweck’s motivation model with all the modifications that have been discussed in this review of research.
Dweck’s Modified Motivation Model

<table>
<thead>
<tr>
<th>Theory of Intelligence</th>
<th>Perceived Competence (role not in revised model)</th>
<th>Achievement Goal Orientation</th>
<th>Pattern of Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entity Theory</td>
<td><img src="image" alt="Diagram" /></td>
<td>Performance-Avoidance Goals: Seeking to Avoid Negative Evaluation</td>
<td>Maladaptive (High Self Handicappers)</td>
</tr>
<tr>
<td>Incremental Theory</td>
<td><img src="image" alt="Diagram" /></td>
<td>Mastery Goals: Seeking to Increase Academic Competence</td>
<td>Adaptive (Lo Self Handicappers)</td>
</tr>
</tbody>
</table>

* Based on (Dweck & Elliot, 1983; Elliot & Church, 1997)

Figure 2. Modified Motivation Model.
CHAPTER THREE: STATEMENT OF THE PROBLEM

Dweck and colleagues (Dweck & Elliott; Dweck & Leggett, 1988) have proposed a social cognitive model of academic motivation that consists of four components: (a) theory of intelligence, (b) goal orientation, (c) perception of ability, and (d) study behavior. Within the model, these components interrelate in specific ways to influence student achievement.

The previous chapter provided a comprehensive review of the research to support the components of the model. This research has demonstrated that students’ beliefs about the malleability of intelligence, beliefs about their own ability, and goals for learning, all influence their study behavior and achievement (e.g., how students view academic situations, the goals they set, and response to academic setbacks). Research growing out of this model also has shown that interventions aimed at changing implicit beliefs about intelligence can have an impact on students’ response to failure and achievement (e.g., effort, academic self-competence, and grades).

Although the positive results of interventions aimed at changing students’ beliefs about the nature of intelligence (Aronson et al., 2002; Good et al., 2003), suggest that malleability of intelligence is a key component of the social cognitive model of motivation, there have been few studies that have directly examined whether students’ theories of intelligence are related in the predicted ways to the other three major components of the model. Instead, the majority of the research has either focused on changing students’ theory of intelligence (e.g., training students to adopt a particular theory of intelligence), or examining students’ learning goals and their relationship to study behavior and outcomes.
(e.g., academic absorption, persistence, and grades). Thus, there is a need for research that examines all components of Dweck’s model and tests for the interrelationships predicted in her model, particularly the relationship between theory of intelligence and the remaining components.

Since Dweck’s original description of her model (Dweck & Leggett, 1988), additional research has led to modifications in the earlier model. Specifically, Elliot (1994, 1999; Elliot & Church, 1997; Elliot & Harackiewicz, 1996) has proposed that the performance goal orientation in the original model should be split into two orientations, the performance-approach and performance-avoidance orientation. Of these, the performance-avoidance orientation appears to be more closely associated with the use of maladaptive study strategies and poor achievement outcomes that Dweck hypothesized were characteristic of the performance goal orientation. As previously mentioned, Dweck has also hypothesized that the perception of ability component may serve as a buffer for some of the maladaptive behaviors observed in students with a performance goal orientation. However, Elliot has not provided an explanation for the ways in which the perception of ability component may fit with his three goal orientations, and findings are inconsistent (Miller, et al., 1993; Kaplan & Midgley, 1997). Although there are some research studies to support Dweck’s claim that perception of ability may influence students’ academic behavior and grades (Leonardi & Gialamas, 2002), research examining perception of ability and Elliot’s modification to Dweck’s model are scarce. Few studies have investigated the relationship between students’ perception of ability and the process components of Dweck’s modified model.
Others (Rhodewalt, 1994; Zuckerman et al., 1998) have proposed that the adaptive and maladaptive behavior component of Dweck’s original model can be assessed by looking at students’ use of self-handicapping strategies when studying. Self-handicapping strategies are maladaptive learning strategies (e.g., procrastination, withdrawal of effort, or an unwillingness to seek help) used by students to create an academic situation in which they can later use a less threatening excuse for academic failure other than lack of academic ability.

Only a small number of studies have examined how Dweck’s other three components fit within the model. Thus, an additional need in this area of research is an examination of how theory of intelligence is related to the three goal orientations, students’ perception of ability and to students’ use of self-handicapping strategies.

Finally, relatively little research has examined components of Dweck’s model in college students and in the context of academic classes instead of laboratory situations. Examining the hypothesized links among components in model in college students may lead to a better understanding of the determinants of academic success in college and may be helpful in suggesting ways to promote student engagement and learning, as well as ways to encourage students to take difficult courses or continue in the face of failure.

In light of these gaps in the research literature, the present study examines the extent to which college students’ theories of intelligence predict their goals, academic self-judgments, and study behavior in a Psychology course. Studying the interrelationships of students’ beliefs, cognitions, responses to academic success and failure, and achievement in a
naturalistic setting will provide a better understanding of student motivation, how it influences student behavior, and how academic experiences (such as good and poor grades) are related to students’ subsequent motivation, beliefs, and behaviors.

The primary purpose of the present study was to examine relation between each component of Dweck’s academic motivation model in the context of a semester-long college course. The relationships between the following key components from Dweck’s motivation model (a) theory of intelligence (b) goal orientation (c) perceived ability, and (d) pattern of behavior, were used to examine students’ response to academic success and failure in a Psychology course. The results from the present study provide important information about the way in which college students view their own intelligence and the way in which their perceptions influence their academic goals, behavior, and grades.

Research Questions and Hypotheses

The research questions and related hypotheses of primary interest are provided below, along with a brief explanation of each.

Research Question 1: What percentage of college students can be classified as endorsing an incremental or entity theory of intelligence?

An important preliminary step to the present study is an examination of the present study sample and its similarity to the samples used by other researchers. Of primary interest is the percent of students who enter a Psychology course defined as having an incremental or entity theory of intelligence.
Previous researchers (e.g., Bandura & Dweck, 1981; Hong & Dweck, 1992; Dweck et al, 1995) have found that typically 15 percent of elementary and college students do not fall in either category and the remaining 85 percent are evenly distributed among incremental and entity groups.

**Research Question 2:** How is theory of intelligence related to achievement goals when goals are framed within Elliot’s trichotomous framework?

Previous studies describing Dweck’s theory of intelligence and the goal orientation components have examined aspects of her model separately. The present study directly examines the way in which the process components of Dweck’s motivation are connected to Elliot’s trichotomous framework in the context of a college course.

**Research Question 2.1:** Will incremental theorists tend to endorse the mastery goal orientation or performance-approach orientation within the trichotomous framework?

Hypothesis 2.1: Theory of intelligence will be associated with choice of achievement goal, such that incremental theorists will be more likely to pick mastery and performance-approach goals than performance-avoidance goals.

**Research Question 2.2:** Will Entity theorists tend to utilize a performance-avoidance goals within the trichotomous framework?

Hypothesis 2.2: Theory of intelligence will be associated with choice of achievement goal, such that entity theorists will be more likely to pick performance-avoidance goals than mastery and performance-approach goals.
Research Question 3: Does theory of intelligence predict students’ use of self-handicapping strategies?

In terms of self-handicapping and theory of intelligence, only one study has been conducted which directly links these two components of Dweck’s motivation model (Rhodewalt, 1994). The results suggested that entity theorists were more likely to be high self-handicappers. The author also found self-handicapping to be unrelated to the incremental theory of intelligence. The present study examined whether these results could be replicated within the present sample.

Hypothesis 3: Entity theorists will have a significantly higher mean score on the SHS than incremental theorists.

Research Question 4: Does goal orientation predict students’ use of self-handicapping strategies?

Rhodewalt (1994) directly tested the relationships between college students’ academic goal orientation and use of self-handicapping strategies in a college course. Although the authors measured students’ goal orientation and use of self-handicapping strategies at the beginning of the semester, they did not measure students’ responses to academic challenges that are likely to occur in the context of a college course. Additionally, (McGregor & Elliot, 2002) conducted a series of studies which measured students’ academic behavior leading up to a college exam. The authors provided information about the differences that can be observed in terms of students’ use of adaptive and maladaptive behavior strategies. Although the authors did not directly measure students’ use of self-
handicapping strategies, they provided important information about the academic behaviors associated with Elliot’s trichotomous framework of students’ goal orientation. The present study examined the relationship between students’ goal orientation as described in Dweck’s modified model and students’ use of self handicapping strategies.

Hypothesis 4: Students classified as having a performance-avoidance goal orientation will have significantly higher means on the SHS than students classified as having mastery or performance-approach goals.

Research Question 5: Does perception of ability in Psychology predict students’ use of self-handicapping strategies within the performance-approach orientation?

Previous studies utilizing Dweck’s earlier motivation model (e.g. Miller et. al, 1993; Kaplan & Midgley, 1997) have suggested that high perceptions of ability may not serve as a buffer for performance-oriented students who seemed to display more negative academic responses to academic failure. However, when Leonardi and Gialamas (2002) utilized Dweck’s modified motivation model with elementary and high school students, differences were detected among performance-approach and performance-avoidance students. Performance-approach students seemed to have higher perceptions of academic competence than performance avoidance students. In an attempt to add to previous research studies, the present study directly measured the relationships between college students’ academic behaviors, perceptions of competence, and academic goals in a naturalistic setting.

Hypothesis 5: Students classified as having a performance-approach and a high perception of ability will have a significantly lower mean score on the
SHS than students classified as having a performance approach and a low perception of ability.

Research Question 6: Does theory of intelligence predict student grades at the end of the semester?

Although the majority studies examining students’ theory of intelligence have mainly been conducted in contrived settings (Bempechat, et al., 1991; Hong & Dweck, 1992; Hong et al., 1999), two intervention studies have examined the theory of intelligence and grades of high school and college students (Good, Aronson, & Inzlicht, 2003; Aronson, Fried, & Good (2002). The authors found that students learning the incremental view of intelligence received higher grades than students who were taught the entity view of intelligence. The present study added to previous research by measuring college students’ theory of intelligence and academic grades in a naturalistic setting.

Hypothesis 6: Compared to entity theorists, incremental theorists will have a higher mean class grade (on a 4-point scale).
CHAPTER FOUR: METHOD

Participants

A sample of 152 undergraduate students volunteered to participate in this questionnaire-based study. Students were recruited from the introductory psychology courses at North Carolina State University (NCSU). Introductory psychology courses at NCSU typically include students in a variety of majors. Participation in at least three hours of research or completion of a written term paper was a requirement for the course. Students received four research credits for their participation in this study. No student withdrew from the study prior to completing the surveys. Table 3 provides descriptive information on the demographic characteristics of all the participants sampled in this study. Similar to the criteria employed by Dweck et. al (1995), only those students who were identified as incremental or entity theorists were included in the primary data analyses for the present study. Students who fell in the middle between the two views were excluded. Of the 152 students who completed questionnaires, 123 could be classified as either incremental or entity theorists. The demographic characteristics of this more restricted sample are also provided in Table 2.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Entire Sample of Participants (n=152)</th>
<th>Participants Who Were Identified as Incremental or Entity Theorists (n= 123)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency (Percent)</td>
<td>Frequency (Percent)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2

Descriptive Information Describing Entire Participant Pool and Participants Who Were Identified as Incremental or Entity Theorists
Table 2 Continued

<table>
<thead>
<tr>
<th>Age</th>
<th>18 years old</th>
<th>19 years old</th>
<th>20 years old</th>
<th>21 years old</th>
<th>22 years old</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>85 (56)</td>
<td>41 (27)</td>
<td>15 (10)</td>
<td>7 (5)</td>
<td>4 (2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>69 (45)</td>
<td>83 (55)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>African American/Black</th>
<th>American Indian</th>
<th>Asian/Pacific Islander</th>
<th>Hispanic/Latino/Latina</th>
<th>White</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25 (16)</td>
<td>1 (&lt;1)</td>
<td>11 (7)</td>
<td>7 (5)</td>
<td>105 (69)</td>
<td>3 (2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year in College</th>
<th>1st year</th>
<th>2nd year</th>
<th>3rd year</th>
<th>4th year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>99 (65)</td>
<td>39 (26)</td>
<td>11 (7)</td>
<td>3 (2)</td>
</tr>
</tbody>
</table>

Measures

Theories of Intelligence Scale. The Theories of Intelligence Scale (Dweck, Chui, & Hong, 1995) is a self-report designed to measure the degree to which an individual views intelligence as malleable. The questionnaire is comprised of eight items describing students’
perceptions of intelligence. Each item is rated by students using a 6-point Likert scale, ranging from 1 (strongly agree) to 6 (strongly disagree). The scores for the eight items are averaged together to form an intelligence theory score that can range from 1 to 6, with higher scores indicating a stronger belief in the malleability of intelligence or the incremental theory. The authors suggest that research on the implications of theory of intelligence only include participants with clear implicit theory beliefs, therefore students are only classified as entity theorists if they obtain scores of 3.0 or lower on the scale, and students are only classified as incremental theorists if they obtain scores 4.0 or higher. Using this criterion, previous studies (e.g., Dweck et. al, 1995) have excluded about 15 percent of participants who did not fit either classification, and the remaining 85 percent have been evenly distributed between the entity and incremental groups.

In terms of the psychometric properties of the Theories of Intelligence Scale, Dweck, et. al, (1995) reported high internal reliability for the instrument. Across six studies, the internal consistency reliability ranged from .94 to .98. Additionally, the test-retest coefficient over a two week interval was .80.

To address validity, Dweck et al., (1995) conducted a study in which items from the intelligence theory scale and the authors’ morality and world theories measures were administered. All three implicit theory measures formed clear and separate factors in a factor analysis. The authors also reported that the Theory of Intelligence Scale was unrelated to measures of cognitive ability and self-reported confidence in intellectual ability, providing support for the measure's discriminant validity.
Other studies have been conducted to examine the psychometric properties of the Theories of Intelligence Scale. For instance, Zhao and Dweck (1994) confirmed that holding an incremental theory of intelligence was related to positive self-judgments about academic ability and increased effort in the face of an academic setback, and entity beliefs were associated with negative self-judgments about academic ability and decreased effort in the face of an academic setback. These findings provide some evidence for the measure's construct validity. Hong et al. (1999) confirmed that students’ theories of intelligence were related to the attributions that students make about poor performance, with entity theorists attributing poor performance to a lack of ability. Additionally, in a subsequent study, the authors confirmed that students with an entity theory of intelligence were less likely to take remedial action in an academically challenging situation than students holding an incremental view of intelligence (Hong et al., 1999). As a result, the authors reported that the Theories of Intelligence Scale has good predictive validity (Hong et al., 1999).

The Achievement Goal Measure. The Achievement Goal Measure (Elliot & Church, 1997) is a self-report measure that is designed to assess students' achievement goals within an academic setting. The instrument is based on Elliot’s trichotomous model of achievement goal orientation. The questionnaire is comprised of 18 items assessing students' tendency to adopt mastery, performance-approach, and performance-avoidance goals. Each item is rated by students using a 7-point scale ranging from 1 (not at all true of me) to 7 (very true of me).

The Achievement Goal Measure is divided into three subscales assessing the extent to which students endorse mastery (6 items), performance-approach (6 items), and
performance-avoidance (6 items) goal orientations. Factor analysis and reliability results have been reported by Elliot and Church (1997) based on a sample of 204 undergraduates enrolled in a college course. The authors confirmed that the measure yields three distinct factors; mastery, performance-approach, and performance-avoidance goals. These factors accounted for 63 percent of the variation in student scores. Internal consistency estimates for these factors were .89, .91, and .77, respectively. Additionally, mastery and performance goals were related to high achievement motivation, and performance-approach goals were associated with fear of failure, providing some evidence for the measure's construct validity. Performance-approach goals were also associated with higher course grades and performance-avoidance goals were predictive of lower course grades, indicating the measure's predictive validity.

The Self-Handicapping Scale (SHS). The SHS (Jones & Rhodewalt, 1982) is a self-report measure of the degree to which an individual tends to utilize self-handicapping behaviors or create barriers to academic success. The SHS is comprised of 25 items that assess students’ tendency to utilize self-handicapping strategies in evaluative situations. Each item is rated by the student using a 6-point scale, ranging from 0 (disagree very much) to 5 (agree very much), indicating participants’ use of self-handicapping strategies and concern about performance in academic settings.

Reliability figures on this scale have been reported by Rhodewalt (1994) based on a sample of 685 college undergraduates. Internal consistency was .78. In a second testing
session, a subsample of 100 students completed the SHS one month later. The test-retest coefficient obtained was .74.

Other authors have also investigated the psychometric properties of the SHS. For instance, Strube (1986) confirmed that high self-handicapping scores were associated with higher public self-consciousness and higher social anxiety. As a result, Strube (1986) concluded that the SHS has good construct validity.

Engagement in Academic Work. The Engagement in Academic Work questionnaire (Miller, 1996) is a self-report measure that assesses student goals that may be related to student achievement and engagement in academic work. The questionnaire is comprised of 83 items that assess the following variables: (a) goals for doing academic work in class; (b) self-perceptions of ability in class; (c) persistence when faced with difficult problems in class; and (d) effort compared with other classes. Each item is rated by the student using a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree), indicating students' level of academic

Procedures

Data collection took place in the Fall semester of 2008 during a ten-week period. Following approval from the Institutional Review Board, participants were recruited by posting a description of the study on the internet at the campus Experimetrix website. Experimetrix is an established computerized sign-up system that is hosted and maintained by NCSU-affiliated personnel, and allows for participants to anonymously sign-up for on-campus experiments. All data collection sessions were conducted in rooms located within the
College of Humanities and Social Sciences. Participants completed the Implicit Theories of Intelligence Scale, The Achievement Goal Measure, the Self-Handicapping Scale, and subscales from the Engagement in Academic Work Measure in groups of approximately 15-20 people.

Even though all participants were encouraged to read the informed consent form, several major points were reiterated prior to questionnaire completion in order to guarantee that participants were fully aware of their rights during the introduction to the study. Specifically, the experimenter read instructions to each group of participants from a prepared script (see Appendix B) that emphasized: (a) the nature and purpose of the study, (b) students’ rights as participants, (c) confidentiality of information, and (d) the maintenance of students’ anonymity. Participants were reminded that their participation in the study was completely voluntary and any information they provided would be held confidentially.

After the instructions had been read, the surveys were distributed and participants were asked to complete them. Once the participants completed all measures, the investigator read a debriefing statement explaining the purpose of the study and provided the phone numbers of all lead investigators in case they had follow-up questions and concerns. Students were reminded that their final course grade would be obtained from their instructor and assured that their course grades and responses would be coded by participant number and stored in a cabinet accessible only to research members.
CHAPTER FIVE: RESULTS

This chapter describes the data analysis procedures and findings for the present study. All statistical procedures were conducted using the SPSS statistical program (version 15.0) published by SPSS, Inc. Descriptive statistics are presented first, followed by the results corresponding to each of the research questions and hypotheses. Additional post hoc analyses are reported when appropriate.

Descriptive Statistics for Primary Measures

Table 3 provides the means, standard deviations, and range of scores for each measure used in the present study.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Range of Obtained Scores</th>
<th>Range of Possible Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory of Intelligence Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incremental Theory</td>
<td>3.49</td>
<td>0.31</td>
<td>1-6</td>
<td>1-6</td>
</tr>
<tr>
<td>Entity Theory</td>
<td>4.07</td>
<td>1.07</td>
<td>1.25-6</td>
<td>1-6</td>
</tr>
<tr>
<td>Achievement Goal Measure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mastery Goal Orientation</td>
<td>2.27</td>
<td>0.64</td>
<td>1-4.17</td>
<td>1-6</td>
</tr>
<tr>
<td>Performance Approach Orientation</td>
<td>2.33</td>
<td>0.67</td>
<td>1-4.33</td>
<td>1-6</td>
</tr>
<tr>
<td>Performance Avoidance Orientation</td>
<td>2.64</td>
<td>0.71</td>
<td>1.33-4.83</td>
<td>1-6</td>
</tr>
<tr>
<td>Self-Handicapping Scale</td>
<td>57.53</td>
<td>10.08</td>
<td>31-87</td>
<td>25-125</td>
</tr>
<tr>
<td>Engagement in Academic Work</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3 Continued

<table>
<thead>
<tr>
<th>Measure</th>
<th>Attitude toward Psychology</th>
<th>Effort</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>26.75</td>
<td>4.87</td>
<td>13-36</td>
<td>8-40</td>
</tr>
<tr>
<td></td>
<td>9.62</td>
<td>2.08</td>
<td>5-15</td>
<td>5-15</td>
</tr>
</tbody>
</table>

Previous studies have used students’ scores to place them into categories in terms of their theory of intelligence and the type of academic goals they tend to adopt. Tables 4 and 5 show the frequency and percent of students falling into the classifications for Dweck’s Theory of Intelligence Scale and Elliot’s Achievement Goal Orientation Measure.

Table 4

*Number and Percent of Students Falling Into Dweck’s Classifications for Theory of Intelligence*

<table>
<thead>
<tr>
<th>Theory of Intelligence</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incremental Theorists</td>
<td>94</td>
<td>62</td>
</tr>
<tr>
<td>Entity Theorists</td>
<td>29</td>
<td>19</td>
</tr>
<tr>
<td>Middle (Neither Entity or Incremental)</td>
<td>29</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>100</td>
</tr>
</tbody>
</table>

Note. Students were classified as Incremental Theorists when scoring 4.0 or higher, and classified as Entity Theorists when scoring 3.0 or lower.
Table 5
Number and Percent of Students Falling into Elliot’s Classifications for Achievement Goal Orientation

<table>
<thead>
<tr>
<th>Achievement Goal Measure</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mastery Goal Orientation</td>
<td>57</td>
<td>38</td>
</tr>
<tr>
<td>Performance Approach Orientation</td>
<td>52</td>
<td>34</td>
</tr>
<tr>
<td>Performance Avoidance Orientation</td>
<td>29</td>
<td>19</td>
</tr>
<tr>
<td>Nonclassified</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>100</td>
</tr>
</tbody>
</table>

Note. Students were placed into an achievement goal orientation based on their lowest mean score. Students were not classified into a goal orientation if they had identical mean scores on their two lowest goal orientation scales.

Table 6 presents the intercorrelations among study measures.

Table 6
Correlations Among Key Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Incremental</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Entity</td>
<td>-.739**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Performance Avoidance</td>
<td>-.092</td>
<td>-.006</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Performance Approach</td>
<td>.081</td>
<td>-.122</td>
<td>.084</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Mastery</td>
<td>.309**</td>
<td>.175*</td>
<td>.096</td>
<td>.203*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Effort</td>
<td>.173*</td>
<td>.055</td>
<td>-.106</td>
<td>.107</td>
<td>.331**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Perception of Ability in Psychology</td>
<td>-.043</td>
<td>-.055</td>
<td>.245**</td>
<td>.375**</td>
<td>.266**</td>
<td>.056</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Self-Handicapping</td>
<td>-.143</td>
<td>-.084</td>
<td>.085</td>
<td>-.060</td>
<td>.007</td>
<td>-.241**</td>
<td>-.127</td>
<td></td>
</tr>
</tbody>
</table>
\begin{tabular}{|c|c|c|c|c|c|c|}
\hline
& & & & & & \\
9. Final Course Grade & -.049 & .007 & -.253** & .184* & .014 & .074 \\
& & & & & & .318** & -.146 \\
\hline
\end{tabular}

Note. Several measures were reverse coded (e.g., Theory of Intelligence Measure, Achievement Goal Orientation subscales, and the Perception of Ability in Psychology Measure) because measures were initially administered as written by their authors. However, measures were reverse coded according to the direction that would more clearly communicate the relationships that exist between measures. *p < .05, **p < .01

\textit{Research Questions and Hypotheses}

Six research questions were posed in this study. This section presents the results organized by research question and the hypotheses related to each research question.

\textit{Research Question One: University Students’ Theories of Intelligence}

Research Question One pertained to the theory of intelligence endorsed by each student. Of interest were the percentage of students who endorsed an incremental view of intelligence or an entity view of intelligence. The results pertinent to Research Question One were presented in Table 4 above. Similar to Dweck et al. (1995), the present study found that 19% of students obtained scores that could not be put into either theory of intelligence classification. According to Dweck et al., respondents in previous research have tended to be evenly divided between the two classifications and this pattern was expected in the present study. However, the majority of students who could be classified in the present study obtained scores that indentified them as incremental theorists. To test whether this proportion of students endorsing the incremental theory differed from the expected 50 percent, a chi-square goodness-of-fit analysis was performed. The sample in the present
study did not fit the expected pattern, \( \chi^2 = 38.53, df = 1, N = 120, p = 0 \) This difference between present and past study results and its possible impact on the findings in the present study will be addressed in the Discussion section.

**Research Question Two: Relationship of Theory of Intelligence to Achievement Goal Orientation**

Research Question Two explored whether students’ theory of intelligence classification was related to their achievement goal orientation. Hypotheses 2.1 predicted that incremental theorists would be more likely to utilize mastery and performance approach goals rather than performance avoidance goals. Hypothesis 2.2 predicted that entity theorists would be more likely to utilize performance avoidance goals rather than mastery and performance approach goals. Both hypotheses were tested in a single chi square to determine the relationship between students’ theory of intelligence and their achievement goal orientation.

Hypotheses 2.1 and 2.2 were not confirmed. Although Incremental theorists were more likely to endorse Mastery (36%) and Performance Approach goals (38%), relative to Performance Avoidance goals (20%), a significant relationship between theory of intelligence and goal orientation was not observed, \( \chi^2 = .365, df = 2, N = 111, p = .833 \). A similar pattern was observed for entity theorists.
Table 7

Number and Percent of Students Classified by Theory of Intelligence falling into each Achievement Goal Orientation by Theory of Intelligence

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mastery</th>
<th>Performance Approach</th>
<th>Performance Avoidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incremental</td>
<td>34(36%)</td>
<td>36(38%)</td>
<td>19(20%)</td>
</tr>
<tr>
<td>Entity</td>
<td>8(31%)</td>
<td>8(31%)</td>
<td>6(23%)</td>
</tr>
</tbody>
</table>

Research Question Three: Relationship of Theory Intelligence to Students’ Use of Self-Handicapping Strategies

Research Question Three was concerned with whether students’ theory of intelligence predicted their use of self-handicapping strategies. Hypothesis 3.1 predicted that students endorsing an entity theory of intelligence would report using more self-handicapping strategies than students endorsing an incremental theory of intelligence. A one-way analysis of variance, with theory of intelligence classification as the independent variable and SHS score as the dependent variable revealed that the use of self-handicapping strategies in students did not differ for students endorsing an incremental or entity theory of intelligence (Table 8). Therefore, Hypothesis 3.1 was not confirmed, [F (1, 151) = .016, p>.05].

Research Question Four: Relationship of Achievement Goal Orientation to Students’ Use of Self-Handicapping Strategies

Research Question Four was concerned with whether students’ goal orientation would predict their use of self-handicapping strategies. Hypothesis 4.1 predicted that students endorsing a performance avoidance goal orientation would report using more self-
handicapping strategies than students with a mastery or performance approach goal orientation. The mean SHS score for students endorsing a performance avoidance goal orientation did not differ significantly from the mean SHS scores for students endorsing either a mastery or performance approach goal \([F, (1,137 = .535 p>.05]\).

Table 8

*Mean SHS Score by Students’ Theory of Intelligence and Goal Orientation*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theory of Intelligence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incremental</td>
<td>68.68</td>
<td>10.64</td>
</tr>
<tr>
<td>Entity</td>
<td>68.96</td>
<td>10.98</td>
</tr>
<tr>
<td><strong>Goal Orientation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mastery and Performance Approach Orientation</td>
<td>68.09</td>
<td>11.32</td>
</tr>
<tr>
<td>Performance Avoidance Orientation</td>
<td>70.89</td>
<td>9.06</td>
</tr>
</tbody>
</table>

*Research Question Five: Relationship of Perception of Ability in Psychology to Students’ Use of Self-Handicapping Strategies*

Research Question Five examined whether the Perception of Ability in Psychology subscale predicted students’ use of self-handicapping strategies. Hypothesis 5 predicted that students classified as having a performance approach orientation and high perceptions of
ability would report using less self-handicapping strategies than students classified as having a performance approach and a low perception of ability.

In order to determine whether this relationship existed, a median split was conducted to classify performance approach students as high or low in terms of their perception of ability. Then, a one-way analysis variance was conducted, with performance approach students with high ability as the independent variable and students’ use of self-handicapping strategies as the dependent variable. The means for students endorsing a performance approach orientation did not differ significantly in terms of their use of self-handicapping strategies. Therefore, Hypothesis 5 was not confirmed, \[ F (1, 65) = .706 \ p > .05 \].

Research Question Six: Course Grades and Students’ Theory of Intelligence

A final question of interest was whether there was an association between students’ theory of intelligence and their course grades. Hypothesis 6 predicted that students endorsing an incremental theory of intelligence would earn higher grades than students endorsing an entity theory of intelligence at the end of the semester. This hypothesis was not confirmed. In a one-way ANOVA, students endorsing an incremental theory of intelligence did not differ from students endorsing an entity theory in terms of their course grades \[ F (1, 119) = 0.387 \ p > .05 \]. However, results were in the intended direction in that the mean grade point average for incremental theorists was 3.24 and the mean grade point average for entity theorists was 2.7.
Additional Analyses

The analyses that tested the predicted relationships among Dweck’s model components were nonsignificant. However, as previously mentioned, many students were not classified as incremental or entity theorists because their scores fell in the middle, and few students were classified as entity theorists. Both of these factors decreased study power. To increase power, additional analyses were done where theory of intelligence was treated as two continuous variables (extent to which a person holds entity beliefs and extent to which a person holds incremental beliefs) rather than a categorical variable to see if some of the predicted relationships would be found. Additionally, relationships among model components that would be predicted by Dweck’s model, but were not specifically tested by the present study’s hypotheses were also examined when incremental and entity theories were treated as continuous variables.

To examine the unique variance that Dweck’s model components contributed to students’ final course grades, a hierarchical linear regression analysis was conducted. In the first step, age and gender were entered as control variables and together they accounted for only a small, nonsignificant amount of variance. In the second step, theory of intelligence, achievement goals, self-handicapping, effort, and perception of ability were entered as predictor variables and together they accounted for about 18 percent of the variability in student grades. The extent to which students endorsed performance avoidance goals and a positive perception of ability in psychology made significant and unique contributions to the variability in students’ final grades. Table 9 shows the results of the linear regression
analysis for students’ final course grades with Dweck’s model components as the predictor variables.

Table 9

Results of Linear Regression Analysis Examining Predictors of Students’ Final Course Grades

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
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Reexamining hypotheses. When the four hypotheses that included theory of intelligence were retested, one was confirmed. Hypothesis 2.1 predicted that students with the incremental theory of intelligence would be more likely to endorse the mastery goal orientation. When both the incremental theory of intelligence and the mastery goal orientation were treated as continuous variables, there was a positive relationship between the mastery goal orientation and the incremental view of intelligence ($r (150) = .309, p < .01$).

Hypotheses 2.2, 3, and 6 were also reexamined, but were not confirmed with this new analysis strategy. Performance avoidance goals, self-handicapping, and grades were not related to students’ theory of intelligence (see Table 6).

Relationships consistent with Dweck’s model, but not previously tested. The extent to which student effort was related to the incremental theory of intelligence in the context of a Psychology course was examined. According Dweck’s motivation model, incremental students tend to believe that intelligence can be improved through hard work and effort (Dweck, 1995). When both the incremental theory of intelligence and the effort subscale were treated as continuous variables, there was a positive relationship between the incremental theory of intelligence and students’ academic effort, ($r (150) = .173, p < .05$). This
pattern of results suggests that there may be a relationship between student effort and the incremental theory of intelligence.
CHAPTER SIX: GENERAL DISCUSSION

One of the most widely cited models of the role of motivation in academic achievement is the social cognitive theory proposed by Carol Dweck and elaborated upon by other researchers working in the same area (Elliot, 1997; Elliot & Church, 1997; Elliot & Harackiewicz, 1996). Dweck’s model proposes multiple cognitive constructs underlying academic motivation and then makes several predictions about the relationships between these cognitive constructs, student behavior, and learning outcomes. Specific components of this model include students’ theory of intelligence, the academic goals they set, their perceptions of academic ability, and academic behaviors.

Although Dweck presents a rather complete and detailed theory, research linking all components of Dweck’s motivation model is scarce. The bulk of the research has examined relationships among only two or three components (e.g., theory of intelligence and academic behavior). Additionally, few studies have been conducted that test students’ theory of intelligence coming into an academic situation without manipulating their cognitions about intelligence in any way.

The goal of the present study was to increase empirical knowledge about students’ academic motivation by examining the relationships among the major components of Dweck’s motivation model and their relationship with student outcomes in a real world context. Specifically, students enrolled in a university psychology course completed multiple questionnaires assessing the major components of Dweck’s model. Predictions that were derived from Dweck’s model were then tested, including how well these motivational
constructs predicted student outcomes. The present study is one of the first to simultaneously examine variables drawn from each of the four major components of the social cognitive model of motivation, including constructs added to the model (e.g., perceived academic confidence; performance avoidance) by other social cognitive researchers (Elliot & Church, 1997).

The study posed six hypotheses based on Dweck’s social cognitive model of academic motivation. These hypotheses were concerned with the distribution of the two theories of intelligence (H1) in the population, the relationship between theory of intelligence and the achievement goals students set (H2), the relationship of theory of intelligence to self-handicapping strategies (H3), the relationship of achievement goals to self-handicapping strategies (H4), the relationship of perception of ability in psychology to self-handicapping strategies among students who adopt a performance approach (H5), and the relationship of theory of intelligence to grades (H6).

None of the six hypotheses were confirmed. Except for H1, which was concerned with the distribution of entity and incremental theorists in the student population, the remainder of the hypotheses examined predicted relationships among theory components. In each of these hypotheses, the findings did not disconfirm the theory, but statistical significance was not achieved. In this chapter, possible reasons for the failure to find support for Dweck’s model in the present study will be discussed. In addition, post hoc analyses confirmed some of the relationships among social cognitive constructs, study behaviors, and outcomes predicted by Dweck, and these findings will be discussed. Following this major
section, limitations, directions for future research and implications of the study will be presented.

Why Were Hypotheses Not Confirmed?

There are two broad classes of reasons why the present study failed to confirm the six hypotheses posed. First, it is possible that aspects of the study’s design or aspects of the current sample contributed to the failure to find support for Dweck’s motivation model. Second, it is also possible that the ways in which specific components of Dweck’s model and their interrelationships have been portrayed in the research literature are not correct and therefore, the predictions made in the present study were based on a faulty model that needs to be modified somewhat. Both possibilities for failure to confirm the proposed hypotheses are discussed in this section, with problems with the present study’s design considered first and aspects of Dweck’s model considered second.

Aspects of the Present Study Contributed to the Failure to Confirm the Hypotheses

The study design might have contributed to the failure to find the predicted effects. Among the possible aspects of the present design to be discussed here are the choice to assess theory of intelligence in a real-world setting, restriction in individual differences in academic motivation in the sample due to similarities among students included in the study, failure to control for students’ prior knowledge, and use of a single response format to assess aspects of Dweck’s motivational model.

Observing versus manipulating students’ theory of intelligence. As previously mentioned, few studies have tested students’ theory of intelligence in a naturalistic setting.
Instead, many research studies have manipulated or triggered students’ theory of intelligence in a laboratory setting (e.g., training students to adopt a particular theory of intelligence or providing negative feedback on a problem solving task). For example, Bandura and Dweck (1988) tested elementary aged students’ theory of intelligence and academic behaviors by providing a problem solving task in a laboratory setting and then providing negative feedback to each student about his or her performance. After providing the negative feedback, the researchers then found an even distribution of incremental and entity theorists and found that students’ beliefs about intelligence were related to goal orientation, concerns about failure, and preference for challenging tasks. Similarly, Hong et al. (1999) administered a 90-item abstract reasoning task (students were told it was an intelligence measure) where negative feedback was given to participants indicating they performed poorly on the task regardless of students’ actual performance. Again, the authors found an even distribution of entity and incremental theorists when each student was given the theory of intelligence measure after the contrived feedback. Additionally, academic setbacks (e.g., feedback indicating poor performance) were experienced differently, with entity theorists who received negative feedback about their performance attributing failure to ability and incremental theorist attributing their performance to lack of effort. Given the success of these studies in finding the predicted relationships, perhaps some type of failure feedback or manipulation of theory of intelligence is needed to replicate Dweck’s distributions of entity and incremental theorists, and induce the predicted relationships among model components.
In the present study, no manipulations were done to elicit a particular theory of intelligence. Instead, participants’ theories of intelligence were measured early in the semester. It may be that it is more difficult to replicate Dweck’s findings in real world contexts when compared to laboratory settings. Perhaps it takes specific kinds of experiences for students to endorse the entity theory of intelligence and to observe the significant contrasts between entity and incremental students outlined in Dweck’s motivation model. If this is the case, it may explain why most students in the present sample were incremental theorists, rather than the even distribution between entity and incremental theorists that has been found in previous research studies (H1). The uneven distribution of incremental and entity theorists weakened the power of the study to find many of the predicted relationships. For example, only 19 percent of the students sampled were identified as entity theorists, which made it more difficult to detect the predicted relationships among Dweck’s model components. Although the present study failed to confirm the proposed relationships between model components, it may present a more accurate picture of how theory of intelligence operates in real-world contexts.

*Similarities in academic course and university setting.* Another broader issue to be considered with the design used in the present study is that all of the students sampled were enrolled in sections of the same psychology class with similar academic expectations and grading criteria. It is possible that factors that were specific to the particular psychology course or academic setting where the study took place were responsible for the failure to find the predicted relationships between theory of intelligence and students’ use of more
advantageous learning goals. For example, related to (H2.1) all the classes had similar grading requirements where the students were typically tested using a multiple choice format. Thus, students may not have adopted the more advantageous learning goals that Dweck has described (e.g., analyzing information and application of course material) because the testing format largely required only lower level types of learning such as memorization of factual knowledge. It is possible that more varied learning goals as proposed by Dweck’s motivation model would have been reported if different types of courses from other academic disciplines with varied ways of testing student knowledge had been utilized. For example, Greene and Miller (1996) conducted studies measuring students’ level of cognitive engagement (e.g., students’ ability to relate new material to prior knowledge, number of completed homework assignments, and students’ ability to organize course information) in a course with broad range of learning tasks. The authors utilized measures examining whether students used shallow (e.g., memorizing definitions, writing exactly what the professor says, memorizing study guide answers) or meaningful (e.g., summarizing new material in own words, deep analysis of course material) cognitive engagement strategies prior to taking an exam. Students’ achievement goals and perceptions of ability were positively related to reports of meaningful cognitive engagement. Courses requiring students to utilize varied learning strategies and that assess students’ mastery of course material using varied methods may have helped to better detect the relationships among Dweck’s model components. In the present study the relationships that were predicted between students endorsing mastery goals and their identification as an incremental theorist in terms of higher grades and the use
of more advantageous study strategies were not found. Perhaps asking students about their study goals and use of study strategies while enrolled in a course or courses with assignments that encouraged students to utilize deeper cognitive processes would have made it easier to detect the proposed relationships among model components.

Similarly, it is important to note that all of the students sampled were enrolled at the same university, a large university with a technical focus. University settings vary in size, competitive emphasize, and student population. These factors may affect the types of students who select that setting or the academic climate may vary in the ways that affect students’ beliefs about intelligence. Had the study been conducted in a broader range of academic settings, the predicted relationships might have been observed, or different results might have been found in different university settings.

Universities are also embedded in a broader cultural context. Hong et al. (1999), in a study conducted at the University of Hong, found a positive relationship between theory of intelligence and more advantageous learning strategies in response to negative feedback. Specifically, they found that incremental students were more likely to take a remedial course after receiving negative feedback than entity students. The authors speculated that the relationship may have been observed because more effort-oriented beliefs are taught in Asian cultures. In sum, it is possible that the particular course format, university setting, and cultural context in which the present study was conducted contributed to the failure to find relationships among Dweck’s model components.
*Examining college setting as a transitional period.* Another broader design issue to be considered is the use of college students for the present study. Dweck (1999) has suggested that students may have an increased vulnerability to academic difficulty during transitional periods such as entering high school or college. Dweck proposed that some academic transitions may expose students to additional negative academic experiences which may cause a more negative interpretation of their academic ability due to more rigorous coursework and an increased emphasis on grades. For example, Leonardi and Gialamas (2002) sampled both elementary and high school students in order to examine some of the difference that might exist among different age groups. The authors found that elementary students were more likely to endorse an incremental theory of intelligence in comparison to high school students. The authors hypothesized that older students who were going through a more difficult transitional period would be more likely to endorse an entity theory of intelligence which is associated with more negative academic outcomes. In contrast, the present study found that the majority of students endorsed an incremental theory of intelligence. It is possible that students who have been accepted to college are more likely to endorse an incremental theory of intelligence due to the academic effort they have expended to gain entrance to college. After succeeding at this difficult task, they may feel less threatened and be more likely to adopt an incremental view of intelligence. Thus, students’ status as college students may have influenced the study results. Perhaps sampling students in different transitional periods (e.g., entry to high school) or age groups would have yielded results more in line with predictions from Dweck’s model.
Controlling for prior knowledge. Another aspect of the present study’s design to that may have led to the failure to find the predicted relationships among theory components is that measures of students’ prior knowledge (e.g., prior academic achievement or SAT scores) were not obtained. Obtaining information about student’s previous academic achievement in the current study may have allowed for a more sensitive examination of students’ theory of intelligence and final grades (H6) by controlling for the variability in students’ prior knowledge. For example, Dochy (1994) asserted that prior knowledge seems to account for between 30 and 60 percent of the variance in student achievement outcomes. If this is the case, then failing to control for prior knowledge may mask effects of motivation on outcomes. In fact, in many of the studies where a relationship between motivation and achievement outcomes has been found, prior knowledge has been controlled. For example, Aronson, Fried, and Good (2002) found that intervening with minority students and teaching a malleable view of intelligence resulted in improved student outcomes. However, the authors found that that the mean SAT scores of the students taught the malleability of intelligence were lower than the scores of students in control and fixed conditions. To control for differences in prior achievement, the authors conducted all analyses using student SAT as a covariate. When they did so, the authors found that students taught the incremental theory of intelligence reported more academic enjoyment, earned higher grades, and reported an increased identification with academics when compared to students who were not taught the incremental theory of intelligence. Perhaps controlling for students’ prior knowledge in
the present study would have reduced error variance making it easier to detect relationships among Dweck’s model components.

*Self–report versus multimethod design.* A final design issue to consider in the present study has to do with the use of self-report questionnaires to measure students’ theory of intelligence, academic goals, and study behaviors. The current study mainly focused on students’ self-reported perceptions of their theory of intelligence, academic goals, and use of self-handicapping strategies. For instance, in the failure to find a relationship between students’ goal orientation and their use of self-handicapping strategies in (H3), it is possible that students were exhibiting study behaviors (e.g., withdrawal of effort, staying up late prior to an exam, procrastination) that were consistent with Dweck’s motivation model. However, it is possible that the specific strategies students employed were not consistent with the behaviors measured by the self-handicapping scale and did not accurately characterize their study behaviors. If this is the case, a behavioral measure of study strategies might have detected self-handicapping. For instance, Dupeyrat and Marine (2005) conducted a study where they measured the number of voluntary homework assignments completed by students in addition to using self-reported measures of study behaviors. In this case, some students appeared to utilize self-handicapping strategies as indicated by their completing fewer voluntary homework assignments when they performed poorly.

Perhaps utilizing a multimethod design would have provided a broader picture of students’ beliefs about intelligence and their study behaviors. Gathering qualitative information from students in addition to the self report questionnaires used in the study may
have provided additional information about students’ cognitions about intelligence in the context of a college course and their impact on motivation. For example, Quihuis, Bempechat, & Boulay, (2002) incorporated student interviews in their study of academic motivation to examine whether students would communicate a particular theory of intelligence. Although interviews are also a self-report method, the less structured format may have added additional information about students’ theory of intelligence that could not be captured through a Likert scale questionnaire. In another study, Dweck (1993) asked students whether they would complete remedial work after receiving negative feedback on an academic task. The purpose was to gather additional evidence or another indicator of the student’s theory of intelligence, with incremental theorists being more likely to complete remedial tasks. Thus, utilizing mainly closed end self-report measures of student cognitions and behaviors may have made it more difficult to detect the hypothesized relationships.

In sum, several aspects of the study’s design possibly contributing to the failure to find the predicted effects have been presented. Failure to find the predicted relationships within Dweck’s motivation model may have been a result of the setting, course format, type of course, or type of assignment used in the present study. It is also possible that the use of more sensitive and varied measures of students’ academic behavior and controlling for students’ prior knowledge may have made the relationships within Dweck’s model easier to detect. In addition, low power due to small number of entity theorists may have contributed to the failure to confirm predicted results. Directions for future research based on some of the design issues that have presented will be addressed in a later section of the document.
Aspects of Dweck’s Model Contributed to the Failure to Confirm the Hypotheses

A second possibility is that a number of broader aspects related to the way in which Dweck’s model has been conceptualized might have contributed to the failure to find the predicted effects. That is, perhaps the observed findings in the present study were correct and the model is in need of revision. Among the possible aspects of the model that may be in need of reconsideration are the model’s portrayal of theory of intelligence as a categorical variable, the claim that entity and incremental theorists are equally distributed in the student population, the portrayal of student cognitions as being focused on global versus specific academic domains, and the particular sequencing of model components.

Is Dweck’s Portrayal of Theory of Intelligence Correct? The foundation of Dweck’s motivational model is theory of intelligence (Dweck, 1995). Dweck has portrayed theory of intelligence as a dichotomous, stable, global trait where about half of persons are entity theorists and half are incremental theorists. All other components of her model build on this central construct. If her characterization of this central construct is only partially correct, then it may change how all the components are interrelated.

There are some indications in this study and in the motivational literature that her initial portrayal of this construct may need modification. Of particular concern in the present study was the model’s characterization of all but a small minority of students as either entity or incremental theorists, but not both. In the present study, almost double the percent of students predicted by the social cognitive model had scores on the Theory of Intelligence scale that fell in the middle of the distribution, indicating they could not be classified into one
of the two theories of intelligence. Even those students that did meet the cut scores used in 
previous studies for classification as entity or incremental theorists had scores near the 
middle of distribution. This finding suggests that students may hold elements of both 
theories simultaneously and that perhaps scores should be treated as continuous, where 
students have more or less of an incremental theory of intelligence.

If scores on the theory of intelligence measure are treated as continuous, rather than 
classifying students as into one theory of intelligence or the other, then some of the 
relationships predicted in Dweck’s theory are found in the present study. For example, 
Dweck’s model predicts that students with an incremental theory of intelligence are more 
likely to set positive academic goals or fall within the mastery goal orientation when 
compared to students with an entity theory of intelligence.

In the present study, when theory of intelligence was recoded as a continuous variable 
a significant positive relationship was found between the incremental theory of intelligence 
and the mastery goal subscale, as predicted in Hypothesis 2. Similarly, Dweck’s model 
suggests that incremental theorists have more advantageous academic outcomes and would 
be more likely to expend additional effort if faced with an academic challenge. Again, when 
conducting additional analyses in the present study using theory of intelligence as a 
continuous variable, a significant relationship was found between the incremental theory of 
intelligence and amount of effort expended in a class. The fact that more predicted 
relationships were significant when theory of intelligence was treated as a continuous 
variable lends support to this alternative way of viewing theory of intelligence. Moving
towards viewing theory of intelligence as a more continuous variable in research, where students can endorse aspects of both viewpoints, may be a more precise way of characterizing students’ beliefs about intelligence and lead to the identification of new relationships among variables in Dweck’s model.

Another aspect of theory of intelligence that may need to be revisited is Dweck’s characterization of theory of intelligence as a stable trait. For instance, Dweck and others have reported the ways in which students’ theory of intelligence can be manipulated with intervention. As previously summarized in the literature review, Aronson et al. (2002) examined the impact of manipulating students’ theory of intelligence in order to improve academic achievement. In the experimental condition, students were asked to participate in a long distance pen pal program in which they would mentor an “at-risk” middle school student and given activities to do that prompted them to endorse an incremental theory of intelligence. Students in experimental condition viewed intelligence as more malleable and had better academic outcomes than the students in the control conditions indicating that the intervention had a lasting impact on student beliefs about intelligence. The fact that students’ theory of intelligence can be easily manipulated may indicate that students’ beliefs about intelligence are less stable than implied by Dweck’s model. If this is so, then manipulation may be needed to elicit entity theories and studying theory of intelligence in real life contexts will not produce the types of results predicted from experimental studies.

Another aspect of Dweck’s explanation of theory of intelligence within the model that may require further investigation is the way in which student behavior may vary depending
on the academic course. Dweck typically discusses theory of intelligence and other aspects of her model as more global student responses rather than more subject or domain specific. Students’ views on theory of intelligence and use of study behaviors may be very different in the context of a psychology course versus a math or English course. Thus, findings concerning academic behavior may vary according to the academic course. For example, Bempechat et al. (2002) found that students held different theories of intelligence across different academic areas. The authors speculated that students’ beliefs about intelligence based on academic area could be influenced by classroom context (e.g., teacher beliefs and competitive versus cooperative classrooms). Berg and Sternberg (1992) found that students may actually view intelligence differently in terms of verbal skills versus nonverbal abilities.

As previously mentioned, it may be more accurate to discuss the degree to which a student holds a particular theory of intelligence. Thus, either theory may be accessed depending on the student’s beliefs about a particular subject area. Perhaps the proposed relationships among model components (e.g., theory of intelligence and outcome grades or students’ goal orientation and theory intelligence) would have been found if the model included the consideration of academic domains and the possibility that relationships can be different in different academic domains.

In another study Burns and Isbell (2007) examined the differences that may exist among students identified as entity theorists in particular academic domains. The authors hypothesized that hold an entity theory may be beneficial to some in terms of their academic outcomes depending on whether they have a high or low perception of ability in a particular
academic area. The authors found that entity students who were highly skilled in math and were taught the fixed theory of intelligence tended to perform better on a difficult math task than incremental theorists taught the fixed theory of intelligence. The authors hypothesized that entity theorists who are already highly skilled in math and were taught about the fixed nature of math ability were actually reminded of their strong abilities which encouraged increased performance on a math task.

Again a broader examination of Dweck’s model that includes an examination of students’ perception of ability and specific academic domains may be needed to explore the relationships that have been proposed among Dweck’s model components. Thus, the proposed hypotheses in the present study may not have been confirmed due to a need to examine students’ perceptions of ability across multiple domains.

Alternative pathways. It is also possible that the relationships between model components may be different than those proposed in Dweck’s current motivation model (where students’ goals and study behaviors are determined by their theory of intelligence). For example, Gonida, Kiosseoglou, and Leonardi (2006) tested alternative pathways within aspects of Dweck’s model (e.g., theory of intelligence, perceptions of ability, and school achievement). The authors attempted to examine whether theory of intelligence was the consequence or cause of the students’ perceptions of ability and academic achievement. The authors sampled fifth and sixth grade students using the theory of intelligence measure, a perceived competence measure, and then gathered their grades in math and language arts in the first phase of the study. The same information was gathered again one year later in the
second phase of the study. The authors found that adoption of an entity or incremental theory of intelligence seemed to be determined by the outcome of students’ level of school achievement and perceived competence. In contrast, Dweck has asserted that students’ academic achievement and perceptions of ability are consequences or outcomes of their theory of intelligence. Thus, further research is needed testing alternative pathways using a longitudinal component within Dweck’s motivation model to better explain students’ academic outcomes and the relationships that may exist among model components. For example, the present study could have included a longitudinal component examining where student goals, study behaviors, and academic outcomes’ impact on changes in their theory of intelligence could have been examined.

Limitations

Although the failure to find the predicted results in the present study may suggest that the social cognitive theory of academic motivation is in need of some modification, it is important to recognize the study’s limitations. These limitations were detailed in the last section and included the use of a single university, students drawn from sections of only one course where all sections had similar course formats, and the use of college students rather than drawing students from a wide age range. Another limitation is the failure to control for students’ prior knowledge with measures such as their IQ or SAT scores. A final limitation of the current investigation that has already been discussed is the use of self-report questionnaires to measure student goals and academic behavior rather than using a multimethod design.
Directions for Future Research

Although some directions for future research have been addressed throughout this chapter, this final section will elaborate on future research directions that might enhance our understanding of student motivation and how constructs in Dweck’s model operate. Developing a better understanding of the process by which students approach academic tasks and set academic goals may help to better explain students’ achievement outcomes, and develop interventions to help students approach study tasks more productively.

As discussed earlier, several changes or additions might have led to a clearer set of findings in the present study. First, a more diverse set of courses requiring student knowledge to be displayed in different ways could have been examined. Broadening the study to include courses that test students’ knowledge through more diverse course methods would add to the understanding of students’ theory of intelligence and the academic behaviors they utilize in different learning contexts.

Second, to increase generalizability, sampling students from different age groups would add to the research examining aspects of Dweck’s motivation model. Future research studies examining Dweck’s motivation model among different age groups would provide a better understanding of the way in which different transitional periods impact students’ identification with a particular theory of intelligence, academic goal they set, and their academic behaviors.

Third, future research should examine Dweck’s model by exploring students’ perceptions of intelligence and study behavior through a multimethod design. Thus, future
studies could build upon the present study by conducting interviews that address students’ beliefs about intelligence, assessing the learning environment of the student, and collecting feedback from professors about the study behaviors of the students. Additionally, future studies should address Dweck’s assertion that differences in students’ behavior are most pronounced when students are faced with challenging situations or difficult tasks (Grant & Dweck, 1993). Conducting a longitudinal study that addresses this issue by collecting data about student behavior prior to and after completing difficult tasks may increase the possibility of detecting the relationships among Dweck’s model components.

Fourth, another issue to be considered in future studies is related to the concern about theory of intelligence as a continuous versus categorical variable and the predicted distribution of theory of intelligence. In the present study, the majority of students obtained scores on the theory of intelligence measure indicating they held an incremental theory of intelligence. Although the scale that was used to place students into the incremental or entity categories yields a continuous score, this score is then converted into a categorical variable. It may be that when students are forced into a particular category within a real world context, students tend to fall in the incremental category. As previously mentioned when looking at the distribution, more students than would have been predicted by Dweck’s model fell in the middle (e.g., were not placed into the incremental or entity categories) and were identified as incremental theorists which reduced the present study’s power. Thus, future research studies should be conducted in real world contexts and consider the possibility of viewing theory of intelligence as a continuous variable.
Finally, as mentioned earlier, failure to find support for the hypothesized relationships between Dweck’s model components raises many questions about students’ beliefs about intelligence and the ways in which their beliefs impact academic achievement in natural contexts rather than experimental settings. Studies are needed to further examine Dweck’s model in natural contexts as well as exploring alternative pathways to student achievement.

**Implications**

In summary, the present study adds to the few studies that have been conducted examining Dweck’s model in a naturalistic setting. The results of the present study have limited practical implications because: (a) the hypotheses that were presented were not confirmed, and (b) the correlational nature of the study does not allow causal inferences so that even positive results would have simply been an indication that intervention research might yield promising results.

In follow-up analyses, two variables were significantly related to student grades, the performance approach orientation was positively related and the performance avoidance orientation was negatively related to grades. Grades were not related to whether or not students held an incremental theory of intelligence as predicted (H6) by Dweck’s motivation model. Due to the importance of students’ academic outcomes, it is possible that more emphasis should be placed on examining the relationships between students’ goal orientation and their academic achievement. The results of the present study indicate that students’ academic goal orientation may play a more important role in student grades than the way in which students view intelligence. According to Dweck, the performance approach goal
orientation is associated with students wanting to achieve positive academic outcomes relative to their peers, while the performance avoidance orientation is associated with utilizing more negative or avoidant strategies in effort to avoid appearing incompetent. Perhaps some students have better academic outcomes in more competitive learning environments. It is also possible that the type of course and the course format (e.g., multiple choice exams) in the present study was a more advantageous environment for students with a performance approach goal orientation. The results in the present study seem to support Dweck’s model in that there was a negative relationship between the performance avoidance goal orientation and the student grades. The fact that students with a performance avoidance orientation received lower grades seems to indicate that this is an important area for further intervention research. Interventions could be targeted for performance avoidant students in the areas of test anxiety, effort withdrawal, and procrastination.

Another implication of the present study is that the way in which theory of intelligence is measured may have important consequences for future research studies. When theory of intelligence was treated as a continuous variable, a significant relationship was found between the incremental theory of intelligence and students’ academic effort. Dweck’s model suggests that incremental theorists have more advantageous academic outcomes and would be more likely to expend additional effort if faced with an academic challenge. According to the results that have been presented, when theory of intelligence was treated as a continuous variable, students holding an incremental theory of intelligence seemed to display more advantageous outcomes in terms of academic goals and effort.
Future research studies should take into account the way in which students are classified when using the theory of intelligence measure. Rethinking theory of intelligence as a more continuous variable may provide a more critical analysis of Dweck’s motivation model in future research studies and broaden possibilities for the use of the model in real world contexts.

In closing, failure to find support for Dweck’s motivation model in the present study points to the complexity of understanding students’ beliefs about intelligence and academic outcomes. Educators must consider the possibility that students may possess very different attitudes about intelligence depending on the academic context. Students may view aspects of their intelligence in certain contexts as fixed, while viewing other areas as malleable. The present study suggests that students’ academic behavior is complex in nature within a naturalistic setting, not always conforming to how it is portrayed in models primarily derived from studies in more controlled settings. It is likely that student achievement and its determinants cannot be fully addressed without considering learning context, and the cognitions and study behaviors elicited in that context.
REFERENCES


Crick, N.R. & Dodge, K.A. (1994). A review and reformulation of social information-


underexplored aspect of goal theory. *Journal of Educational Psychology*, 89 (4), 710-718.


APPENDIX A

Demographic Information

Please answer the following questions. Your responses will be kept confidential.

1. ID #: 

2. Age (in years): 

3. Gender: 
   A  Male  
   B  Female  

5. Ethnic Origin: 
   A  African American/Black  
   B  American Indian  
   C  Asian/Pacific Islander  
   D  Hispanic/Latino/Latina  
   E  White  
   F  Other  

6. Major: 

7. Year in College: 
   A  1\textsuperscript{st} year  
   B  2\textsuperscript{nd} year  
   C  3\textsuperscript{rd} year  
   D  4\textsuperscript{th} year  
   E  5\textsuperscript{th} year  
   F  6\textsuperscript{th} year  

8. Current GPA: 


Title of Study: Understanding the Relations Between Students’ Beliefs about Intelligence, Academic Goals, Study Behavior, and Achievement in the Context of a College Course: An Analysis of Dweck’s Academic Motivation Model

Principal Investigator: Joylynn T. Miller, M.S.  
Faculty Sponsor: Ann Schulte, Ph.D.

The primary purpose of this study is to understand students’ academic motivation in the context of a college course.

INFORMATION
Participants will be asked to complete a packet of self-report surveys once during the academic semester. The estimated time for the session during the semester is approximately 30 minutes.

RISKS
Because the procedures involve a self-report format, it is believed that the methodology will cause minimal potential risk to participants. However, students will be asked to provide information about their academic behavior and reactions to professor grades and feedback twice during the semester. Additionally, the researcher will obtain permission to access students’ final grades from their instructor. To ensure students feel comfortable providing personal academic information, several precautions will be taken. Student responses will be coded by participant number and stored and locked in a cabinet that is accessible only to research members. Individual student responses will not be shared with teaching staff. Only group results will be shared a semester after grades have been awarded. Students will be informed that their participation is entirely voluntary and they may withdraw from the study at any time without a negative effect on their course grade.

BENEFITS
Your participation in this study will provide beneficial information about student motivation, how it influences academic behavior, and responses to academic success and failure in the context of a college course.

CONFIDENTIALITY
The information in the study records will be kept strictly confidential. Data will be stored securely and will be made available only to persons conducting the study unless you specifically give permission in writing to do otherwise. No reference will be made in oral or written reports that could link you to the study.

COMPENSATION
There will be no compensation for participation in this research study.

CONTACT
If you have questions at any time about the study or the procedures, you may contact the researcher, Joylynn T. Miller at (919) 389-0448. If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Dr. David Kaber, Chair of the NCSU IRB for the Use of Human Subjects in Research Committee, Box 7906, NCSU Campus (919/515-3086) or Mr. Matthew Ronning, Assistant Vice Chancellor, Research Administration, Box 7514, NCSU Campus (919/513-2148)

PARTICIPATION
Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed your data will be returned to you or destroyed.

CONSENT
I have read and understand the above information. I have received a copy of this form. I agree to participate in this study.