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The Relation of Theory of Intelligence to Academic Motivation and Academic Outcomes

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THE FLORIDA STATE UNIVERSITY
COLLEGE OF EDUCATION

THE RELATION OF THEORY OF INTELLIGENCE TO ACADEMIC MOTIVATION AND
ACADEMIC OUTCOMES

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This work is dedicated to my mother and kindred spirit, Andrea, who always told me that I had the potential to do anything, and whose love, encouragement, teaching, and wisdom made me who I am today.

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ABSTRACT

Motivational research attempts to clearly conceptualize the construct of motivation, measure it effectively, use the results to enhance student learning and success, and possibly make predictions about achievement. It has been proposed that core beliefs related to the nature of intelligence can determine one's response to challenges or setbacks and one's motivation level. The relationship between these constructs of motivation, theories of intelligence, and achievement has not been widely researched, and a clearer understanding in this area could help researchers, teachers, and parents use theories of intelligence to enhance achievement in students. This study explored a possible dimension of motivation, theory of intelligence, and examined 1.) the impact of theory of intelligence on academic motivation and achievement, 2.) the relationship between theory of intelligence and goal orientation (mastery vs. performance goals), and 3.) whether children's theories of intelligence tend to match those of their parents. Findings showed that motivation predicted GPA, that no direct relationship existed between theory of intelligence and achievement, that an incremental theory of intelligence predicted performance goals, and that parent theory of intelligence predicted child theory of intelligence.

CHAPTER 1

INTRODUCTION

Theory of intelligence (also referred to as implicit theory of intelligence) and goal orientation have been shown to have effects on academic motivation and academic achievement. However, the precise impact of a learner's theory of intelligence and goal orientation is not clearly understood, and research findings have not been consistent. This study aims to more clearly understand the potential relationship between theory of intelligence, goal orientation, academic motivation, and academic achievement. A better understanding of the relation of these constructs could, ultimately, lead to the development of applied methods for enhancing motivation, and in turn, achievement.

Motivation is a complex construct and can have many facets, such as persistence, ambition, goal orientation, and self-perceptions. Motivation has been linked to achievement, but achievement cannot be improved until the facets of and factors underlying motivation are understood. Motivation research can give us clues as to why some people succeed at tasks, the reasons why some people give up easily or some persist, and ways to encourage motivation. Alderman (2004) writes that motivation can impact the development of one's potential to be successful in life. Motivation remains an important area of study, even after decades of previous work, because the effects of motivation, or lack thereof, can be great.

Dweck (1986) describes patterns of motivation that are adaptive and maladaptive. The study of motivation sheds light on maladaptive patterns, their causes, and how to ameliorate them. Maladaptive patterns, according to Dweck "are associated with a failure to establish reasonable, valued goals, or, ultimately, to attain valued goals that are potentially within one's reach" (1986, p. 1040). Many researchers believe that achievement behavior is affected by motivational patterns (Dweck, 1986). Those with maladaptive motivational patterns avoid challenge and show low persistence when difficulties arise. Children with these patterns often show a negative affect and negative self-cognitions related to obstacles (Ames, 1984; Dweck, 1986). While children with differing patterns may have the same intellectual ability, maladaptive patterns can put

children at a disadvantage in regard to the acquisition and display of cognitive skills when they experience challenges or setbacks (Dweck, 1986).

Dweck (1999) believes that people's beliefs about themselves affect their motivation and performance. She is one of the main researchers in the area of theories of intelligence, or individuals' views about their intelligence—whether it is seen as something that is fixed that cannot ever change or whether it is something that can change and improve with learning and effort. She posits that students' theories of intelligence predict school achievement. Dweck (1999) states, "A belief in fixed intelligence raises students' concerns about how smart they are, it creates anxiety about challenges, and it makes failures into a measure of their fixed intelligence. It can therefore create disorganized, defensive, and helpless behavior" (p. 37). Dweck (2006) also believes that one's theory of intelligence (also referred to as mindset) affects his or her level of motivation and that many of these theories may be influenced by the messages received from those in the students' environments.

One possible way that theory of intelligence affects achievement is through achievement goals. These goals can be learning goals that focus on mastery of a task or performance goals that place an emphasis on demonstrating competence or ability to others. Dweck (1999) states that theories of intelligence cause students to adopt different goals. Some studies have found that students with an entity/fixed theory of intelligence were more likely to adopt a performance goal, while students who had an incremental/growth theory of intelligence tended to adopt learning goals. Dweck & Sorich (1999) found a strong connection between students' theory of intelligence and achievement goals and also found that these factors predicted achievement.

One area that requires more in-depth study is the development of children's theories of intelligence and the role that parents/caregivers play in this. Little research exists in this area related to motivation, and more knowledge of the development of theories of intelligence could help researchers, teachers, and parents develop methods of encouraging the most effective theories of intelligence.

Statement of the Problem

Clearly, understanding motivation, achievement, and the factors that affect these constructs is complicated. Identifying how and why a person achieves at an optimal level continues to challenge researchers. There has been a great deal of research conducted related to each of the main constructs (motivation, achievement, theory of intelligence, and achievement goals); however, the relationships among them continues to remain unclear, and further research would benefit our understanding of these relationships.

There have been inconsistent findings in the area of achievement goals and achievement outcomes (Dweck & Leggett, 1998; King, McInerney, & Watkins, 2012). Some studies have found that mastery goals relate to better academic performance (Farrell & Dweck, 1985; Kaplan & Middleton, 2002; Midgley, Kaplan, & Middleton, 2001) while other studies have found that performance goals have led to positive academic outcomes (Elliot, 1999; Harackiewicz, Barron, and Elliot, 1998; Harackiewicz, Barron, Pintrich, & Thrash, 2002; Pintrich, 2000). The relationship between theories of intelligence and achievement is also unclear—is it a direct relationship? Are there mediating factors, such as achievement goals? Many theories that attempt to explain achievement outcomes do not seem to include motivation as its own construct or as a possible intermediary to achievement. If achievement goals are not mediators between theories of intelligence and achievement, are theories of intelligence directly related to achievement, and, if so, could this indicate that theory of intelligence is a facet of motivation?

With a clearer understanding of how these constructs relate, researchers and educators could work together to help foster the most effective goals and mindsets in children to lead to optimal achievement. Also, with more information on how theories of intelligence are formed, parents and teachers could help children to develop the most effective mindset to foster learning and achievement.

Research Questions and Hypotheses

Research questions explored in the present study include:

- 1.) What impact does theory of intelligence have on academic motivation and achievement?
- 2.) What is the relationship between theory of intelligence and goal orientation (mastery vs. performance goals)?
- 3.) Do children's theories of intelligence tend to match those of their parents? What is the strength of the relationship between child and parent theories of intelligence? (Do parents' theories of intelligence influence those of their children?)

Based on current knowledge about these variables, it is hypothesized that

- 1.) Academic motivation will act as a mediator between theory of intelligence and academic achievement
- 2.) An incremental theory of intelligence will predict mastery goal orientation
- 3.) Parent and child theories of intelligence will match.

Social Significance

People's theories about their own intelligence can have an influence on their motivation to learn, as well as on their achievement (Dweck, 1986; 1999; 2006; Stipek & Gralinski, 1996). Students who maintain a "fixed" mindset are concerned with looking smart and tend to avoid challenges, give up easily, see effort as a sign that they are not competent, and feel threatened by the success of others (Dweck, 2006). In contrast, people who hold a "growth" mindset tend to have a desire to learn and challenge themselves to increase their abilities, despite possible setbacks; view effort as the path to mastery; and find lessons in the success of others (Dweck, 2006).

These theories of intelligence, or mindsets, can be related to what kind of goals students adopt, whether mastery or performance goals. Goal orientation can affect students' cognitive engagement in learning and achievement outcomes (Dweck & Legget, 1988; Elliott & Dweck, 1988; Molden & Dweck, 2000). Mastery (or learning) goals focus on understanding material, mastery of a skill, or increasing competence. Students holding mastery goals are self-referencing, or compare their work with their own progress or achievements, when determining success. Students holding

performance goals are concerned with extrinsic rewards and their ability and performance compared to others.

If a child holds a fixed view of intelligence, he or she is more likely to pursue a performance goal and focus on showing others that he or she is smart or competent, rather than focusing on mastering a task. This pattern can be maladaptive if a child fails at a task and attributes it to a lack of ability. Alternatively, if a child holds a growth view of intelligence, he or she will be more likely to assume mastery goals and focus on developing abilities. If a child who holds this combination of growth mindset and mastery goal fails at a task, he or she will likely attribute the setback to a lack of effort and will try harder next time. These beliefs about intelligence and corresponding goals have an effect on a student's success and can create either a renewed effort toward a task or defensive, helpless response (Stipek & Gralinski, 1996; Dweck, 1999).

Stipek and Gralinski (1996) examined children's beliefs about ability and effort, as well as their achievement, goal orientations, and learning strategies. The primary finding was that the beliefs that children held about intelligence predicted achievement. This effect was over and above that of goal orientation and problem-solving strategies (Stipek & Gralinski, 1996). The researchers also found a direct relationship between the children's beliefs about ability and performance at the start of the school year and their end-of-year academic performance. Similar to Dweck (1986), Stipek and Gralinski (1996) reason that the negative effects of a fixed theory of intelligence on learning and achievement could be a result of children's maladaptive responses to difficult tasks. This study shows support for the notion that a person's self-theories can affect the goals they adopt, and, in turn, can affect their academic performance.

Knowledge of these thoughts and goals can help researchers understand students' motivational patterns. Theories of intelligence are important to study because they appear to have a profound effect on people's lives. Related to mindsets, Dweck (2006) states, "It's about seeing things in a new way. When people—couples, coaches and athletes, managers and workers, parents and children, teachers and students—change to a growth mindset, they change from a *judge-and-be-judged* framework to a *learn-and-help-learn* framework" (p. 244). This shift in thinking seems to be a catalyst

for change in people's lives. Change can come in different ways, including through increasing motivation and changing the way people deal with obstacles, negative feedback, and the success of others. Theory of intelligence appears to permeate one's outlook on life and have a notable effect on future success and achievement. This can have a considerable impact on society because growth-minded individuals have the potential to be better leaders, teachers, and innovators. If society's focus could shift to become more aware of mindsets and more open to embracing a growth mindset, opportunities for individuals and collective society could be vast, and people could become much more adept at not only handling setbacks, but encouraging and fostering success. Blackwell, Trzesniewski, and Dweck (2007) write,

Prior research in developmental psychology has often paid insufficient attention to how individuals psychologically construct their worlds and to the effect these meaning systems have on actual behavior and achievement. This line of inquiry is especially important because past and present research suggests that these meaning systems can be changed. More constructive mental models can be taught, with beneficial consequences for students' achievement. (2007, p. 258)

Another aspect of theories of intelligence that needs further exploration is their origin. Are students' theories of intelligence similar to their parents' theories of intelligence? Do parents influence their children's theories of intelligence? There has been no published research in this area to date, and understanding how theories of intelligence develop could help people learn ways to teach the most effective theory and, in turn, improve motivation and achievement.

The current study investigates how students' academic motivation relates to their theories of intelligence, goal orientation, and academic outcomes. Origins of theories of intelligence will also be explored. With increased knowledge in these areas, developments can be made toward 1.) understanding the relationship between motivation, theories of intelligence, goal orientation, and achievement, 2.) accurately assessing goal orientation, theories of intelligence, and motivation, and 3.) creating interventions to help students enhance motivation and, thus, success. Supporting and

cultivating motivation is clearly important in fostering academic success, as well as in increasing people's overall life success and contributions to society.

Operational Definition of Terms

The following terms are used throughout this dissertation. The terms and definitions are drawn from a number of models and theories, which are discussed in detail in Chapter 2.

Motivation – considered a multidimensional construct in this study, “Motivation refers to a student’s drive or persistence, desire to succeed, tendency to enjoy challenging tasks, and ability to work well without encouragement or reinforcement” (Pfeiffer & Jarosewich, 2003, p. 7).

Theory of Intelligence – A way of viewing intelligence, whether as a fixed (entity) trait or a malleable (incremental) trait.

Entity Theory of Intelligence/Fixed Mindset – “...intelligence is portrayed as an entity that dwells within us and that we can’t change” (Dweck, 1999, p. 2).

Incremental Theory of Intelligence/Growth Mindset – “...intelligence is not a fixed trait that [people] simply possess, but something they can cultivate through learning” (Dweck, 1999, p. 3)

Achievement Goals – desired outcomes in achievement situations, either a performance goal or a learning goal.

Performance Goal – “This goal is about winning positive judgments of your competence and avoiding negative ones” (Dweck, 1999, p. 15).

Learning Goal – “...the goal of increasing your competence. It reflects a desire to learn new skills, master new tasks, or understand new things—a desire to get smarter” (Dweck, 1999, p. 15).

Delimitations

While this study possesses many strengths, including an adequate sample size and sound instruments, some delimitations exist. For example, while the sample group is large, the participants came from only one school. However, it should be noted that the diversity of students at this school does represent the public school population of the

state where the school is located. Therefore, the findings of the study will not be generalizable to all students and will be limited to populations matching the one in the study. Also, this sample includes 4th-8th graders, and it would likely provide a wider scope if a high school population were included in future studies.

Another delimitation is that much of the data is of a self-report nature and is not objective. While students were ensured that their responses would be confidential and would have no bearing on any aspect of their schooling, they might have attempted to respond in a way that would show themselves in a positive light, whether the responses were honest or not. Although self-report measures can be used effectively, future research might incorporate data from other sources, such as teachers. Also, this research is cross-sectional and does not track the students' theories of intelligence, motivation, and achievement over time. This would provide a more thorough look at the effects of the constructs on each other.

Measurement issues could also be a delimitation. One method was used to measure theory of intelligence, as well as goal choice. It is possible that other measurement techniques or perspectives might yield different results. Best practices advocate for triangulation when measuring psychological constructs (Pfeiffer, 2012). Additionally, experimenter bias is possible, if the experimenter were expecting a certain result and inadvertently biased the perspective of the supporting literature, data collection, or interpretation of the results.

CHAPTER 2
LITERATURE REVIEW
Theories of Motivation

This literature review aims to explore theories of motivation and different factors that can affect motivation with a focus on theories of intelligence. Over the years, motivation research has taken many different perspectives, and the present study takes the view that motivation is a multi-dimensional construct. As motivation is investigated, some issues arise including questions about its definition, factors that affect motivation, ways of measuring it, and ways to encourage it. The literature review will set the stage for the current research project in which the relationship between motivation, theory of intelligence, goal orientation, and academic achievement is examined.

Motivation research explores a seemingly simple question: Why do we choose to act and react in the ways we do? While the question seems basic, the explanations and underlying theories are numerous. Everyday conversation is full of references to motivation, such as “He tries so hard,” “Here is a reward for your work,” “That task is too difficult,” or “She’s working toward her goal,” but a precise definition of motivation seems elusive. Broadly defined, motivation affects decision-making related to one’s goals, but the concept of motivation carries different meanings for different researchers (Gagne & St. Pere, 2001). Motivation has been thought of as the psychological processes that interact with one’s environment to shape people’s actions (Heckhausen & Dweck, 1998). Pfeiffer and Jarosewich (2003) state, “Motivation refers to a student’s drive or persistence, desire to succeed, tendency to enjoy challenging tasks, and ability to work well without encouragement or reinforcement” (p. 7). The causes of goal-oriented activity are also involved in understanding motivation (Atkinson, 1964; Dollard & Miller, 1950; Dweck, 1986; Hull, 1943).

Early motivational psychologists tended to study motivation through what initiates or activates behavior, focusing on general traits or motives, while more contemporary motivational psychologists have focused on what activities a person undertakes or specific cognitive and affective mediators (Heckhausen & Dweck, 1998; Weiner, 1992).

Recent research includes judgments and emotional feelings, while early research looked at observable actions.

Many theories have been used to explain motivation, especially related to achievement. Initial research on human motivation focused on the physical component of motivation—the need for food, shelter, comfort, sleep, etc. This physical aspect of motivation was integral to the studies of Pavlov (1927) on classical conditioning and those of Skinner (1953) on instrumental conditioning. Behaviorists sought to explain all human behavior in terms of bodily needs, but by the 1950s, researchers began to wonder why people, whose bodily needs were met, still exhibited goal-oriented behavior. Researchers posited that curiosity was an innate motive or trait. This traditional motive approach to understanding motivation was developed by Murray (1938) and McClelland, Atkinson, Clark, & Lowell, (1953). They viewed achievement motivation as a trait, or personal characteristic, assuming that there is an overall achievement motive that one may have that underlies achievement behaviors. The motive approach was in the forefront of motivation conceptualization and research until the 1970s when cognitive theory was introduced, placing an intense focus on cognitive processes and their implications. Attention was shifted to inferences about the causes of behavior (Weiner & Kukla, 1970) and goal constructs (Ames, 1984; Dweck & Elliott, 1983; Nicholls, 1984). With goal approach as the new perspective, behavior was explained in a different way: as goal-directed actions, rather than as unconscious acts driven by feelings or desires

Current lines of motivation research stem from work of the pioneers in the field. These include achievement research (Atkinson, 1964; Heckhausen, 1967; McClelland, Atkinson, Clark, & Lowell, 1953), action theory (Kuhl, 1987), the psychology of causal attribution and perceived control (Bandura, 1977; Rotter, 1966; Weiner, 1972; Weiner & Kukla, 1970), the psychology of personal causation and intrinsic motivation (Csikszentmihalyi, 1975; DeCharms, 1968; Deci, 1975; Deci & Ryan, 1985), and perceived competence (White, 1959, 1963). The following sections will explain the various motivation theories in further detail.

Intrinsic and Extrinsic Motivation

Researchers often refer to two different types of motivation, intrinsic and extrinsic, and attempt to understand what circumstances produce each type. Intrinsic motivation is evidenced when a person performs an activity with no reward other than the activity itself or feelings associated with that activity. Extrinsic motivation involves a person performing an activity with rewards to be gained that are outside of himself or herself, such as money, social benefits, objects, etc.

Two lines of inquiry laid the groundwork for future research in intrinsic and extrinsic motivation. One of these holds the belief that curiosity is an innate motive and would move a person, whose basic needs were already met, to seek stimulation (Berlyne, 1960; Harlow, Harlow, & Meyer, 1950; Hunt, 1965). The other line of inquiry was based on work by Robert White (1959), who proposed the idea of effectance motivation—or a "tendency to explore and influence the environment" (p. 298). White suggested that competence, defined as a person's ability to interact effectively with his or her environment, is the main human reinforcer. He stated, "I consider it necessary to treat competence as having a motivational aspect, and my central argument will be that the motivation needed to attain competence cannot be wholly derived from sources of energy currently conceptualized as drives or instincts" (White, 1959, p. 297).

White's idea of competence as a reinforcer ties closely with a motivational model proposed by Dweck that suggests that core beliefs about intelligence can affect motivation and can elicit different patterns of responses related to challenges, failures, and achievement. This study utilizes this motivational model and views theories of intelligence as a possible facet of motivation. It also explores achievement goals that are associated with the two theories of intelligence.

Other research in intrinsic and extrinsic motivation focuses less on goals, but on the facilitation of intrinsic motivation. Edward Deci, who would later develop self-determination theory with Richard Ryan, began his motivation research in the area of intrinsic and extrinsic motivation. Deci (1971) explored the idea that external rewards decrease intrinsic motivation. For example, when people worked at an activity with money as an external reward, study participants' intrinsic motivation for the activity

decreased. He also found that participants' intrinsic motivation seemed to increase with external rewards of verbal reinforcement and positive feedback. Another early study by Deci (1972a) produced similar findings that a reward of money decreased intrinsic motivation. These and following studies led Deci and Ryan to develop self-determination theory. The construct of self-determination is described in the following section.

Self-Determination

White's (1959) research, as described previously, proposed that one's desire for control over his or her environment drives behavior. This idea served as a basis for many motivational theories, including Bandura's self-efficacy theory (1982), Seligman's learned helplessness theory (1975), DeCharms' study of perceptions of control (1968), and Deci & Ryan's self-determination theory (1985).

Research by DeCharms (1968) focused on the idea of self-determination when analyzing perceptions of control and motivation, specifically in a school setting. He assumed that students who thought that they maintained control over their own learning process would experience feelings of efficacy, or an ability to produce and regulate life events, and, in turn, would gain motivation to learn and explore. He labeled these students who perceived control as "origins," and he called the students who showed a lack of perceived control "pawns." The "pawns" were more likely to attribute success in school to external factors and were less likely to initiate exploration. DeCharms (1968) suggested that humans possess a need for feelings of personal control over their actions and outcomes in life, and perceived free choice and commitment underlies intrinsic motivation.

Self-determination theory by Deci and Ryan grew out of their initial work in intrinsic and extrinsic motivation and from previous work by others in the area, including that of DeCharms. Self-determination theory is based on the belief that humans have innate psychological needs for competence, autonomy, and relatedness that form the basis for self-motivation and character development (Ryan & Deci, 2000). They deem these needs to be necessary for enabling optimal growth, integration, social development, and personal well-being (Ryan & Deci, 2000). If these needs are not met,

a person will be less motivated and have decreased well-being. This theory does not directly address the construct of achievement motivation, but it presents the motivational basis for achievement.

Deci & Ryan (1992) view self-determination as the most important aspect of intrinsic motivation. They state that people are active and self-determined when they feel intrinsically motivated and that factors that undermine self-determination will cause a decrease in intrinsic motivation. A person who believes that his or her self-esteem is dependent on evaluations from others is likely to feel controlled and lose interest in the activity at hand.

Self-determination theory emphasizes the social-contextual factors that lead to self-motivation and healthy psychological development. Bandura's work also functions within a social framework and focuses on self-efficacy, or the belief that it is within one's control to effect desired outcomes. This research led to the development of social cognitive theories of motivation.

Social Cognitive Theories of Motivation

Both achievement goal theory and theories of intelligence, which will be explored below, are considered social cognitive theories. Social cognitive theory grew, in part, out of work by Bandura (1977), who initially developed social learning theory. Social learning theory proposes that people acquire information by observing others' behaviors, results of behaviors, and views. This theory incorporates the interplay between cognitive, behavioral, and environmental factors in its explanation of human behavior. Bandura (1986) later presented social cognitive theory. By naming it social cognitive theory, he aimed to emphasize the critical role of cognition in one's ability to construct reality, take in information, and control thoughts and behaviors. Social cognitive theory operates under the assumption that people are not just reactive beings, molded by their environment, but have the ability to organize and regulate thoughts and actions and reflect on themselves.

Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli (2003) stated that one of the main features of human agency based on social cognitive theory is the capacity for self-regulation. Self-perceptions affect one's thoughts, behaviors, and feelings.

Bandura (1982) states that perceived self-efficacy takes into account judgments of how well one can carry out a plan to effectively handle life situations. Perceived self-efficacy is important in the process of self-management because of its direct and indirect impact on cognitive, motivational, decisional, and affective determinants (Bandura et al., 2003).

An important aspect of research by Dweck on theories of intelligence is self-perception of efficacy. Her work focuses on an aspect of social cognitive theory—the way that people’s beliefs, values, and goals create a meaning system with which they define themselves. This area of social cognitive theory originated with George Kelly (1955) who believed that people make sense of their world through meaning systems that they create through social learning. Mischel (1973) added to the work of Kelly, making social cognitive theory a more mainstream idea and identifying social-cognitive elements that affect people’s behavior, such as the way they interpret situations and expectations. An important aspect of both achievement goal theory and theories of intelligence is how these meaning systems or self-perception of efficacy affect people’s thoughts, motivation, and behavior. These areas will be explored further in the sections below.

Achievement Goals

From the initial work in the area of intrinsic and extrinsic motivation and social cognitive theory, extensive research has developed. Achievement motivation theory was built on the notion of internal processes and posited that people are motivated by a need to achieve or be successful (Atkinson & Feather, 1966; Atkinson & Raynor, 1978; McClelland, Atkinson, Clark & Lowell, 1953). This theory suggests that people seek a balance between succeeding and avoiding failure. Atkinson and Raynor (1978) indicate that extrinsic motivation can also play a role in achievement, especially when incentives, such as social approval or tangible rewards exist. Atkinson, Bastion, Earl, and Litman (1960) state that two motives are at work in competitive circumstances: the motive to achieve and the motive to avoid failure. Atkinson’s theory assumes that the incentive value of an outcome is determined by its likelihood. Some researchers believe that this is too simplistic and does not take into account factors that result from success, such as financial or social gains (Canavan-Gumpert, Garner, & Gumpert, 1978). Despite this, it

seems that the more difficult the task, the more likely that success will seem attractive, and the easier the task, the more anxious a person will feel about failing. When task difficulty is moderate (when the prospect of success and failure are equal), the task will seem most attractive to people who are driven toward achieving success and will be anxiety-provoking to those who seek to avoid failure.

Within the area of achievement motivation, achievement goal theory has been one of the foremost theories in the past few decades and has been extensively researched, particularly related to the field of education (Ames, 1992; Dweck & Leggett, 1988, Nichols, 1984). Achievement goal theory focuses on performance goals and mastery goals. Both of these goals represent different ways of defining competence and skill level. When pursuing performance goals, people attempt to perform better than their peers in an effort to confirm their ability. In doing so, they measure success versus failure by normative standards. When pursuing mastery goals (also called learning goals), people work on developing their own abilities and measure their success or failure by self-referencing. Achievement goal theorists argue that performance goals should result in similar or worse outcomes than mastery goals, but never better.

The underlying postulate of achievement goal theory is the mastery goal hypothesis—that mastery goals produce the greatest motivation and performance. Grant & Dweck (2003) write:

Performance goals, with their emphasis on outcomes as measures of ability, were shown to produce a vulnerability to helplessness and debilitation after a setback or negative feedback, particularly in cases where current perceptions of ability were low...Learning goals, with their emphasis on understanding and growth, were shown to facilitate persistence and mastery-oriented behaviors in the face of obstacles, even when perceptions of current ability might be low.” (p. 541)

With this in mind, achievement goal theorists propose that mastery goals should be encouraged in schools, rather than performance goals (Ames, 1992; Maehr & Midgley, 1991).

While there has been support for achievement goal theory, there is also question as to whether achievement goals are directly related to positive or negative outcomes or whether other factors are at work. Cury, DaFonseca, Elliot, and Moller (2006) write that performance goals have had mixed results—both showing positive and negative outcomes, sometimes regardless of the presence of failure. They also state that mastery goals have produced positive outcomes, but not always high achievement.

These researchers propose a different way of viewing achievement goals, using a 2 x 2 achievement goal framework, crossing the performance-mastery goal distinction with an approach-avoidance motivational orientation. In approach-avoidance motivation, people either approach a situation to highlight their qualities or avoid a situation to prevent showing their perceived weaknesses. The framework used by Cury et al. (2006) is made up of four achievement goals: “mastery-approach (focused on attaining task-based or intrapersonal competence), performance-approach (focused on attaining normative competence), mastery-avoidance (focused on avoiding task-based or intrapersonal incompetence), and performance-avoidance (focused on avoiding normative incompetence literature—mastery-avoidance goals).” (p. 667)

While the mastery goal hypothesis seems to be the most common way to view achievement goals, other achievement goal theories are being explored and questions remain as to the effect that achievement goals have on achievement. Further exploration into the mechanisms underlying achievement goals could answer questions about the path to the most effective way to encourage achievement, and it is possible that theories of intelligence could play a role.

Perceptions of Competence/Theories of Intelligence

Social-cognitive theory acknowledges the significance of the social nature of motivation (Weiner, 1990) and the role of the environment (Bandura, 1986). The social cognitive approach has been researched by many, including Dweck, whose focus is research in self-theories and theories of intelligence. She writes,

The social-cognitive approach with its emphasis on specific mediating processes, has generated important implications for practice and ameliorative interventions. Indeed, ways of appropriately incorporating issues of “self-concept” into

education have long been sought. The social-cognitive approach, by identifying particular self-conceptions (e.g., children's theories of their intelligence) and by detailing the relationship to behavior, may well provide the means. (Dweck, 1986, p.1046)

Dweck is one of the main researchers in the area of self-theories and theories of intelligence, which focuses on the self-perceptions that people use to create their sense of self and drive their behavior. People may view attributes about themselves to be fixed or malleable qualities—things that can change or things that cannot. Self-theories are measured by asking people to agree or disagree with statements such as, “Your intelligence is something basic about you that you can't really change,” or “No matter who you are, you can substantially change your level of intelligence” (Dweck & Grant, 2008). People may either hold an entity theory or an incremental theory about their own intelligence. Entity theory indicates a belief that qualities are fixed, while incremental theory indicates that qualities can develop with effort. The self-theory that a person adopts can have important consequences related to his or her motivation, and Dweck (1986) has found that these motivational processes influence learning.

Other researchers have studied related areas of perceptions of competence, such as self-efficacy. Self-efficacy, as stated by Bandura (1986) refers to one's perceptions and judgments of their ability to reach goals. Research in the area of self-efficacy and motivation indicates that the interest and value beliefs of students might develop from judgments of competence (Wigfield, Eccles, Yoon, Harold, Arbreton, Freedman-Doan, & Blumenfeld, 1997). Bandura (1997) came to a similar conclusion that if a person gains a sense of competence or efficacy related to an activity, then he or she develops interest and value in it. Linnenbrink and Pintrich (2003) reviewed research in the area of self-efficacy and made recommendations to teachers based on their findings. Among their suggestions were the following, 1.) “Help students maintain relatively high but accurate self-efficacy beliefs,” and 2.) “Foster the belief that competence or ability is a changeable, controllable aspect of development” (p. 17). Linnenbrink and Pintrich (2003) find that students who believe that they can be successful at tasks will be more motivated to engage and achieve and that attributions

that students make regarding their failures (for example, lack of effort or lack of ability) can affect their efficacy.

In an effort to understand the connection between self-theories and achievement, researchers have theorized that beliefs about one's ability and intelligence can affect what kind of goals students adopt, whether mastery or performance goals. Mastery (or learning) goals focus on understanding material, mastery of a skill, or increasing competence. Students who hold performance goals are concerned with extrinsic rewards and their ability and performance compared to others. Students with mastery goals are self-referencing when determining success, while students with performance goals focus on how they compare to others.

Related to Dweck's theories of intelligence, if a child holds an entity, or fixed, view of intelligence, he or she is more likely to pursue a performance goal and focus on showing others that he or she is smart or competent. This pattern can be maladaptive if a child fails at a task and attributes it to a lack of ability. Alternatively, if a child holds an incremental, or malleable, view of intelligence, he or she will be more likely to assume learning, or mastery, goals and focus on developing their abilities. If a child who holds this combination of assumption and goal fails at a task, he or she will likely attribute the setback as a lack of effort and will try harder next time. These beliefs about intelligence and corresponding goals have an effect on a student's success and can create either a renewed effort toward a task or defensive, helpless behavior (Dweck, 1999; Stipek & Gralinski, 1996).

As mentioned previously, recent research has been done to indicate that a possible shift in this theory is necessary. Cury et al. (2006) believe that achievement goals may not be a moderator between theory of intelligence and achievement and suggest that theory of intelligence may be more directly related to achievement. They recommend placing the emphasis on the direct relationship of theories of intelligence on achievement outcomes, as well as the negative effect of holding an entity theory and/or performance goals (Cury et al., 2006). These theories that attempt to explain achievement outcomes do not seem to include motivation as its own construct or as a possible intermediary to achievement. If achievement goals are not moderators

between theories of intelligence and achievement, one might ask if theories of intelligence are directly linked to achievement, and, if so, could this indicate that theory of intelligence is a facet of motivation?

Role of Parents in Children's Theories of Intelligence

In the process of understanding the roles of motivation, theories of intelligence, and achievement goals, one might ask where students' self-theories and goal orientations originate. Is it from their caregivers? Duchesne & Ratelle (2010) state that interest in family socialization patterns has spurred research in the area of achievement goal development, but the current state of the research requires much more work to establish a link among behavior of parents, emotional problems in children, and children's achievement goals.

Dweck has investigated the role of parents in children's theories of intelligence. She found that praise for intelligence tends to lead children to develop a fixed theory of intelligence, while praise for hard work and effort leads children to develop a growth theory of intelligence. "Kids with the fixed mindset tell us they get constant messages of judgment from their parents. They say they feel as though their traits are being measured all the time" (Dweck, 2006, p. 184). It appears that parents have a strong influence on their children's achievement goals and self-theories; however, this influence is not clearly understood. To date, there have not been any studies that compare parent and child self-theories. Further research in this area may be helpful in understanding how parents can best help their children to develop goals and mindsets that will lead to success.

Clearly, understanding motivation, achievement, and the factors that affect these constructs is complicated. Identifying how and why a person achieves at an optimal level is and continues to be a challenge to researchers. New theories and ideas related to motivation and achievement continue to arise, and researchers strive to use their findings to help people achieve success. The following section describes research that has been conducted related to motivation, achievement goals, and self-theories.

Research and Findings in the Areas of Motivation, Achievement, Goals, and Self-Theories

The constructs described in the previous section are hypothesized to be related in different ways, but questions remain, and potential links between school achievement, theories of intelligence, achievement goals, and motivation are unclear and need further investigation. Exploring and understanding the relationship between theories of intelligence, motivation, achievement goals, and achievement outcomes could make way for research-based strategies for helping students succeed. This section will explore research related to the constructs and theories described previously and will lead to the current research questions.

Achievement Goals

For over 25 years, achievement goal theory has been the most prominent theory in explaining academic motivation and achievement. This theory has been studied and revised multiple times, yet questions still remain as to which achievement goals are most beneficial and why. It was originally thought that the achievement goals that students adopt affect achievement outcomes, specifically that mastery (or learning) goals focus on understanding material, mastery of a skill, and increasing competence, while performance goals focus on extrinsic rewards and students' ability and performance compared to others (Dweck, 1986; Elliott & Dweck, 1988; Farrell & Dweck, 1985; Nicholls, 1984). Many studies have indicated that students holding mastery goals are self-referencing when determining success and perform better, while students with performance goals focus on how they compare to others and exhibit lower achievement.

An example of one of these studies is by Farrell and Dweck (1985), who tested students with different achievement goals in a classroom setting. The researchers gave junior high school students instructional booklets with material for their science class. After having the booklets for a week, the students were given novel problems to solve, using their new knowledge. Farrell and Dweck (1985) found that students holding mastery goals for the science class unit scored higher than those with performance goals on the new tasks. Students with mastery goals also produced more written work as they tried to solve the problems. Students with learning goals seemed to attempt to

apply the rule that they learned in their booklets to the new problems, indicating that they may have been using more effective learning strategies and trying to apply previous learning effectively.

While these findings were supported by multiple studies, some studies began to show different results than the original theory and research. Harackiewicz, Barron, and Elliot (1998) proposed a revision to the theory, stating that there could be positive outcomes resulting from both mastery and performance goals. A debate between theorists developed, with some more recent research supporting the original concept (Kaplan & Middleton, 2002; Midgley, Kaplan, & Middleton, 2001), while others favored a new perspective in which each achievement goal had the potential to produce positive outcomes (Elliot, 1999; Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002; Pintrich, 2000).

As an alternative to the original achievement goal theory, Elliott and colleagues proposed the idea of the 2x2 achievement goal model (Elliot, 1999; Elliot & McGregor, 1999). In this framework, the performance and mastery goals are divided into independent approach and avoidance sections, and four achievement orientations are created: a performance-approach goal, focused on gaining positive judgments of competence; a performance-avoidance goal, focused on avoiding negative judgments of competence; a mastery goal-approach goal, focused on the development of understanding and competence; and a mastery-avoidance goal, focused on developing competence and mastering tasks with an emphasis on avoiding mistakes or failure.

Elliot and McGregor (1999) conducted a study exploring performance-approach goals and grades in school. Performance-approach goals were found to positively relate to students' exam grades in a beginning psychology class. When the researchers also analyzed goal/grade relationships for long-term retention of material, performance goals were unrelated to grades, and mastery goals were positively associated. Long-term retention was measured by comparing grades on an unexpected quiz from the end of the course with an exam that had been completed earlier in the course.

In sum, these results clearly implicate mastery goals, not performance-approach goals, as facilitators of retention and suggest that performance-avoidance goals

have a negative impact...mastery goals were documented as positive predictors of long-term retention. Performance-approach goals did not predict retention, whereas performance-avoidance goals evidenced a negative relationship. (Elliot & McGregor, 1999, p. 639-640)

King, McInerney, & Watkins (2012) found benefits associated with mastery goals, but found complex results related to performance goals. They state that performance goals positively predicted positive academic emotions, but also positively predicted anxiety, shame, and hopelessness (King et al., 2012). These findings illustrate the mixed results produced by students who hold performance goals as well as the lack of consensus as to whether performance goals are efficacious. Many studies have shown that mastery goals produce better achievement, but recently, some studies refute this idea and have found that performance goals have been associated with higher achievement (Elliot, 1999; Farrell & Dweck, 1985; Harackiewicz, Barron, and Elliot, 1998; Harackiewicz, Barron, Pintrich, & Thrash, 2002; Kaplan & Middleton, 2002; Midgley, Kaplan, & Middleton, 2001; Pintrich, 2000). This indicates that the theory continues to require revision and further investigation. Senko, Hulleman, and Harackiewicz (2011) state, "The effects of mastery goals and normative performance goals on classroom achievement were unexpected and remain at odds with original goal theorizing. It behooves researchers, therefore, to identify the mechanisms responsible for these effects" (p. 41). Questions remain as to which goals are most beneficial and how these goals develop. Additionally, a more thorough understanding of achievement goal theory related to theories of intelligence could shed light on these issues.

Theories of Intelligence Related to Achievement Goals

As described previously, students may believe that their intelligence is stable over time, while some believe that their intelligence can grow with effort and as one gains skills and knowledge. Students' academic behaviors can vary, depending on the meaning that individuals attach to them. For example, a person's beliefs about intelligence, whether it is fixed or changeable, are thought to facilitate or impede academic success, have an effect on motivation, and affect achievement goal choice.

It is believed that there is a relationship between theory of intelligence and achievement goals, and Dweck (1999) states that theories of intelligence cause students to adopt different goals. Bandura and Dweck (1985), Dweck and Leggett (1988), Elliot & Dweck, (1988), and Dupeyrat & Marine (2005), for example, have found a relationship between students' choice of achievement goal and their theory of intelligence. The researchers found that students with an entity/fixed theory of intelligence were more likely to adopt a performance goal, while students with an incremental theory of intelligence tended to adopt learning goals. Dweck & Sorich (1999) found a strong connection between students' theory of intelligence and achievement goals and also found that these factors predicted achievement. Other studies have also found a link between theories of intelligence and achievement (Blackwell, Trzesniewski, & Dweck, 2007; Henderson & Dweck, 1990).

Work by Stipek and Gralinski (1996) examined children's beliefs about ability and effort, as well as their achievement, goal orientations, and learning strategies. They found that "children's beliefs about intelligence and performance was a powerful predictor of achievement outcomes over and above their effect on goal orientation and problem-solving strategies" (Stipek & Gralinski, 1996, p. 406). They examined children's beliefs related to math and social studies and found no evidence for subject-specific ability beliefs (Stipek & Gralinski, 1996). They also found a direct relationship between ability-performance beliefs and academic outcomes. Stipek and Gralinski (1996) suggest, like Dweck (1986), that the negative effects of a fixed theory of intelligence on learning and achievement could be a result of children's maladaptive responses to difficult tasks.

People's reactions to difficult tasks and failure can have an effect on their motivation and achievement, and reactions can be very different. Diener and Dweck (1978, 1980) describe two responses to failure that create very different outcomes related to goals, achievement, and self-concept. When faced with failure, one might have a helpless response, in which he or she sees the outcome as beyond his or her control and something that cannot be changed. Those with a helpless response may question their ability, have negative feelings and self-doubt, and fail to use effective

strategies to overcome the failure. The other response to failure described by Diener and Dweck (1978, 1980) is the mastery-oriented response in which people actively look for ways to overcome the failure, do not view failure as a failure, do not blame things outside themselves for the failure, remain confident, and persist. These responses are important to understand because helpless responses may lead to drops in achievement and performance, may interfere with learning, and may affect goal choices.

Diener and Dweck (1978) conducted a study, showing that children with a helpless or maladaptive behavior pattern, show decreased performance when they experience failure, compared to their peers who believe that their failure is due to lack of effort, not lack of ability. “There appears to be a striking difference between the helpless and mastery-oriented groups in their emphasis on the cause of, versus remedy for, failure” Diener and Dweck (1978, p. 460). These responses to failure could help explain the negative results of a fixed theory of intelligence.

Other experimental research has also shown a connection between theory of intelligence and achievement. Blackwell and colleagues (2007) found that one’s theory of intelligence can be manipulated and that theory of intelligence can have a positive effect on achievement. They conducted a study measuring aspects of motivation (theory of intelligence, goal orientation, beliefs about effort, and response to failure) and achievement outcomes, finding that an incremental theory of intelligence is positively correlated with positive beliefs about effort, learning goals, low helpless attributions, and positive learning strategies. The researchers created a path model to assess mediational variables and to learn more about and be able to explain how these variables interrelated. They write:

The process model suggests multiple mediational pathways. That is, it suggests that (a) learning goals mediate the relation between incremental theory and positive strategies, (b) positive strategies mediate the relation between learning goals and increasing grades, (c) effort beliefs mediate the relation between incremental theory and helpless attributions, (d) effort beliefs mediate the relation between incremental theory and positive strategies, (e) helpless attributions mediate the relation between effort beliefs and positive strategies, (f) positive

strategies mediate the relation between effort beliefs and increasing grades, and (g) positive strategies mediate the relation between helpless attributions and increasing grades. (Blackwell et al., 2007, p. 253)

Overall, the results of this study show that these variables are interrelated and, while it seems evident that theories of intelligence have an influence on achievement, the mechanism behind this still remains somewhat unclear because so many pathways and relationships are possible. The point is raised that using a global motivation construct could incorporate these many mediational facets and could be a better way to conceptualize, measure, and explore the relationship between theory of intelligence and achievement. The present study includes a global measure of motivation and includes it in a path model.

Blackwell et al. (2007) also found that effective theories of intelligence can be taught and that theories of intelligence are malleable. Half of the students in the study received an intervention teaching an incremental theory, and these students enhanced motivation in a math class and performed as well or better than they did prior to the intervention in the same math class. The study of theories of intelligence is especially important if research is correct in supposing that people's self-perceptions of their intelligence can change and be taught, which could be a means of enhancing school achievement, as well as success later in life.

Robins and Pals (1998) found that among surveyed college students, theory of intelligence remained stable through their four years of college. This could indicate that these beliefs are not likely to change without being called into awareness or without being taught that there are other, more adaptive, ways to view ability. These findings show the potential benefit of teaching a growth mindset to students to help them learn new ways to view their ability and, in turn, finding healthy ways to respond to challenges, as well as creating achievement goals that are more likely to lead to success.

It is clear that mediational models including these motivation and achievement-related variables have not been widely studied. Also, most studies use self-report data, and this study includes information from the participants' parents related to perceived

motivation and theory of intelligence. Few studies address *why* there is a relation between theories of intelligence and achievement, but the present study will examine a mediational model that could help explain mechanisms underlying the relationship.

Role of Parents in Children's Theories of Intelligence

The effects of theories of intelligence have been explored, as well as mediator relationships to theories of intelligence that might impact achievement. As mentioned previously, an aspect of theories of intelligence that has not been explored thoroughly, whether in theory or research, is where students' theories of intelligence originate. Is it from family socialization experiences? Are students' theories of intelligence the same as their parents'? There is little theory or research in this area, and the present study explores the relationship between parents' and children's theories of intelligence. This section presents what little research exists in this area.

Dweck's work has addressed parents' role in children's development of theories of intelligence and found that praise for intelligence tends to guide children to develop a fixed theory of intelligence, while praise for hard work and effort leads children to develop a growth theory of intelligence. Findings from Duchesne & Ratelle (2010) compared parent involvement (parental support, involvement, assistance, and responsiveness) and parent control (pressure to conform to parental expectations) and found that parental control (for students in 6th grade) predicted that the student would show performance goals one year later. They also found that parental involvement (for students in 6th grade) was associated with higher scores on mastery goals at the end of the students' first year of middle school.

Mueller & Dweck (1998) researched the effect of praise on children, specifically exploring the differing results of praise for ability and praise for effort. Results showed that children who received praise for their intelligence after an achievement chose to work on problems that allowed them to show their ability. Children who were praised for effort chose problems that were said to increase their learning. These results show that praise for intelligence seems to promote performance goals, while praise for effort tends to promote mastery goals. Children who were praised for intelligence were also more likely to compare their performance with that of others, gauge their intelligence by their

performance, and view intelligence as a fixed trait. Conversely, children who received praise for hard work seemed to have more of an incremental theory of intelligence. If praise has an impact on the development of theories of intelligence, it seems likely that parents or caregivers can play a central role in children's development of theories of intelligence. An aspect of theories of intelligence that has yet to be measured and compared is parent and child theories of intelligence.

To date, there have been no published studies that compare parent and child self-theories. Dissertation research by Kinshasa Bennett (2011) explored how theories of intelligence and goals are transmitted from parents to children. Findings showed that a higher endorsement of incremental theory of intelligence, children's reports of less communication about ability by parents, and less modeling about ability by parents predicted children's adoption of an incremental theory of intelligence. Children's endorsement of learning goals was associated with a higher endorsement of learning goals by parents. Further research in this area may be helpful in understanding how parents can best help their children to develop goals and mindsets that will lead to success.

Motivation and Intelligence

When speaking of theories of intelligence, academic achievement, and motivation, the question of the impact of intelligence on these constructs arises. Intelligence is a widely debated concept that has been defined in many ways by many theorists and researchers. Some view intelligence as pure cognitive abilities, and some include personality and motivational factors into intelligence. The most common understanding of intelligence is based on psychometric testing that uses number values to represent different abilities and cognitive aptitude.

It is commonly thought by the general population that ability and motivation play equal roles in determining academic success. Some researchers question whether motivation plays an important role in academic achievement or if other factors, such as IQ, are stronger determinants (Gagne & St. Pere, 2001). The relationship between academic achievement and cognitive ability has been well documented, as has the relationship between academic achievement and motivation. However, there is little

information in the education literature regarding the independent additive contributions of these elements of academic achievement (Gagne & St. Pere, 2001). The role that motivation plays in explaining academic achievement is being debated—previous research examining the relationship between cognitive abilities, motivation, and achievement has yielded inconsistent findings. For example, Gottfried and Gottfried (2004) found that intrinsic academic motivation was significantly related to academic achievement above and beyond IQ, whereas Gagne and St. Pere (2001) found that IQ and motivation were not correlated.

The correlation between academic achievement and cognitive ability is well-documented. Walberg (1984) conducted a meta-analysis of research of nearly 3,000 studies of school learning and found IQ to be the most powerful determinant of academic achievement. He calculated the average correlation between IQ (measured by various instruments) and academic achievement to be .71 (Walberg, 1984). Since then, many studies have been conducted in support of this finding. Among these is Gottfredson (1997, 2002) who stated that *g*, or general mental ability factor, is the best individual predictor of job performance. Schmidt and Hunter (1998) conducted a meta-analysis of 85 years of research in personnel psychology, considering the validity of various different methods of selecting employees. Like Gottfredson (1997, 2002), they found that general mental ability (GMA) and work sample measures had the highest validity of any selection method. The aforementioned studies do not indicate that motivation plays a key role in achievement or success. These findings may be particularly concerning to educational psychologists who emphasize the role of motivation in achievement.

While some studies show intelligence to be the most powerful predictor of academic achievement, Spinath, Spinath, Harlaar, and Plomin (2006) point out that it is worthwhile to explore other dimensions that could explain individual differences. They pose several reasons for this, which are summarized as follows. 1.) Less than half of the variance in academic achievement is accounted for by individual differences in intelligence. Much variance in achievement is left unexplained. 2.) In the field of education, teachers and researchers are focused on how to help students gain a

thorough understanding of material and improve learning and achievement. The identification of factors that could affect learning and achievement processes might be useful, even if the factors lack strong predictive power. 3.) Predictors might have commonalities, and a part of variance could be better understood by identifying what the predictors have in common. For example, it could be possible that a high level of motivation could positively influence the development of cognitive abilities. 4.) People do not always use their full potential or work to the extent of their ability. Motivation could be an important factor in predicting actual behavior. “Taken together, these considerations imply that motivation is a promising candidate to add to our understanding of achievement behavior and to have incremental predictive power over intelligence” (Spinath et al., 2006, p. 364).

In their study, Spinath et al. (2006) collected achievement assessments from teachers in the areas of English, Math, and Science, and students self-reported their perceived ability and intrinsic value placed on these subjects. General mental ability was shown to be the best predictor of school achievement, but when they controlled for general mental ability, the motivational constructs of ability self-perceptions and intrinsic values added to the prediction model of school achievement. Ability self-perceptions predicted school achievement more strongly than intrinsic values. A considerable portion of the common variance in achievement was explained by both general mental ability and motivation.

Despite the many studies that show cognitive ability to be the best predictor of achievement, support for motivation’s role in achievement remains. Previous studies that have compared the relationship between academic self-perceptions of ability and achievement in school have reported moderate correlations between these two constructs, ranging from .40 to .60 (Guay, Marsh, & Boivin, 2003; Marsh, Smith, Barnes, & Butler, 1983; Skaalvik & Hagtvet, 1990; Skaalvik & Valas, 1999). Spinath et al. (2006) found ability self-perceptions and intrinsic values to have predictive power for school achievement, but there have been few studies that examined the predictive value of ability self-perceptions and intrinsic values independent of intelligence.

Two studies investigate self-perceived ability—with 6th graders (Gose, Wooden, & Muller, 1980) and with 4th, 6th, and 8th graders (Schicke & Fagan, 1994). Both studies found that the construct of ability self-perceptions was able to explain unique variance in achievement that was not explained by intelligence. Schicke and Fagan (1994) found that intelligence accounted for 51% to 57% of the variance in achievement, and ability self-perceptions contributed 3-6%. Other researchers have also found that intrinsic motivation contributed to the prediction of school achievement (3% to 6%), independently from intelligence, in 1st to 4th graders, 5th to 8th graders, and 10th graders (Gottfried, 1985; Gottfried, 1990; & Lloyd & Barenblatt, 1984).

Interestingly, some researchers have found that gifted students, who have high cognitive ability, are high in motivation (Davis & Connell, 1985; Gottfried & Gottfried, 1996; Gottfried & Gottfried, 2004; Vallerand, Gagne, Senecal, & Pelletier, 1994). Some believe that motivation is an aspect of giftedness (Gottfried & Gottfried, 2004). It is commonly believed that gifted children have higher levels of motivation than non-gifted children, and assessments of gifted traits often include curiosity, inquisitiveness, and intrinsic motivation to learn new things. In the Gifted Rating Scales (GRS), a rating scale designed to aid in the identification of gifted students, Pfeiffer and Jarosewich (2003) include a subscale devoted to motivation. About the motivation scale, the authors write:

This scale refers to the student's drive or persistence, desire to succeed, tendency to enjoy challenging tasks, and ability to work well without encouragement or reinforcement. The motivation scale is not viewed as a type of giftedness but rather as the dynamic energy that drives or impels a student to achieve. (Pfeiffer & Jarosewich, 2007, p. 42)

It is clear that many different views about the role of motivation in achievement exist, and some of them conceptualize motivation very differently. Given these varying perspectives, the study of motivation and achievement is complex and ever evolving. Ultimately, researchers desire to understand the role of motivation in academic achievement in order to enhance student learning and success.

Critical Analysis of the Literature

Among the findings in the preceding research in theories of intelligence, motivation, and achievement, there are a few main points to consider: 1.) Students' theories of intelligence seem to affect the goals they adopt, achievement, and motivational processes, 2.) The reasons underlying the positive and negative effects of theories of intelligence and goal choice remain unclear, particularly mediating variables, 3.) The influence of parents on the development of children's theories of intelligence has been studied little and is not well understood, and 4.) Cognitive ability appears to be a powerful predictor of academic achievement, but support has been shown for the predictive ability of motivation.

Main findings of research explored in this dissertation suggest that students' beliefs about their intelligence affect the goals they adopt, as well as their learning strategies, motivational processes, and achievement. As described previously, students may believe that their intelligence is something that is fixed or stable over time, while some believe that their intelligence can grow with effort and as one gains skills and knowledge. Students' academic behaviors can vary, depending on the meaning that individuals attach to them. For example, a person's beliefs about intelligence, whether fixed or malleable, are thought to facilitate or impede academic success, have an effect on motivation, and affect achievement goal choice.

Dweck (1999) developed a model of motivation to help understand the psychological mechanisms that allow some students to thrive when challenged and some to give up or avoid the challenging activity. She proposes that core beliefs related to the nature of intelligence can determine one's response to challenges or setbacks. Dweck (1999) writes that people take either an "entity" view (that intelligence is unchangeable and fixed) or an "incremental" view (that intelligence can develop with effort and learning). These views on one's own intelligence have been related to achievement goals (Bandura & Dweck, 1985; Dupeyrat & Marine, 2005; Dweck, 1999; Dweck & Leggett, 1988; Elliot & Dweck, 1988). Students with an entity/fixed theory of intelligence were more likely to adopt a performance goal, while students with an

incremental theory of intelligence tended to adopt learning goals. In turn, students' theories of intelligence and achievement goals may predict achievement.

Research that explores the above mentioned constructs is important because of the overall effects on motivation and achievement. The area of motivation is important to society because motivation helps people accomplish their goals. The study of motivation can give us clues as to why some people are successful in school and exhibit high achievement, why some people give up easily and some persist, how achievement and motivation go together, and how to measure the construct of motivation. There has been a great deal of research in the area of motivation, yet motivation still remains a complex construct to study, understand, and measure.

An important underlying aspect of this research that may have a bearing on children's motivation, goals, and achievement, is the role of parents in the development children's theories of intelligence. This is an issue that has received little attention and very little research. No studies have compared children's and parents' theories of intelligence and explored reasons why they may or may not match and what this means for children's motivation and achievement.

Another little-researched area is *why* there is a relation between theories of intelligence and achievement. Examination of these constructs and others, including motivation and goal orientation, using a mediational model could help explain mechanisms underlying the relationship. It is clear that mediational models including these motivation and achievement-related variables have not been widely applied or studied. Also, most studies use self-report data, and information from a more objective source, such as a parent, could add a new dimension to research in this area.

Despite much previous work in the area of academic achievement and motivation, it is clear that holes continue to exist in the research. Another area of research that remains unclear is the relationship between academic achievement, motivation, and cognitive abilities. The relationship between academic achievement and cognitive ability has been well documented, as has the relationship between academic achievement and motivation. Previous research that has examined the relationship between cognitive abilities, motivation, and achievement has yielded

inconsistent findings. The present study will help in understanding the independent contribution of motivation in academic achievement.

The present study aims to shed light on the ways that theories of intelligence affect academic motivation and if this relationship, in turn, affects academic achievement. The present study also explores the role of parents in children's development of theories of intelligence and how parent and child theories of intelligence are related. Clearer understanding in these areas could help researchers, teachers, and parents develop applied methods for fostering effective theories of intelligence and ultimately to increase motivation and achievement in students. All of the previous and future research in the area of motivation offers valuable clues to understanding and improving academic outcomes, and they show the importance and utility of continued research in the area.

Research Questions and Hypotheses

Research questions to be explored by the present study include:

- 1.) What impact does theory of intelligence have on academic motivation and achievement?
- 2.) What is the relationship between theory of intelligence and goal orientation (mastery vs. performance goals)?
- 3.) Do children's theories of intelligence tend to match those of their parent? What is the strength of the relationship between child and parent theories of intelligence? (Do parents' theories of intelligence influence those of their children?)

Based on current knowledge about these variables, it is hypothesized that:

- 1.) Academic motivation will act as a mediator between theory of intelligence and academic achievement.
- 2.) An incremental theory of intelligence will predict mastery goal choice.
- 3.) Parent and child theories of intelligence will match.

CHAPTER 3

METHODS

Participants

Participants were 208 students from grades 4-8 who attend a charter school in a southeastern state and 133 of their parents, who chose to participate. The researcher obtained consent from the school (see Appendix B) to conduct research there, and approval for the study from Florida State University's institutional review board was granted (see Appendix A). The researcher made e-mail contact with teachers in grades 4-8 at the school, then scheduled in-person meetings to explain the study and obtain consent to participate from each willing teacher. The researcher made in-person announcements about the upcoming study to students in each participating homeroom classroom and distributed informed consent forms for the students to take home to give to their parents. The researcher also explained the study, then handed out flyers with study information and information about gift card drawings for participants along with informed consent forms. A reward of a \$1 fast-food restaurant certificate was offered for each student who returned their consent forms, regardless of whether the students and parents consented to participate in the study. Students who returned consent forms within the same week that it was originally sent home were also entered in a drawing for a \$10 gift card, one per grade level, to a local store. If the students and parents consented to participate and completed all questionnaires and forms, they were entered into a drawing for two \$50 gift cards to a local store. Participating teachers were each rewarded with \$10 gift cards to a local store.

Consent from the parents for student and parent participation was obtained prior to administering any scales or questionnaires to the students or parents. Students took informed consent forms home with them a few weeks before data collection began. Parents were asked to sign and return the forms indicating their consent to participate in the study or their refusal. Consent forms were sent home with 438 students in the 4th-8th grades, and 208 students returned their forms and participated in the study. This is a 47% response rate from this group of students.

The participating school is a unique charter school that offers research and development opportunities for educators and a laboratory for teacher education. The charter school is sponsored by a large state university, and the school and university collaborate on many research projects. Parents may choose for their children to attend this school and they provide their own transportation to school. The demographics of the student population at the school represent a population typical of other public schools in the state. Students who apply for admission are randomly selected by a computer to most closely represent the state's public school student population.

Demographics for the entire school's student population for the 2009-2010 school year (when data was collected) are as follows: total Students: 1698, number of female students: 852, number of male students: 846, number of African American students: 469 (28%), number of Caucasian students: 906 (53%), number of students of another minority group: 323 (19%), number of gifted students: 45 (3%), number of students with exceptionalities: 158 (9%), and number of students receiving free or reduced lunch: 472 (28%). The age range of the student participants was from 9-16 with a mean of 11.86 and a median of 12. Student grade point averages ranged from 1.36-4.0 with a mean of 3.23 and a median of 3.43. The demographics of the participants in this study are included in Table 3.1, and the group of participants minus outliers and those with high percentages of missing data are shown in Table 3.2.

Table 3.1
Demographic Frequencies for All Participants

	N	%
<u>Gender</u>		
Male	90	43.3
Female	118	56.7
<u>Grade Level</u>		
4 th	32	15.4
5 th	63	30.3
6 th	40	19.2
7 th	28	13.5
8 th	45	21.6
<u>Race</u>		
American Indian or Alaska Native	1	.5
Asian	6	2.9
Black or African American	59	28.4
Native Hawaiian or Other Pacific Islander	0	0
White	123	59.1
Some Other Race	15	7.2
Hispanic	28	13.9
Non-Hispanic	174	86.1
<u>Parent Gender</u>		
Male	29	21.8
Female	104	78.2
<u>Parent Education</u>		
Some high school	2	1
High school/GED	15	7.2
Some college	22	10.6
2-year college degree	21	10.1
4-year college degree	41	19.7
Graduate school	28	13.5

Table 3.2
Demographic Frequencies for Participants, Excluding Outliers and Incomplete Data

	N	%
<u>Gender</u>		
Male	82	43.2
Female	108	56.8
<u>Grade Level</u>		
4 th	29	15.3
5 th	61	32.1
6 th	36	18.9
7 th	26	13.7
8 th	38	20
<u>Race</u>		
American Indian or Alaska Native	1	.5
Asian	6	3.2
Black or African American	54	28.4
Native Hawaiian or Other Pacific Islander	0	0
White	115	60.5
Some Other Race	13	6.8
Hispanic	28	13.7
Non-Hispanic	162	85.3
<u>Parent Gender</u>		
Male	27	14.2
Female	96	78
<u>Parent Education</u>		
Some high school	2	1.1
High school/GED	13	6.8
Some college	21	11.1
2-year college degree	19	10
4-year college degree	36	18.9
Graduate school	28	14.7

Fourth through eighth graders were chosen because the pre-teen years bring a complicated period of transition when intervention could be critical. The transition from elementary school to middle school can be difficult for many students and has been linked with a decline in academic achievement, motivation, self-perceptions, and self-esteem (Alspaugh, 1998; Anderman & Midgley, 1997; Eccles, 2004). Holas and Huston (2012) state that the literature indicates that the middle school transition tends to be difficult for children, but individual differences have an impact on level of difficulty. Recent research by Holas and Huston (2012) examined the middle school transition, specifically the achievement of fifth and sixth graders from a large number of schools across many regions. Results showed that grade in school does not necessarily relate to achievement loss, but classroom quality and school characteristics did have an effect on achievement.

If the quality of instruction affects achievement in this age group, as well as individual differences, perhaps teaching theories of intelligence could be efficacious. Little research has been done related to theories of intelligence and its role in the academic difficulties that can be experienced in the transition to middle school. This could be a time when a student's theory of intelligence is particularly important in guiding their academic motivation and success and also a time when intervention could be crucial.

Measures

The following table includes the measures that were used with both students and parents. The GRS, SMALSI, and ACES are routinely used in public schools throughout the U.S. The Theories of Intelligence Scales (adult and child forms), created by Dweck (1999), are scales that are not widely used in schools; however, they have been utilized in many studies with both children and adults and appear to be reliable and valid (Blackwell, Trzesniewski, & Dweck, 2007; Braten & Stromso, 2005; Dweck, Chiu, & Hong, 1995; Garcia-Cepero & McCoach 2009; Shih, 2011). The Task-Choice Goal Measure was also created by Dweck (1999) and has been used in many studies to distinguish between learning and performance goals (Dai, 2000; Livengood, 1992; Harper, 2010). Each measure utilized in the present study is described below. Table

3.3 shows the instruments used in the study and whether they are completed by students or parents.

Table 3.3
Overview of Instruments Used

Student	Parent
SMALSI (child form or adolescent form)	GRS (Motivation Scale only)
ACES (appropriate for 6 th -8 th graders only)	Theories of Intelligence Scale—Self Form for Adults
Theories of Intelligence Scale for Children—Self Form	Demographic Survey
Task-choice Goal Measure	
GPA	

Demographic Information Survey

A brief survey (see Appendix C) was used to collect data from parents regarding the demographic information of the student and parent.

Motivation

Academic Competence Evaluation Scales (ACES). The ACES is an instrument that was created to measure the academic functioning of students in grades K-12 or college. The ACES has multiple forms, student, teacher, and college student. The self-report, student version is appropriate for students in grades 6-12. Academic competence is defined as a multidimensional construct, and the ACES provides scores on the following scales: Reading/Language Arts, Mathematics, Critical Thinking, Interpersonal Skills, Engagement, Motivation, and Study Skills. These scales are broken into two groups, Academic Skills (Reading/Language Arts, Mathematics, and Critical Thinking) and Academic Enablers (Interpersonal Skills, Motivation, Study Skills, and Engagement).

The Motivation scale, which has 9 items, will be focused on for the purposes of this study. DiPerna and Elliott (2000) identify motivation as an Academic Enabler—an important aspect of the learning process, stating that motivation has been correlated with scores on achievement tests and grades. Each item gives a likert scale from 1-5, with 1 indicating a response of “Never” and 5 indicating “Almost Always.” Scores on each item are totaled, and scores on the Motivation scale range from 9-45. Higher scores indicate a higher level of motivation reported by the student.

The ACES was chosen for use in the present study because it is efficient, taking only 5-10 minutes to complete, provides self-report data related to students’ motivation, and is psychometrically sound. The ACES is age-appropriate for a large portion of participants in the sample group.

The coefficient alphas, indicating internal consistency estimates of reliability, are very high across all grade levels and on both teacher and student ACES forms (student form for Academic Skills = .94 and Academic Enablers = .96). Coefficient alphas for the subscales ranged from .83-.96 (DiPerna & Elliott, 2000). For the ACES Student Form, test-retest reliabilities were .81 for the Academic Skills scale and .82 for the Academic Enablers scale. The test-retest reliability for the Motivation scale was .84. Higher alpha values are desirable, with a rule of thumb being that a measure have a reliability of .7 for use (Henson, 2001). The coefficient alphas for the ACES indicate that both forms of the ACES are highly reliable.

Evidence suggests that the ACES is valid for measuring the academic functioning of students in grades K-12 or college. Evidence for the appropriateness of the test content was obtained through qualitative feedback from practicing teachers and educational researchers, reviewing educational standards for several states, conducting a pilot study, and examining the distribution of responses. The test authors determined that the content is valued by teachers, is at an appropriate reading level, and is easy to complete (DiPerna & Elliott, 2000). Construct validity is shown for this test by its appropriate content and by its relation to other measures designed to assess similar content. The ACES appears to be moderately to highly correlated with measures of academic skills, as well as with measures of social skills and academic concept,

including the Social Skills Rating Scales and the Iowa Test of Basic Skills (DiPerna & Elliott, 2000).

School Motivation and Learning Skills Inventory (SMALSI). The SMALSI is a self-report inventory that examines 10 constructs that are associated with academic motivation, learning, and study strategies. The SMALSI scales include Study Strategies, Note-Taking/Listening, Reading/Comprehension Strategies, Writing/Research Skills, Test-Taking Strategies, Organizational Techniques, Time Management, Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties. This inventory has two different forms: the SMALSI-Child Form is appropriate for students ages 8-12, and the SMALSI-Teen Form is appropriate for students ages 13-18. The Child Form has 147 items, and the Teen Form has 170 items. The SMALSI takes about 20-30 minutes to complete and is an untimed, self-report instrument. The authors state that most children in grades 3-12 will be able to read and respond to the SMALSI items (Stroud & Reynolds, 2006).

The SMALSI was chosen for use in this study because it is a widely used measure of academic motivation, is psychometrically sound with a large standardization sample, is appropriate for the age group of the sample in this study, and uses an appropriate reading level. Evidence suggests that the SMALSI is valid for measuring the academic functioning of students in grades K-12 or college. Reliability is high for both SMALSI forms with alpha coefficients being above .75. For the teen form, almost all coefficients are in the .80s and .90s and are tend to be routinely higher than on the child form (Stroud & Reynolds, 2006).

It is important to examine the relationship between scores on the SMALSI to that of other measures in order to assess construct validity. One assessment with which the SMALSI was compared is the Behavior Assessment System for Children, Second Edition (BASC-2), both the Self-Report of Personality (SRP-C)--Child Form and the Self-Report of Personality--Adolescent Form (SRP-A). The BASC-2 is a commonly used assessment that was created to measure dimensions of child personality, emotion, and behavior. The results of the correlation analysis show that the SMALSI subscales that represent Student Strengths are negatively correlated with BASC-2, SRP-C scales

measuring maladjustment or pathology. The SMALSI Student Liabilities scores, including Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties, are positively correlated with BASC-2, SRP-C scores that measure maladjustment and pathology. High correlations exist between SMALSI scores and BASC-2 SRP scores measuring school-related issues like Attitude to School, Attitude to Teachers, and School Maladjustment. Related to the correlations between the SMALSI and BASC-2, Stroud & Reynolds (2006) state that validity of recommended interpretations of the scores are supported, and development of aspects of learning measured by the SMALSI are associated with overall school adjustment. This study will focus on the Low Academic Motivation scale within the SMALSI. Responses to items are on a 0-3 likert scale with a score of 0 indicating “Never” and 4 indicating “Almost Always.” This scale includes 19 items, and total scores range from 0-57. Since this scale measures Low Motivation, higher scores indicate lower motivation.

Gifted Rating Scales. The Gifted Rating Scales (Pfeiffer & Jarosewich, 2003) is a teacher-completed gifted rating scale that was developed to measure indicators of giftedness in children. The GRS is based on current theories of giftedness with a belief that talent is multi-dimensional. Five brief subscales cover proposed domains of ability: intellectual, academic readiness, motivation, creativity and artistic talent. The GRS comes in two forms: the School Form and the Preschool/Kindergarten Form. The school-age GRS form is used to evaluate children between the ages of 6:0 and 13:11 years who are in grades 1-8, and this is the scale being used in the present study.

The GRS includes a Motivation subscale measuring students’ “drive or persistence, desire to succeed, willingness to work hard, tendency to enjoy challenging tasks, and ability to work well without encouragement or reinforcement” (Pfeiffer & Jarosewich, 2003, p. 2). Pfeiffer & Jarosewich (2003) note that motivation is not a type of giftedness but an indicator of a student’s potential to apply his or her abilities. This scale serves as a measure of motivation in the current study. Each scale on the GRS includes twelve items with individual scores ranging from 1-9 (Below Average to Above Average). Total scores range from 12-108, with higher scores indicating above average ability, per the rater’s report.

The GRS has been shown to be a psychometrically sound instrument with its standardization sample (teacher report), as well as with a parent-report sample. Across all scales of the measure and across age ranges, the GRS coefficient alpha reliabilities were between .97 to .99. Standard error of measurements were in the range of 1.0 to 1.73. The test–retest reliability coefficient was .97 on the Academic Ability and Motivation scales with a retest period of seven days for 160 students, ages 12:0–13:11 (Pfeiffer, Petscher, & Kumtepe, 2008).

For the current study, the GRS was not used as an overall measure of giftedness, but the Motivation subscale was used to obtain information from the parents about their children. The GRS is typically completed by teachers, but the current study used parents as the reporters. Studies from the United States and Korea used parents to rate their children on the GRS, rather than teachers, and found high internal consistency and moderate to high concurrent validity for scores of these ratings (Lee & Pfeiffer, 2006). Li, Lee, Pfeiffer, and Petscher (2008) found that parent ratings produced a similar factor structure to teacher ratings. On the Korean GRS, five of the six scales produced coefficient alphas of .95 or .96 with correlation coefficients with an academic measure between .33 and .6.

Inviting parents to provide ratings of their child offers several advantages. Parent ratings offer a unique viewpoint on a child’s behaviors and abilities that may not be evident in the school environment, and they complement the perspectives of the teachers. In fact, in several instances parents are viewed as the best source of data on child behaviors and functioning. Loeber, Green, and Lahey (1991), for example, found that mothers provided more useful information than either child self-reports or teacher ratings for child internalization problems, oppositional behavior, and conduct problems. (Li et al., 2008, p. 662)

Based on internal structure, the GRS-S appears to be a valid measure. Intercorrelations among the scales across the age bands within the GRS school-age group are moderate to high and range from .45 (between Artistic Talent and Leadership) to .95 (between Intellectual Ability and Academic Ability). There is an especially high correlation between the Academic Ability and Intellectual Ability scales

of the GRS, and this is consistent with other measures of academic achievement and intellectual ability (Pfeiffer & Jarosewich, 2003).

Convergent validity was assessed by comparing the GRS scores with scores of other measures that are purported to measure the same constructs. It was found that the GRS scales of Intellectual Ability and Academic Ability moderately correlated with the Full Scale IQ score on the Wechsler Intelligence Scales for Children, Fourth Edition (WISC-IV) (.53 and .54). These GRS scales also significantly correlated with the Verbal Comprehension Index scores, the Perceptual Reasoning Index scores, the Working Memory Index scores, and the Processing Speed Index scores on the WISC-IV (Pfeiffer & Jarosewich, 2003). Additionally, scores on all GRS scales, the ACES motivation scale, and the Behavioral Characteristics of Superior Students (SRBCSS), are highly correlated (Pfeiffer & Jarosewich, 2003).

The GRS was also validated by comparing criterion groups—one group of students previously identified as gifted and one group of students not identified as gifted. Results showed that the group identified as gifted had significantly higher scores than the group not identified as gifted, and the gifted group scored the highest on the Intellectual Ability and Academic Ability scales (Pfeiffer & Jarosewich, 2003).

Theories of Intelligence

The Theories of Intelligence Scale, Self-Form for Children, measures children's theories of intelligence and consists of six items (see Appendix D). Three of these are entity theory statements, such as "You have a certain amount of intelligence, and you really can't do much to change it" (Dweck, 1999, p.177). The other three items are incremental theory statements, such as "You can always greatly change how intelligent you are" (Dweck, 1999, p.177). A theory of intelligence score on the low end (1) of the likert scale (ranging from 1-6) represent an entity theory, while scores on the high end (6) represent an incremental theory. On the Self-Form for Children, items 4-6 are reverse-scored, and items 3, 5, 7, and 8 are reverse-scored on the Self-Form for Adults. Scores for each item on the scale are added and averaged. If the average score is 1-3, the participant is more likely to hold an entity theory of intelligence, and if the average score is 4-6, they are more likely to hold an incremental theory of intelligence.

This measure was chosen because there are few measures of theory of intelligence, it is psychometrically sound, and Dweck, the creator, is a leading and reputable researcher in the area of theory of intelligence. In a study by Blackwell, Trzesniewski, & Dweck (2007), the Theories of Intelligence Scale was used with 373 7th grade students, and the internal reliability of the theory measure was .78 (N=373). The mean score was 4.45 with a SD of .97 (range 1 – 6) and a test–retest reliability over a 2-week period of .77 (N=52).

The Theories of Intelligence Scales (adult and child forms), created by Dweck, are scales that are not widely used in the schools, but are published in her book, *Self-Theories: Essay in Social Psychology* (1999). However, they have been used with children and adults, as part of research conducted by Dweck, and appear to be reliable and valid (Braten & Stromso, 2005; Dweck, Chiu, & Hong, 1995; Greene, Costa, Robertson, Pan & Deekens, 2010; Shih, 2011).

Dweck, Chiu & Hong (1995) used an abbreviated, 3-item version of the theories of intelligence scale and found that it had high internal validity (from .94-.98) and that the test-retest reliability was .8 over a two-week time period. Validation studies conducted by Dweck, Chiu, and Hong (1995) indicated that the theories of intelligence measure was independent of the respondents' gender, age, political affiliation, and religious background. Related to discriminant validity, it was also found that the measure did not correlate with measures of cognitive ability, confidence in intellectual ability, self-esteem, or confidence in other people or the world (Dweck, Chiu, & Hong, 1995).

The Theories of Intelligence Scale—Self Form for Adults measures theory of intelligence in adults (age 18 and older). This scale is very similar to the child version but has 8 items, rather than 6. It utilizes a 6-point likert scale and includes statements about both incremental and entity theories. Shih (2011) used this eight-item scale with eighth-grade Taiwanese students. A confirmatory factor analysis (CFA), conducted to establish validity, showed that items from each subscale (entity and incremental theories of intelligence) loaded only onto their hypothesized variables and represented an acceptable goodness of fit (Shih, 2011). In this study, reliability estimates

(Cronbach's alpha) were .83 for the entity items and .77 for the incremental items. Research by Garcia-Cepero & McCoach (2009) also conducted a CFA and found adequate goodness of fit.

A study by Braten and Stromso (2005) used the adult theories of intelligence scale, translated into Norwegian, with two groups of college students and found Cronbach's alpha to be .90 and .88 for the entity items and .92 and .89 for the incremental items.

Achievement Goals

The Task-Choice Goal Measure (Dweck, 1999) is a straightforward method of differentiating mastery/learning goals and performance goals (see Appendix E). Dweck states, "When we use measures that pit learning goals against performance goals—asking which is more important to the students (looking smart vs. attempting challenging learning tasks), then we find a clear relation with students' theories of intelligence" (1999, p. 184). This measure was chosen because it will help determine if this relationship holds true for the participants in this study. This could have implications for understanding how theories of intelligence lead to goal formation and level of motivation.

This measure presents one statement and asks a person to choose among four responses. The responses represent tasks that embody different goals. Statements one, three, and four, represent performance goals, while statement two represents a mastery goal. The task-choice measure has been used in multiple studies to determine whether students pursue performance or mastery goals (Dai, 2000; Harper, 2010; Livengood, 1992). Prior to presenting the measure, the proctor says, "We have different kinds of problems here for you to choose from. There is no right answer—different students make different choices. Just put a check in front of your choice" (Dweck, 1999, p. 185). See the statements and possible responses below:

I would like to work on:

_____ *Problems that aren't too hard, so I don't get many wrong.*

_____ *Problems that I'll learn a lot from, even if I won't look so smart.*

_____ *Problems that are pretty easy, so I'll do well.*

_____ *Problems that I'm pretty good at, so I can show that I'm smart.*

Academic Achievement

Student GPAs were obtained from student records and are used to represent academic achievement. Students' final course grades were converted from percentages or letter grades to GPAs, using their school's grading scale, as follows in Table 3.4. Students' GPAs reflect final course grades from both fall and spring semesters of the school year during which the data for the present study was collected.

Table 3.4
Grading Scale

Percentage	Letter Grade	GPA
90-100	A	4.0
80-89	B	3.0
70-79	C	2.0
60-69	D	1.0
0-59	F	0

Procedures

Students were asked to complete the Academic Competency Evaluation Scales (ACES) (grades 6-8 only), the School Motivation and Learning Strategies Inventory (SMALSI), the Theories of Intelligence Scale for Children—Self Form, and the Task-choice Goal Measure. Parents of these students were asked to complete the Theories of Intelligence Scale—Self Form for Adults, as well as the Motivation scales within the

Gifted Rating Scales (GRS). The majority of these inventories are routinely used in public schools throughout the U.S. The students completed their questionnaires while at school, and parents' questionnaires were sent home to be completed. A pilot testing session was conducted with one student prior to the administration to the entire sample. A random 5th grade student was chosen to complete the questionnaires. The pilot student completed the questionnaires, in no particular order, in a classroom with other students present, but quiet, during his first period class (just as all the other participants did), and he required 45 minutes to complete the student questionnaires. He was able to maintain his focus through the class period and did not complain of fatigue, but it was decided that two shorter sessions, rather than one longer one would be most appropriate to account for possible fatigue and inaccurate responding. The researcher estimated that younger students might need slightly more time and older students slightly less time than the pilot student. The students completed their questionnaires during two separate 25-30 minute sessions (on consecutive days) and were allowed extra time for a third session, if needed. Students were in their first period classrooms with classmates during all sessions. The researcher was present in each classroom during sessions to answer questions.

Data Analysis

The following data were collected and coded:

Demographics (categorical variables)

Theory of Intelligence score-parent (continuous variable)

Theory of Intelligence score-child (continuous)

GRS motivation score (continuous)

ACES motivation score (continuous)

SMALSI motivation score (continuous)

GPA (continuous)

Task-choice (categorical)

To answer the research questions, multiple statistical analyses were conducted, and the following analyses were used to answer each research question, as described

below. The statistical program used was Predictive Analytics SoftWare (PASW) 20. Internal consistency of each measure was calculated prior to data analyses.

To examine Research Question 1, a path analysis, or mediational regression analysis, was proposed to examine possible causal relationships between theory of intelligence (independent variable) and motivation and achievement (dependent). Only one of the motivation measures (SMALSI Motivation Scale) had an adequate sample size, so it was the measure of motivation used in the analyses. Path analysis is related to multiple regression and aims to break-down correlations into separate pieces in order to estimate of the magnitude and significance of hypothesized relationships between sets of variables. Regression analysis assumes that the variables used are significantly correlated with each other. Because the relationship between child theory of intelligence and GPA was not significantly correlated, assumptions were not met, and a path analysis could not be conducted. Instead, multivariate regression analyses were conducted to examine the predictive value of both child and parent theories of intelligence.

For Research Question 2, a series of logistic regressions were conducted to determine whether child and parent theories of intelligence predicted goal orientation. Logistic regression is a type of regression that allow for the analysis of a categorical of dichotomous variable (goal orientation) and a continuous variable (theory of intelligence).

For Research Question 3, a Pearson bivariate correlation analysis was conducted to determine the strength of the relationship between parents' theory of intelligence score and children's theory of intelligence score. In addition to the correlation analysis, a multivariate linear regression was also conducted to determine whether parent theories of intelligence predicted child theories of intelligence.

Prior to data analysis, an *a priori* power analysis was conducted to determine the necessary appropriate sample size to produce statistically significant results with appropriate power. The power analysis was conducted with a statistics program called G*Power, Version 3.1.2 (Faul, 2009). With power set at .8, alpha at .05, effect size at .2, and maximum number of predictors set at 5, the necessary sample size for a

multiple regression analysis is 70. Effect size is the magnitude of the relationship between two variables and is the effect that one wishes to detect with respect to a given level of power. Related to effect sizes, Durlak (2009) stated that it is not justified to suppose that large effect sizes are more valuable than medium or small ones because the clinical value can be as important as magnitude. “Small” effect sizes (.20) as designated by Cohen, can show important outcomes in education research, especially when based on measures of academic achievement (Durlak, 2009).

For the present study, the effect size of .2 was chosen as the smallest effect that would be of clinical significance, based on recommendations from the aforementioned literature. The alpha level was set at .05, which is commonly accepted as an appropriate value in the social sciences. This setting means that the researcher is willing to accept a probability of 5% of making a Type I Error. A Type I Error occurs when one assumes that a relationship between the variables exists when it does not. With power set at .8, the analysis will have 95% power to produce a statistically significant result. The sample size of this study well exceeds the necessary sample size to produce statistical significance.

Additional Analyses

Pearson correlations were conducted to examine the relationships between the main variables explored in the research questions. Additional analyses examined demographic variables, distribution of variables, and inter-item reliability. A series of one-way ANOVAs was conducted to determine any potential gender and racial group differences in regard to the study variables.

CHAPTER 4

RESULTS

This chapter presents the results found in the data collected, including various types of statistical analyses to examine the data. Research questions and hypotheses are presented below, as well as preliminary findings, descriptive statistics, and results of statistical analyses, divided by the research question that they attempt to answer. The statistics program used to analyze all data was PASW 20.

Variables and Preliminary Findings

Prior to conducting data analyses for the testing of study hypotheses, study data of the 208 participants were examined for missing data and outliers. Of the 208 participants, data from 10 were removed due to outliers in the data, and 8 were removed due to > 75% of incomplete data. The resulting study sample size was 190, 91% of the original sample. Outliers were visible in the scatter plots for each variable and were examined by using box plots. In the box plots, the box indicates the interquartile range of scores for each variable. Scores that were more than one and a half times the length of the box, or the interquartile range, were determined to be outliers (Hodge & Austin, 2004).

The variables under examination for this study were the independent variables of theories of intelligence, as measured by the Theories of Intelligence Scale-Child Report (ITIC) and the Theories of Intelligence Scale-Parent Report (ITIP) scale, interval coded; the mediating variable of motivation, as measured by the SMALSI motivation scale, interval coded; the dependent variable of academic achievement, as measured by GPA, ordinal coded; and the dependent variable of achievement goal choice, as measured by a dichotomous variable wherein 0 = performance goal and 1 = mastery goal. For the dependent variable of achievement goal choice, 103 (54%) of the sample preferred the goal choice of performance while 87 (46%) of the sample preferred the goal choice of mastery. Many studies do not report the overall ratio of participants' performance to mastery goal choices, but the ratio in the present study is somewhat different from findings by Harper (2010), who found that 186 (72%) high school age study participants chose a performance goal versus 71 (28%) who chose a mastery

goal. The SMALSI motivation scale measures “Low Motivation,” so higher scores on this scale indicate lower motivation, thus revealing a negative correlation with GPA and ITIC. The students’ responses to the three measures of motivation used in this study (SMALSI motivation scale, ACES motivation scale, and GRS motivation scale) were significantly correlated (refer to Table 4.1); however, two of the measures of motivation (ACES motivation scale and GRS motivation scale) were not included in the analyses because the n of those variables was not large enough to produce appropriate power. Descriptive statistics for the variables ITIC, ITIP, SMALSI Motivation scale, and GPA are presented below in Table 4.1.

Table 4.1
Correlation of Motivation Measures

		SMALSI	ACES	GRS
SMALSI	Pearson Correlation	1	.451**	.246*
	Sig. (2-tailed)		.000	.010
	N	203	104	108
ACES	Pearson Correlation	.451**	1	.277
	Sig. (2-tailed)	.000		.051
	N	104	108	50
GRS	Pearson Correlation	.246*	.277	1
	Sig. (2-tailed)	.010	.051	
	N	108	50	109

Note. * $p < 0.05$; ** $p < 0.01$

Prior to hypothesis testing or in-depth data analysis, the internal consistency, or inter-item reliability, was tested for the various measures used. To test for inter-item reliability, Cronbach’s alphas were computed for the ITIC, ITIP, and SMALSI Motivation subscale. The ITIC demonstrated good internal consistency, with a Cronbach’s alpha of .78. The ITIP had strong internal consistency, with a Cronbach’s alpha of .92. The SMALSI Motivation Scale also had good internal consistency with a Cronbach’s alpha of .82 for the Child Form and .88 for the Teen Form. Internal consistencies of .7 or greater are typically acceptable for research purposes, and all scales and subscales used in the

current data analysis exceed .7 (Henson, 2001; Nunnally, 1978). This internal consistency is consistent with previous studies that have used the Theories of Intelligence Scale (Blackwell et al., 2007; Dai, 2000; Shih, 2011) and the SMALSI (Stroud, 2006).

Table 4.2
Descriptive Statistics for Study Variables

Variables	N	Min	Max	M	SD	Skewness	Kurtosis
ITIC	190	1.33	6.00	4.33	1.02	-.41	.21
ITIP	114	1.00	6.00	4.68	.92	-1.21	2.00
<i>ITIP^a</i>	<i>114</i>	<i>.00</i>	<i>.78</i>	<i>.33</i>	<i>.16</i>	<i>.07</i>	<i>-.02</i>
SMALSI Motivation	190	0.00	32.00	10.88	7.57	.74	-.05
GPA	190	1.36	4.00	3.21	.64	-.89	.18

^aThe ITIP row in italics indicates the values after logarithmic transformation to reduce skewness.

As seen in Table 4.2, all study variables except for the ITIP scale were normally distributed. The ITIP scale skewness value was -1.21, which indicated substantial negative skewness, i.e. score being $\geq \pm 1.00$. To further examine the degree of skewness for the ITIP scale, a normal Q-Q plot was derived (see Figure 4.1). The curvilinear shape of the Q-Q plot suggested a deviation from normality. A Kolmogorov-Simonov (KS) test was conducted to check for normality; if a KS score is significant, skewness is evident in the data. The KS value was $Z = 1.79$, $p < .001$, suggesting significant skewness in the data. In order to adjust the ITIP variable for the violation of normal distribution of data, the variable was recomputed in accordance with statistical recommendations (Tabachnick & Fidell, 1996). First, the variable was reflected by subtracting the maximum score all of the values for a variable from one plus the absolute value of maximum value for the variable. The resulting distribution is positively skewed, and all values are larger than zero. Second, a logarithmic transformation was conducted on the reflected ITIP variable such that ITIP scores were now coded as score probabilities. This transformation reduced the skewness and kurtosis of this variable (in Table 4.2, the recoded ITIP scale appears in italics). Due to reflection, the interpretation

of data results should be considered in the reverse (i.e., the positive/negative value in relation to IVs is now opposite from original score).

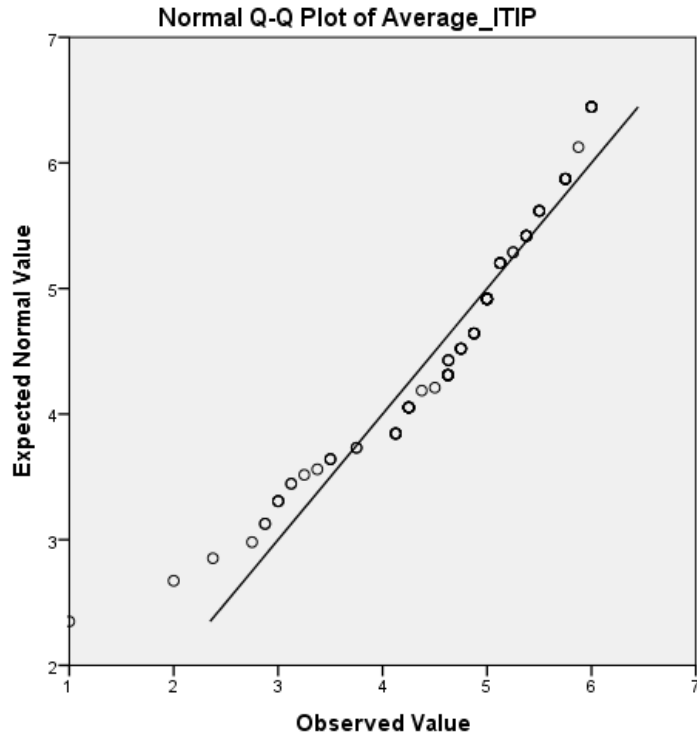


Figure 4.1. Normal Q-Q plot for ITIP.

In order to determine whether the demographic variables of gender and racial group needed to be controlled for in statistical analyses for hypothesis testing, a series of one-way ANOVAs were conducted to determine any potential gender and racial group differences in regard to the study variables of intelligence theory (measured by the ITIC and ITIP); motivation (measured by the SMALSI motivation subscale), and academic achievement (measured by GPA). See descriptive statistics in Table 4.3 by race (0=White, 1=Persons of Color). Gender was not significantly associated with ITIC or ITIP scores, SMALSI Motivation scores, or GPA. Due to a small number of participants in racial groups other than White or Black/African American, for the purpose of analysis, racial groups were divided into two groups: White and Persons of Color. Racial group was not significantly associated with SMALSI Motivation and ITIC scores.

However, there were significant racial group differences in regard to ITIP, $F(1,112) = 6.30, p < .05$. Higher ITIC and ITIP scores indicate a tendency toward an incremental theory of intelligence, while lower scores indicate an entity theory of intelligence. White parent participants ($N=71$) had a significantly higher group mean ($M=.36$ after transformation) than did parent participants from other racial groups ($M=.28$ after transformation). Due to reflection (as part of the statistical procedure to reduce skewness), ITIC and ITIP scale scores are now reversed. Thus, this finding shows that parent participants who were from racial groups other than the White racial group had significantly lower ITIP scores than did White students, suggesting their preference for an entity approach to intelligence. In other words, White students were more likely to report an incremental approach to intelligence. There was also a significant racial group difference in regard to GPA, $F(1,184) = 4.99, p < .05$, with White participants ($N=109$) having a higher GPA mean score ($M=3.31$) than participants from other racial groups ($N=77, M=3.11$).

Table 4.3
Descriptive Statistics by Race for Study Variables

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
GPA	0	109	3.3141	.60092	.05756	3.2000	3.4282
	1	77	3.1091	.63944	.07287	2.9640	3.2542
	Total	186	3.2292	.62373	.04573	3.1390	3.3195
SMALSI Motivation Subscale (High Score = Low Motivation, 0-57)	0	109	10.8246	7.75174	.74248	9.3529	12.2963
	1	77	10.9984	7.52716	.85780	9.2900	12.7069
	Total	186	10.8966	7.63953	.56016	9.7914	12.0017

Note. 0=White, 1=Persons of Color

Table 4.3 (continued)
Descriptive Statistics by Race for Study Variables

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Average_ITIC	0	109	4.3425	.98020	.09389	4.1564	4.5286
	1	77	4.2965	1.09378	.12465	4.0483	4.5448
	Total	186	4.3235	1.02611	.07524	4.1750	4.4719
ITIP_Log	0	71	.3632	.16295	.01934	.3246	.4018
	1	43	.2852	.15711	.02396	.2369	.3336
	Total	114	.3338	.16451	.01541	.3032	.3643

Note. 0=White, 1=Persons of Color

In order to determine whether grade and age of participants needed to be controlled for in statistical analysis for hypothesis testing, Pearson bivariate correlations were conducted with the study variables. Both student grade and age were significantly correlated with ITIC, $r(190) = .30, p < .001$, and $r(190) = .24, p < .001$, respectively; and with GPA, $r(190) = -.35$ and $r(190) = -.38$, respectively. In other words, the older the student, the more likely the student reports adopting an incremental approach to intelligence. In contrast, being older was correlated with lower GPA scores. In order to determine whether the demographic variables of gender and racial group needed to be controlled for in statistical analyses for hypothesis testing on achievement goal orientation, two-way chi-square analyses were conducted. These analyses yield no significant differences in group percentages. A series of one-way ANOVAs were conducted to determine any potential achievement goal orientation group differences as a result of age or grade of student. These results were not significant. Based on significant findings, student race, age, and grade were controlled for in statistical analyses when relevant.

Research Questions and Hypotheses

Research questions to be explored by the present study include:

- 1.) What impact does theory of intelligence have on academic motivation and achievement?
- 2.) What is the relationship between theory of intelligence and goal orientation (mastery vs. performance goals)?
- 3.) Do children's theories of intelligence tend to match those of their parent? What is the strength of the relationship between child and parent theories of intelligence? (Do parents' theories of intelligence influence those of their children?)

Based on current knowledge about these variables, it was hypothesized that:

- 1.) Academic motivation will act as a mediator between theory of intelligence and academic achievement.
- 2.) An incremental theory of intelligence will predict mastery goal choice.
- 3.) Parent and child theories of intelligence will match.

Findings

This section presents the results of various statistical analyses that answer each research question.

Research Question 1

What impact does theory of intelligence have on academic motivation and achievement?

The first research hypothesis was that theory of intelligence would indirectly influence the outcome of academic achievement via the mediator of academic motivation. Mediation analyses for regression (Baron & Kenny, 1986) were conducted to assess significant pathways between Theory of intelligence, Motivation, and GPA. Prior to conducting mediational regression analyses, Pearson bivariate correlations between the predictor, mediating, and outcome variables were first computed, with the expectation that all variables are significantly correlated with one another. If the variables are associated significantly with each other, multiple regression analyses for mediation can then be conducted. In multiple regression analyses for mediation, a first regression analyses is conducted to determine whether the predictor variable is significantly related to the outcome variable. When conducting the second regression analysis, the mediating variable is entered first as a predictor of the outcome variable,

followed by the predictor variable. If the predictor variable is no longer significant in this regression analysis, but the mediating variable is, full mediation has been met. If the predictor variable is less significant in this regression analysis, partial mediation has been met (Baron & Kenny, 1986).

To test for research hypothesis 1, Pearson bivariate correlations were first conducted in accordance with Baron and Kenny (1986). As seen in Table 4.4, ITIC was significantly associated with the SMALSI Motivation scale, and the SMALSI Motivation scale was significantly associated with GPA. However, ITIC was not significantly associated with GPA. Therefore, preliminary analysis requirements for mediation were not met.

Table 4.4
Pearson Correlation Matrix Among Study Variables, Including Child Theory of Intelligence

	ITIC	SMALSI Motivation
SMALSI Motivation	-.15*	
GPA	-.06	-.40**

Note. * $p < 0.05$; ** $p < 0.01$

As seen in Table 4.5, ITIP was not significantly associated with the SMALSI motivation subscale of GPA. The SMALSI Motivation scale was significantly associated with GPA. Due to lack of significant associations between variables, preliminary analysis requirements for mediation were not met.

Table 4.5
Pearson Correlation Matrix among Study Variables, Including Parent Theory of Intelligence

	ITIP	SMALSI Motivation
SMALSI Motivation	-.04	
GPA	.14	-.40**

Note. ** $p < 0.01$

The intended path diagram can be seen in Figure 4.2. Regression analyses were conducted to examine the relationships between the constructs of child theory of intelligence, motivation, and GPA. However, the violation of assumptions for regression, as seen in the non-significant relationship between child theory of intelligence and GPA, indicates that requirements for mediation were not met, thus no mediational relationship was identified.

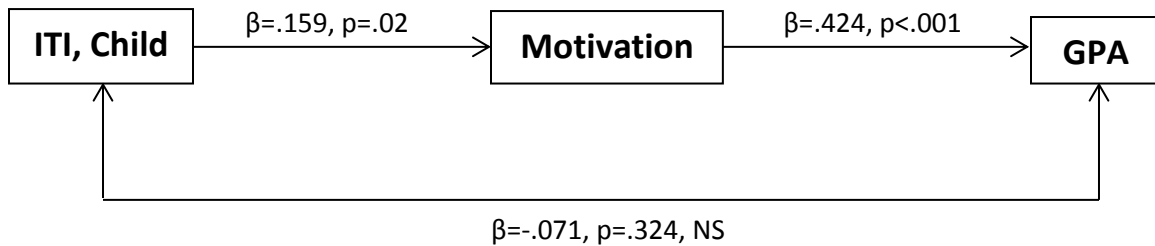


Figure 4.2. Path Diagram

For informative purposes, multivariate regression analyses were conducted to examine the predictive value of ITIC and ITIP (controlling for student race, age, and grade) on the outcomes of GPA and motivation. While the model composed of demographic and ITIC/ITIP variables was significant for the outcome of GPA, $F(5,108) =$

4.12, $p < .01$, neither ITIC ($\beta = .08$, $p > .05$) nor ITIP ($\beta = .11$, $p > .05$) significantly predicted the outcome of GPA. The model wherein both ITIC and ITIP were entered as collective predictors of motivation was not significant, $F(5,108) = 1.98$, $p > .05$. Neither ITIC ($\beta = -.14$, $p > .05$) nor ITIP ($\beta = -.10$, $p > .05$) significantly predicted the outcome of GPA. A multivariate regression was conducted to examine the predictive value of motivation on GPA. After controlling for the variance of race, age, and grade, motivation significantly predicted GPA, $F(4,180) = 18.94$, $p < .001$. In this study, low motivation predicted lower GPA ($\beta = -.41$, $p < .001$). The overall model fit was $R^2 = .296$.

Research Question 2

What is the relationship between theory of intelligence and goal orientation (mastery vs. performance goals)?

The second research hypothesis proposed that an incremental theory of intelligence will predict mastery goal orientation. A series of logistic regressions were conducted to determine whether ITIC and ITIP predicted goal orientation, i.e., mastery versus performance goal. In the first logistic regression, the variables of race, age, and grade were entered as predictors of goal orientation categories. These demographic variables did not significantly predict goal orientation groups and thus were not included in the logistic regression for hypothesis testing. The first logistic regression examined the collective influence of ITIC and ITIP on goal orientation. A Hosmer and Lemeshow χ^2 test found that the model was a good fit to the data, $\chi^2(2) = 8.13$, $p = .42$. However, when examining individual predictive value of ITIC and ITIP, the Wald's statistic was significant only for ITIC, Wald's $\chi^2(2) = 6.23$, $p < .05$. Thus, one additional logistic regression was conducted where ITIC was entered as the single predictor. The Hosmer and Lemeshow χ^2 test found that this model was a better fit to the data, $\chi^2(1) = 11.07$, $p = .14$. Children's incremental theory of intelligence was significantly associated with performance goals, with ITIC successfully predicting 71% of cases for the performance-goal group.

Research Question 3

Do children's theories of intelligence tend to match those of their parents? What is the strength of the relationship between child and parent theories of intelligence?

Research hypothesis three stated that parent and child self-reported theories of intelligence will match. A Pearson bivariate correlation was first conducted to examine the relationship between ITIC and ITIP. The results showed that ITIC and ITIP were significantly correlated with each other, $r(114) = -.30, p < .01$. Due to reflection when recoding ITIP, the ITIP was reverse-scored. This finding shows that child and parent reports were significantly and positively correlated, but not to a degree that multicollinearity was evident, i.e., $r_s > .80$. A multivariate linear regression was also conducted. After controlling for race, age, and grade, ITIP significantly predicted ITIC, $F(4,109) = 4.65, p < .01, \beta = -.27, p < .01$. The overall model fit was $R^2 = .382$.

Additional Findings

Findings that were not directly related to the research questions, but still produced useful and interesting results are discussed in the following section. Findings indicated that racial group was not significantly associated with SMALSI motivation and ITIC scores; however, there were significant racial group differences in regard to ITIP, $F(1,112) = 6.30, p < .05$. This indicates that parents who are Persons of Color had significantly lower ITIP scores ($M=.29$ after transformation) than White parents ($M=.36$ after transformation), suggesting that Persons of Color prefer an entity approach to viewing intelligence. Cohen's effect size value for racial differences in ITIP ($d=.48$) indicated moderate practical significance. Also, a significant racial group difference was found in regard to GPA, $F(1,184) = 4.99, p < .05$, with White student participants ($N=109$) having a higher GPA mean score ($M=3.31$) than participants from other racial groups ($N=77, M=3.11$). Cohen's effect size value for racial differences in GPA ($d=.33$) indicated small to moderate practical significance.

Findings also showed that both student grade and age were significantly correlated with ITIC, $r(190) = .30, p < .001$, and $r(190) = .24, p < .001$, respectively; and with GPA, $r(190) = -.35$ and $r(190) = -.38$, respectively. This indicates that the older the student, the more likely the student is to have an incremental approach to

intelligence. In contrast, being older was correlated with lower GPA scores. No significant relationships were found between age or grade and achievement goal orientation.

Regression analyses for Research Question 1 did not find that ITIC or ITIP predicted GPA; however, after controlling for the variance of race, age, and grade, motivation significantly predicted GPA, $F(4,180) = 18.94, p < .001$. Therefore, low motivation was found to predict lower GPA ($\beta = -.41, p < .001$). The overall model fit was $R^2 = .296$.

CHAPTER 5

DISCUSSION

This chapter will further explain the findings from the previous chapter and how these findings address the research questions. This chapter will also address additional findings, limitations of the study, and implications for future research.

Research Questions and Hypotheses

Research Question 1

What impact does theory of intelligence have on academic motivation and achievement? *Hypothesis One:* It was hypothesized that academic motivation would act as a mediator between theory of intelligence and academic achievement.

A path analysis, or mediational analysis, was originally proposed as a method of exploring and answering this research question. An assumption of this type of analysis is that all variables must be significantly correlated with one another. Child theories of intelligence scores (ITIC) were significantly correlated with SMALSI Motivation scores, and SMALSI Motivation scores were significantly correlated with GPA, but because there was not a significant correlation between ITIC and GPA, a mediational relationship could not be established. Instead, this research question was explored with multivariate regression analyses to determine the predictive value of ITIC and ITIP on the outcomes of GPA and SMALSI Motivation, as well as to examine the predictive value of SMALSI Motivation on GPA. The results showed that neither child nor parent theories of intelligence significantly predicted GPA or motivation; however, motivation did significantly predict GPA.

These results show that the hypothesis was not supported because, based on this data set, there is not a mediational relationship between ITIC/ITIP, SMALSI Motivation, and GPA. The results also show that parent and child theories of intelligence did not predict GPA, but motivation level did predict GPA. These findings are contrary to work by Dweck and others who have found that an incremental theory of intelligence has a beneficial effect on academic achievement. This research question was intended to build on work by Blackwell et al. (2007) who explored aspects of motivation (theory of intelligence, goal orientation, beliefs about effort, and response to

failure) and achievement outcomes, with an overall finding that an incremental theory of intelligence is positively correlated with positive beliefs about effort, learning goals, low helpless attributions, and positive learning strategies. As discussed previously in the literature review, Blackwell et al. (2007) created a path model to assess mediational variables and to learn more about and be able to explain how the aforementioned variables could be related. They found a number of mediational pathways including the following:

(a) learning goals mediate the relation between incremental theory and positive strategies, (b) positive strategies mediate the relation between learning goals and increasing grades, (c) effort beliefs mediate the relation between incremental theory and helpless attributions, (d) effort beliefs mediate the relation between incremental theory and positive strategies, (e) helpless attributions mediate the relation between effort beliefs and positive strategies, (f) positive strategies mediate the relation between effort beliefs and increasing grades, and (g) positive strategies mediate the relation between helpless attributions and increasing grades. (Blackwell et al., 2007, p. 253)

Blackwell et al. (2007) question whether there could be interrelations among motivation constructs that help explain the relationship between theories of intelligence and grades. They also state that more research is necessary to clarify whether the interrelations among the above stated mediators produce the effect on achievement outcomes or whether an overarching construct of motivation explains the relationship between theory of intelligence and school grades.

The current study was not able to utilize a mediational analysis to examine the relationship between measured variables due to the lack of a direct relationship between theories of intelligence and academic achievement, as it was quantified in this study. However, present findings did show that motivation predicted academic achievement. The relationship between theories of intelligence and academic achievement remains unclear, due to differing findings from various studies, but if a relationship between these two construct does exist, as some other studies have found,

perhaps there is an underlying mechanism that accounts for the relationship that is not evident in the present study, such as the mediators found by Blackwell et al. (2007).

The data from the current study was collected at one point in time and does not represent students' theories of intelligence over time or potential changes in theory of intelligence. Theory of intelligence may change and evolve as people grow older and learn more. It is possible that a longitudinal study would have been able to use a mediational model, if a significant relationship between theory of intelligence and achievement were detected over time. If this relationship existed, and a mediational model could have been used, it may have shown motivation to be a mediator of the relationship between theory of intelligence and GPA. This would indicate that motivation could account for a portion of the relationship between theory of intelligence and GPA.

Differences in research methods could account for some discrepancies in findings across studies. The present study has the most commonalities in methods as the study by Blackwell et al. (2007), but some differences exist. Blackwell et al. (2007) recruited 373 participants who were entering the seventh grade, measured achievement with end-of-term grades, and measured theories of intelligence with Dweck's six-item Theories of Intelligence Scale for Children. Their measure of goal orientation, however, was different. Across related studies, theory of intelligence is measured differently. Some studies, including Dweck, Chiu, and Hong (1995), measure theories of intelligence with a shorter, three-item instrument by Dweck that includes only entity theory items. Many studies use an instrument that the authors developed, incorporating parts of Dweck's measures, including Stipek and Gralinski (1996), Braten and Stromso (2005), Dupeyrat and Marine (2005), Burns and Isbell (2007), and Abdullah (2008). Early studies by Dweck and colleagues do not measure theory of intelligence, per se, but measure other constructs, including helplessness in 70 fifth graders (Diener & Dweck, 1978) and attributions for failure in 12 8-13 year olds (Dweck, 1975). These studies led to the development of the construct of theories of intelligence. Elliott and Dweck (1988) and Diener and Dweck (1978), experimentally induced different perceptions of ability, then monitored children's verbalizations following failure, task

choice, and/or performance while experiencing difficulty. These studies, while interesting, appear to allow more room for error than studies that use quantitative measures of the constructs. Differences in research methods across these many studies could, in part, account for variations in the findings, and it is clear that little consistency in measurement exists.

Results of the present study show a significant relationship between theory of intelligence and motivation. Motivation appears to directly influence academic achievement, and related to theories of intelligence, it is possible that motivation could be the agent for increasing academic achievement, since theories of intelligence and motivation were significantly associated in this study. Results of this study do not support the idea that there is a direct relationship between theory of intelligence and achievement; however, this study could support the notion presented by Blackwell et al. (2007), that a global motivation construct could incorporate many mediational facets and could be a better way to conceptualize, measure, and explore the relationship between theory of intelligence and achievement.

This conceptualization of theories of intelligence aligns with previous work by Dweck who believes that achievement behavior is affected by motivational patterns (1986). Children with maladaptive motivational patterns tend to avoid challenge, show low persistence in the face of difficulty, and show negative self-cognitions related to obstacles (Ames, 1984; Dweck, 1986). In describing factors that are often cited in the literature related to underachievement in children with high IQs, Pfeiffer (2012) includes low motivation, as well as the adoption of an entity theory of intelligence. Some research seems to support the hypothesis that theory of intelligence does affect achievement. Given the findings of this study, theory of intelligence appears to affect motivation directly; however, motivation does not have a mediational effect on the relationship between theory of intelligence and academic achievement. Thus, it could be hypothesized that theory of intelligence is a facet of motivation, rather than its own construct.

Research Question 2

What is the relationship between theory of intelligence and goal orientation (mastery vs. performance goals)? *Hypothesis Two*: It was hypothesized that an incremental theory of intelligence would predict a mastery goal choice.

This research question was explored by using a series of logistic regressions to determine whether child or parent theories of intelligence predicted achievement goal orientation. The results showed that an incremental theory of intelligence (child) was significantly associated with a performance goal orientation, successfully predicting 71% of cases from the performance goal group. Parent theory of intelligence did not predict children's goal choice. The hypothesis for this research question was not confirmed.

These results are different from those of Dweck (1999, 2006), who operates under the assumption that if a child holds an entity, or fixed, view of intelligence, he or she is more likely to pursue a performance goal and focus on showing others that he or she is smart or competent, rather than focusing on mastering a task. Mastery goals focus on understanding material, mastery of a skill, or increasing competence, while performance goals are concerned with extrinsic rewards and trying to show greater ability and performance than others. A number of research studies have found that students holding an entity theory of intelligence were more likely to adopt a performance goal, while students with an incremental theory of intelligence tended to adopt mastery goals (Bandura & Dweck, 1985; Dupeyrat & Marine, 2005; Dweck & Leggett, 1988; Elliot & Dweck, 1988).

The intention of this research question was to explore the relationship between theory of intelligence and achievement goals, since many previous studies have already explored the relationship between achievement goals and achievement. The finding was that an incremental theory of intelligence was significantly associated with performance goals, which was not the hypothesized relationship. In the first research question, the researcher expected to find a relationship between theories of intelligence and academic achievement, but did not. If this had been the case, the researcher could have explored possible mediating effects of achievement goals on the relationship between theories of intelligence and academic achievement. In this sample of students,

achievement goal choice cannot help explain why theories of intelligence affect achievement because there was no direct relationship between theories of intelligence and achievement. Therefore, the researcher can conclude that, in this sample, incremental theory was significantly associated with performance goals. Students in the sample who tend to believe that intelligence can change with learning and effort were more likely to adopt an achievement goal that was more focused on showing their ability rather than mastering material.

The reason why these students' goal choices differ from those in some previous studies remains somewhat unclear, but some speculations can be made. A number of studies examining achievement goals in relation to theories of intelligence did not use the same measure for achievement goals. The measure used in this study was created by Dweck (1999), but has not been used widely, and the variation in method used to measure goal orientation across studies could be a limitation, related to this research question. Elliott and Dweck (1988) and Dupeyrat and Marine (2005) assessed goal orientation with measures that they created specifically for their studies. It is also possible that these instruments used to measure goal orientation are too simplistic and do not accurately gauge students' achievement goals. In previous research, achievement goals have been generalized across domains or subjects, but perhaps a student's goal orientation can change, depending on the classroom, teacher, or subject matter. The instrument used to measure achievement goals in this study does not differentiate goal choice by domain and would not detect these differences, if they existed.

The students in this sample had fairly high GPAs overall, and perhaps in a high-achieving student body, there is an element of social comparison and competition that would foster performance goals. Dai (2000) states, "Attempts to present themselves as constant winners or to maintain their self-perceptions of high ability may cause high-achieving students to avoid challenging tasks that run the risk of failure that reveals inadequacy" (p. 313). Many of Dweck's studies, related to achievement goals, took place many years ago, and times have changed since then. With the introduction of standardized testing in schools and the implications of failing these tests, it appears that

education has changed greatly since some of Dweck's studies, and students place more of a focus on grades and achievement and feel more pressure to get high grades. Given this possibility, a quest for the highest grade could cause students to adopt performance goals (to show others that they are smart), rather than mastery goals. The results of Research Question 2, which do not support the hypothesis, may be detecting these overall feelings of students. This could help explain why an incremental theory was significantly associated with performance goals.

Research Question 3

Do children's theories of intelligence tend to match those of their parent? What is the strength of the relationship between child and parent theories of intelligence? (Do parents' theories of intelligence influence those of their children?) *Hypothesis Three*: It was hypothesized that parent and child theories of intelligence would match.

A Pearson bivariate correlation showed that parent and child theories of intelligence were significantly and positively correlated with each other. A multivariate linear regression showed that parent theory of intelligence significantly predicted child theory of intelligence. The hypothesis for this research question was confirmed. This is important information to add to the literature in the area of parent and child theories of intelligence. To date, there has been very little exploration of the relationship between parent and child theories of intelligence.

The present study did not find that theory of intelligence was related to academic achievement in the current sample, but based on findings from other studies, it is possible that theory of intelligence can have an influence on one's motivation and achievement. If this is the case, it would be helpful to know how children's theories of intelligence develop, as well as more about the role that parents play in this development. Dweck (2006) states that children are more likely to develop an entity theory of intelligence if their parents tend to praise intelligence and are more likely to develop an incremental theory if their parents praise hard work and effort. Dweck (2006) wrote, "After seven experiments with hundreds of children, we had some of the clearest findings I've ever seen: Praising children's intelligence harms their motivation and it harms their performance" (p. 175). Few other researchers have theorized about

the development of theories of intelligence, but this study shows that in the sample group, parent theory of intelligence predicted child theory of intelligence. This indicates that parents pass these beliefs on to their children. This could also mean that if parents changed their beliefs, or if parents learned about the possible effects these beliefs have on children, more effective beliefs could be taught to their children. Intelligence is not necessarily something that parents talk about directly with their children, but parents can give cues to children about their intelligence in comments, types of encouragement, and emphasis placed on ability rather than effort. This study provides preliminary evidence that changing a parent's theory of intelligence may be effective in passing the most effective theories on to their children.

While the present study did not find a direct relationship between theory of intelligence and academic achievement, it is possible that theory of intelligence affects children's success and outcomes in life through other avenues. One possible avenue is through self-esteem. Nussbaum and Dweck (2008) discuss the meaning systems created by entity and incremental theories and state:

In both systems, self-esteem reflects the judgment that one is competent. However, in an entity self-system, self-esteem comes from validating one's fixed competence; in an incremental self-system, self-esteem comes from assessing one's acquired competence. Negative feedback is a threat to both kinds of self-esteem because it signals that the desired level of competence is lacking. However, as we have shown, when self-esteem is threatened, different responses are required. In the entity self-system, with no clear way to change one's level of underlying ability, the most direct and effective thing people can do is to re-adjust their thinking about their ability, and defensive processes fit the bill. In an incremental self-system, the most direct and effective thing people can do is to work to bring their skills into line with the level of competence they desire. (p. 610-611)

This research indicates that people who hold an entity theory of intelligence tend to become defensive in the face of negative feedback when self-esteem is threatened. If

this pattern persists through a person's life, it seems likely that this system of coping with challenges could have an effect on his or her persistence and success.

If parents can be taught about the influence of theories of intelligence on their own self-esteem and that of their children, they may be able to increase awareness of their own self-theories and make changes. It seems that positive changes in parent self-theories would result in positive changes in child self-theories. Further research in this area may be helpful in understanding how parents can best help their children to develop goals and mindsets that will lead to success. This could be accomplished through studying specific ways that parents pass their beliefs to their children.

Additional Findings

An important finding of this study was not a direct response to one of the research questions, but was nevertheless useful and interesting. This study found that motivation significantly predicted GPA, after controlling for variance of race, age, and grade. Motivation has been widely studied, but there is still some question as to the role of motivation in explaining academic achievement and which factors are the strongest determinants of academic success. The findings of this study add to this body of motivation literature and show that motivation did significantly predict GPA, while other variables, like child and parent theories of intelligence did not significantly predict GPA. This study provides evidence and supports previous research indicating that level of motivation significantly impacts and predicts academic achievement. This finding indicates that fostering motivation could be one of the most helpful things that parents and teachers can do to help children be successful.

The present study found that the older the student, the more likely the student was to take an incremental approach to intelligence. The study also found that older age was correlated with lower GPA. Thus, relative to this sample, as age and grade increase, so do theory of intelligence scores. A higher theory of intelligence score indicates a tendency toward an incremental approach. The finding that as age and grade level increase, students are more likely to have an incremental theory of intelligence is curious because, according to Dweck's theories, students holding an incremental theory of intelligence would be more likely to have higher grades (1999,

2006). These results are contradictory to the theory and require more research to clarify the reason behind this contradiction, but this result could show that theory of intelligence may change with age and increased learning and knowledge. This finding also could be specific to this school. If teachers subscribed to a manner of teaching that encourages an incremental theory, and if students have been with these teachers for multiple school years, this could potentially effect a change in students' theories of intelligence.

The finding that GPA appears to go down as students get older is not necessarily surprising. The older students in this study are moving into adolescence, and adolescence tends to be a challenging time in children's lives and has been associated with a decrease in academic achievement, motivation, self-perceptions, and self-esteem (Alspaugh, 1998; Anderman & Midgley, 1997; Eccles, 2004). Another possible way to account for this finding in older students is that a GPA is not a standard score and is not equivalent across age and grade level. It could be that as children progress through grades in school, teachers hold them to higher standards, and it becomes more difficult to achieve a high letter-grade in upper grades than in lower grades. Harper (2010) found that high school students in a language arts honors class, when asked whether they would prefer to get a good grade or be challenged by a class, were more likely to choose to get a good grade. This could illustrate that good grades are more difficult to earn in upper grades and students value getting a good grade over being challenged.

Another finding from this study is that parent participants who were from racial groups other than White had significantly lower theory of intelligence scores than did White students, indicating that Persons of Color were more likely to subscribe to an entity theory of intelligence than White parents. There has been little research to date related to theories of intelligence across different races and ethnicities, but one study by Harper (2010) found that, from a high school population of honors students, White and African-American students did differ significantly in their theories of intelligence, with African-American students favoring an entity theory and White students favoring an incremental theory. Future related research could give clues to help explain this finding.

Pfeiffer (2012) states that there is an underrepresentation of culturally, racially, and linguistically diverse students in gifted programs, in part because some children from poor families are lacking in intellectual stimulation and educational opportunities. This places these children at a disadvantage to compete with more prepared students in intellectual and academic arenas. It is possible that some of these parents and students from a low SES group do not see intelligence as something that is changeable, thus do not place a great emphasis on academics and increasing intelligence. Harper (2010) identifies stereotype threat as a possible “means by which black students’ self-beliefs, coupled with their consideration of others’ perceptions of their abilities, discourages achievement” (p. 481). Clearly, there are many factors affecting the achievement of diverse groups, but theories of intelligence could contribute. Exploring cultural and racial differences in theories of intelligence could be a direction for future research.

Limitations of the Study

This section will describe aspects of the study that could affect the outcomes, conclusions, and application of the findings.

Limitations in Sampling

The sample of participants used in this study was an adequate sample size to produce enough power in the data analysis to be significant. A limitation to the study is that the sample came from only one school, which is a unique charter school. This is a public school, but parents apply for their children’s admission and drive them to school daily. The school purports to have demographics typical of other public schools in the state; however, achievement at this school and with this sample seems to be high, with an average GPA in this sample of 3.4. The parent participants tended to be well-educated, with 13.5% having earned a graduate degree and 19.7% having earned a four-year degree. Students who participated in this study were students who returned consent forms from their parents. It is possible that the consent process eliminated less-motivated students because to participate in the study, a student needed to take the consent forms home, have them signed by a parent, and return them to their teacher. The high response rate (47%) could indicate that there is a high number of

motivated students at this school and participating in this study. Therefore, this sample might represent a higher achieving and more motivated sample than the average population and may limit generalizability. The range of GPAs in this sample might be truncated and unusually high if the less motivated students self-selected themselves out of the study by not returning their informed consent forms.

Another aspect of the sample that could affect generalizability is the high percentage of White and female participants. Fifty-nine percent of the sample identified themselves as White, while 28.4% identified themselves as Black, 2.9% as Asian, 7.2% as Other, and .5% as American Indian. Of the student participants, 56.7% were female and 43.3% male. Of the parent participants, an overwhelming majority were female, with 78.2% female and 21.8% male. Despite these differences, sampling bias does not seem to have occurred because informed consent forms were given to every child in the 4th-8th grades, and all were welcomed to participate. The school has very close to the same number of male and female students enrolled. The results of this study might be more likely to generalize to a female, White population who report a higher than average educated level.

Limitations in the Measures

While the GRS, SMALSI, and ACES are routinely used in public schools throughout the U.S., and the measures demonstrated appropriate internal consistency estimates of reliability, some limitations related to the measures used in this study exist. First, the GRS was used for a purpose other than that for which it was originally intended. In this study, the GRS motivation scale was used to measure student motivation level as a construct by itself, rather than as one of the scales used to identify giftedness. Also, the GRS scales are intended to be completed by teachers, and this study used the Motivation scale as a parent-report measure. While the Motivation scale itself shows appropriate coefficient alphas and has previously been used and studied as a parent-report measure, the validity of the measure as it was used in the present study could be less than the validity for its originally-intended purpose.

The instrument used to measure children's theory of intelligence, Dweck's Theory of Intelligence Scale for Children, appears to be a reliable measure (1999). This

measure differs somewhat from a previous, abbreviated version of the instrument that has been used to measure theories of intelligence in some other studies. Differences in the instrument used to measure theories of intelligence, as well as differences in the measurement of other constructs in this study, could affect the comparability of these results with those of other studies. Little consistency exists within the theories of intelligence literature in terms of measurement of the construct.

Dweck's theories and measures view theory of intelligence as a global construct that spans domains or subjects. This view of theories of intelligence could be overly simplistic. Those holding an entity theory toward their intelligence are thought to be more prone to having a helpless response to obstacles, and in turn, lower motivation. This generalization may not apply to many students. For example, perhaps a very bright student could hold an entity theory (based on feedback from others that they are smart), seeing his or her intelligence as being high and also fixed. This same student could also be highly motivated at school and work very hard in his or her classes.

Theories of intelligence may not be generalizable across subjects or domains, and it may be possible to have an entity theory related to ability in one subject, but an incremental view in another. Through most of the history of motivation research, motivation has been thought of as domain-general. In recent years, domain-specific motivation has become of interest to researchers, and studies are being conducted to examine possible differences in motivation across subjects in school. The same domain-specific research is needed in the area of theory of intelligence, as well. Green, Martin, and Marsh (2007) state that some aspects of motivation may be too subject- or domain-specific to be measured by a domain-general approach.

The idea of domain specificity has been the most strongly supported in the area of self-concept research. In a review of research, Marsh (1990) reports a near-zero correlation between math self-concept and verbal self-concept in a large number of studies. However, other research has found more mixed results in subject-specific self-efficacy (Bong, 2001) or support for a generalized theory of intelligence (Stipek & Gralinski, 1996).

In a recent study, Green et al. (2007) examined domain specificity among existing motivation and engagement constructs across different subjects in school. Students were not only asked to respond to surveys for each subject, but they completed each survey in the specific classroom where they learned each subject, in an attempt to eliminate possible bias in responding. Results showed support for domain-specific motivation level and engagement across three different high school subjects (Green et al., 2007). It appears that there is some evidence of domain specificity in the existing literature, but domain specificity related to theories of intelligence across school subjects is still an area that requires more research to be understood fully. A clearer understanding of this domain specificity related to theories of intelligence would have implications for theory development as well as measurement.

Another limitation of the study is that the measure of achievement goals, Dweck's Task-Choice Goal Measure, is a very brief and possibly too simplistic measure. It has been used recently in multiple published studies, but this measure does not have published reliability data, a fact that could call into question the measure's ability to reliably measure achievement goal choice.

Limitations also exist, related to using GPA as a measure of achievement. Grades do not necessarily reflect amount of learning. Also, the same grade in one classroom may not mean the same thing in another classroom. Grades are not standardized scores and can vary across teachers, across classes, and across semesters. It is difficult to make assumptions about a student's ability based on grades because grades represent how well a student has met a teacher's requirements for a class. Sometimes students can also gain or lose points in a classroom for things unrelated to learning, such as returning a form to receive extra credit. The range of GPAs in this sample may not reflect the range of GPAs in the population due to the unique nature of their school and the fact that students in this school are likely to be higher achieving and possibly more motivated than the general population.

Lastly, participants' responses could have been influenced by a desire to respond in a way that would show them in a positive light. It could have been clear to the students and parents, as to what some of the questions were measuring, and the

transparency of the measures may have influenced the way that the participants responded to the items.

Implications

Despite the aforementioned limitations, some interesting findings resulted from this study that have implications for theory development, research, and practice. These implications and directions for future research will be discussed below.

Implications for Theory Development

The hypotheses in this study were not all confirmed, and this has implications for the theory behind the research questions. The findings for Research Question 1 showed that there was not a significant relationship between theory of intelligence and GPA in this sample. This finding contradicts Dweck's theory that one's theory of intelligence can have an important effect on his or her achievement (1999, 2006). It is possible that the limitations of this study had a result on the findings, but if these findings represent the views and achievement of the students in the sample, perhaps Dweck's theory does not apply to all children. It remains unclear as to why the results of this study differ from previous research that has found a significant relationship between theories of intelligence and academic achievement.

Given the results of this study, theory of intelligence appears to be significantly associated with motivation, although it is a weak correlation (.15). Since there is a significant relationship between these constructs, it is possible that theory of intelligence could be considered as aspect of motivation, rather than its own construct, and in this way, is having an effect on academic achievement.

The hypothesis related to Research Question 2 was also not supported. Findings showed that an incremental theory of intelligence was significantly associated with performance goals. A follow-up research question could ask whether goal choice predicts achievement, since this question remains under debate. Performance goals are not only significantly related to an incremental theory of intelligence in this study, but they have been related to increased achievement in other studies. This indicates that achievement goal theory continues to require revision and further investigation. In a study by Senko, Hulleman, and Harackiewicz (2011), the researchers state, "The effects

of mastery goals and normative performance goals on classroom achievement were unexpected and remain at odds with original goal theorizing. It behooves researchers, therefore, to identify the mechanisms responsible for these effects” (p. 41). Brophy (2005) goes so far as to say that perhaps researchers should “phase out” performance goals completely and replace the concept with one of outcome goals that do not include a social comparison aspect. Questions still remain as to which achievement goals are most beneficial, how these goals develop, and the best way to identify and encourage the most effective goals to promote in students. The results of the current study add to the body of research that shows findings that do not correspond with original achievement goal theory.

The hypothesis that was supported in this research pertained to Research Question 3. Findings for this research question indicated that parent and child theories of intelligence were significantly and positively correlated and that parent theory of intelligence significantly predicted child theory of intelligence. There is little research in this area to date, and these findings could help in the formation of a theory that addresses the role of parents in the development of children’s theories of intelligence. The route through which this development happens also requires further research.

Implications for Research

The findings of this study are somewhat inconclusive, and further research is necessary to fully understand these findings. Results of this study do not support the premise that theory of intelligence predicts achievement; however, this study could add to research by Blackwell et al. (2007), that a global motivation construct could incorporate many mediational facets and could be a better way to conceptualize, measure, and explore the relationship between theory of intelligence and achievement. Further studies could explore the role of theory of intelligence, not as an independent construct, but as a facet of motivation. Perhaps questions tapping into theory of intelligence could be included and tested as items in a future measure of motivation. Along a similar line of thought, future research could examine the impact that theories of intelligence have on one’s life through other mechanisms, such as self-concept or self-esteem.

In this sample of students, an incremental theory of intelligence was significantly associated with performance goals. It is unclear why these students' goal choices differ from those in some previous studies. Achievement goal theory has been under debate, and it appears that further research is necessary to determine if previous theories are correct in presuming that mastery goals predict higher achievement, or if performance goals can also be valuable. Further research can also determine if the current types of achievement goals continue to be appropriate or if other characterizations of achievement goals would be more fitting, including new conceptualizations of the goals or further work on existing subsets of the goals, like performance-approach and performance avoidance goals.

The second research question did not specifically ask whether achievement goal choice predicted achievement, but meant to explore the mechanisms underlying achievement goal development and the relationship with theories of intelligence. A follow-up research question would ask whether goal choice predicts achievement, since this question has been under debate. Also, how does goal choice affect motivation? Further studies could also explore whether parent and child achievement goals match and the influence of parents on the development of different achievement goals.

In the previous Limitations section, the reliability of the achievement goal measure was called into question. The Task Choice Goal Measure could be too simplistic, and a more reliable and thorough measure of achievement goals is needed. Further research could explore the most appropriate ways to measure achievement goals and should take into account the aforementioned questions about and changes in achievement goal theory.

The students in this study's sample had fairly high GPAs overall and had well-educated parents. Perhaps a larger sample with a more diverse population would have found more conclusive evidence about the impact of theories of intelligence and achievement goals on academic achievement. This study found significant differences in theory of intelligence, based on race, and this is an area of study that has yet to be fully explored. Future research should also examine differences in socio-economic status. Socio-economic status could have an impact on one's theory of intelligence, but

this is an area not explored in the present study. Also, this sample includes 4th-8th graders, and it would likely provide a wider scope if a high school population were included in future studies. Another avenue for future research might be to track students' theories of intelligence, motivation, and achievement over time. This would provide a more thorough look at the effects of the constructs on one another.

Since Research Question 3 had significant findings and answered a research question that does not seem to have been asked before, further exploration of the role of parents on the development of children's theories of intelligence could produce findings that could be a basis for a theoretical model.

Implications for Education

Results of this study show inconclusive results related to adapting these theories to practice. The constructs explored in this study may have important effects on achievement, but not all of the relationships and possible outcomes are clear. This study does support previous research indicating that motivation is an important aspect of achievement. How the other constructs in this study (achievement goals and theories of intelligence) affect achievement is less clear. Motivation is an important aspect of achievement, and should be promoted by educators.

While the current study does not show a relationship between theories of intelligence and achievement, multiple studies do show this relationship. Therefore, despite the current findings, it is possible that this relationship could exist in other populations. This study did find that parent theories of intelligence predict child theories of intelligence. It seems that positive changes in parent self-theories could result in positive changes in child self-theories. Further research in this area may be helpful in understanding how parents can best help their children to develop goals and mindsets that will lead to success. Perhaps this could be accomplished through teaching parents ways to change their own self-theories as well as learning how to teach effective self-theories to their children. Further research could study specific ways that parents pass their beliefs to their children.

Conclusion

This study intended to create a clearer understanding of the relationships between theory of intelligence, goal orientation, academic motivation, and academic achievement. While not all of the hypotheses in this study were supported, the findings are useful and can inform future research. The finding that theory of intelligence was not significantly related to academic achievement was surprising; however, this finding points to the fact that the relationship between these constructs is still not completely understood. It was also surprising to find that children's incremental theory of intelligence was significantly associated with performance goals; this illustrates the trend of conflicting data in the area of achievement goals. A new finding from this study indicates that parent theories of intelligence predict child theories of intelligence. If theories of intelligence do, indeed, have a significant effect on achievement, this finding could have important implications for theory and practice.

One finding from this study that was not a direct response to a research question, but an important result, was that motivation level significantly predicted GPA. This finding aligns with recent work by Pfeiffer (2012) in the area of identifying giftedness in students. Pfeiffer believes that motivation is an important part of giftedness and that motivation is an integral part of success. High motivation, especially intrinsic motivation, is related to high achievement (Pfeiffer, 2012). Given this relationship between motivation and GPA, as well as a small but significant relationship between theory of intelligence and motivation, one wonders if there is some underlying mechanism through which theory of intelligence has an impact on students. It would be prudent to explore the possibility of theory of intelligence being a facet of motivation, rather than a separate construct.

Little research has been done to date related to the influence of parent theories of intelligence on those of their children. The finding that parent and child theories of intelligence are positively and significantly correlated is an important addition to the growing body of research in the area of theories of intelligence. If theory of intelligence does have an impact on a child's academic functioning, the root of the child's theory of intelligence would be important to know. It is not a surprise that parent theories of

intelligence predict those of their children—parent beliefs about intelligence appear to be translating to children as do many other parental beliefs. If theories of intelligence are found to be important to children’s achievement, knowing how to teach or how to adjust these theories will be important to children’s learning and goal attainment. Increasing parent awareness about theories of intelligence and the way parents portray their beliefs about intelligence to their children could affect the beliefs that their children adopt and perhaps could affect their children’s success in life. This study did not find that theory of intelligence predicted GPA, but it is possible that there are other underlying mechanisms through which theories of intelligence affect people’s lives. If this is the case, it will be important to understand how these theories of intelligence develop and how to help people teach the most effective beliefs to children, whether at home or at school.

APPENDIX A

Institutional Review Board Approval

Florida State University
Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 9/14/2009
To: Erin Clevenger
Address:
Dept.: EDUCATIONAL PSYCHOLOGY AND LEARNING SYSTEMS
From: Thomas L. Jacobson, Chair
Re: Use of Human Subjects in Research
The Relation of Implicit Theory of Intelligence to Academic Motivation and Academic Outcomes

The application that you submitted to this office in regard to the use of human subjects in the research proposal referenced above has been reviewed by the Human Subjects Committee at its meeting on 9/14/2009. Your project was approved by the Committee.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 10/13/2010, you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing, any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: Steven Pfeiffer, Advisor
HSC No. 2009.3399

APPENDIX B Informed Consent Form

FLORIDA STATE
UNIVERSITY



The COLLEGE of EDUCATION
Department of Educational Psychology and Learning Systems

Dear Parent/Guardian,

My name is Erin Clevenger, and I am a doctoral student in counseling psychology and school psychology at Florida State University. My research is being supervised by Professor Steven Pfeiffer. I invite you and your child to participate in a research study. The study investigates how measures of academic motivation relate to intelligence and whether children view intelligence as something that is fixed or something that can change with effort. Your child, your child's teacher, and you were selected as possible participants because FSUS is participating in this research study. We ask that you read this form and consider participating, along with your child, in the study.

If you agree to participate in the study, we ask that you (the parent) will complete two questionnaires related to your child's academic motivation. It should take no longer than 15 minutes to complete. Your child's participation would involve filling out three questionnaires. This should take about thirty minutes. This research will take place while your child is at school.

If you agree to allow your son/daughter to participate, you also give us permission to review your son/daughter's grades and FCAT scores. This information will help us understand how academic motivation relates to intelligence and views of intelligence. The information from the various scales and questionnaires completed by your child, his/her teacher, and you will only be used for research purposes, and the information will have no bearing on your child's grades or how s/he is viewed by his or her teacher. This study is not a required part of class participation, and participation is voluntary.

Risks and Benefits: This study presents minimal risks. The great majority of these questionnaires and tasks are routinely used in public schools throughout the U.S. Each participating student will be assigned an ID number to protect the anonymity and confidentiality of the student. Once questionnaires are completed by the student, parent, and teacher, each child will be assigned an ID number to protect anonymity. Results will only be labeled and recorded with the ID number. No names will be associated with the results. The researcher and her faculty advisor will be the only ones who have access to the file with the names and ID numbers of participants. This file will be kept in a locked drawer in the faculty member's locked university office.

A drawing for parents for two \$50 gift cards to Target will be held after the data has been collected in May. Each child who returns this form will receive a \$1 coupon to

McDonald's for an item of choice. Students, teachers, and parents may benefit from the information that you and your son or daughter provide as we improve our understanding of academic motivation and work toward the creation of a brief and reliable way to measure motivation.

Confidentiality: The records of this study will be kept confidential, to the extent permitted by law. The evaluation data generated from the students may be published, but any published or distributed materials will not contain information that could in any way identify any individual student. Research records will be stored securely and only researchers will have access to the records.

Voluntary Participation: Your participation in this study and that of your son or daughter is completely voluntary. You and your son or daughter may skip any questions that you don't feel comfortable answering. Your decision whether or not to allow your son or daughter to participate will in no way affect your current or future relationship with your son or daughter's school or with Florida State University. If you decide to allow your son or daughter to participate, he or she is free to not complete the surveys, skip any questions, and/or stop at any time. You are free to withdraw your son/daughter's participation at any time.

Contacts and Questions: My name is Erin Clevenger, M.A., and I am the primary research associate for this evaluation study. You may reach me at xxx-xxx-xxxx, or xxx@gmail.com. I am under the direction and supervision of Dr. Steven Pfeiffer, Professor at Florida State University. Dr. Pfeiffer's contact information is xx@fsu.edu or xxx-xxx-xxxx. Please feel free to ask any questions you have now, or at any point in the future. If you have any questions or concerns about your son or daughter's rights as a research participant, you may contact the FSU Institutional Review Board (IRB) at 850-644-8633 or you may access their website at <http://www.fsu.research.edu>. You may keep this consent form for your records.

Please sign on the following page, if you consent to participate.

**PLEASE RETURN THIS PAGE TO HOMEROOM OR FIRST PERIOD
TEACHER**

Statement of Consent

I have read the above information. I have asked questions and have received answers.

I consent to participate in the study and for my child to participate in the study.

Your name: _____

Your son/daughter's name: _____

Your son/daughter's homeroom or first period teacher: _____

Grade level: _____

Date of Birth: _____

Your signature: _____ Date: _____

APPENDIX C
Demographic Information Survey

FLORIDA STATE
UNIVERSITY



The COLLEGE of EDUCATION
Department of Educational Psychology and Learning Systems

Parent/Guardian Information

Parent/Guardian name: _____

Your son/daughter's name: _____

Your son/daughter's homeroom or first period teacher: _____

If there is more than one parent in the household, are you the parent who spends the most time helping your child with homework and school assignments?

Yes No

Please complete the following demographic information:

Your gender: Male Female

Your child's gender: Male Female

Your child's age: _____

Your education level: Some high school High school/GED Some college

2-year college degree 4-year college degree Graduate school

Your race/ethnicity:

Please choose one or more of the following:

- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or Other Pacific Islander
- White
- Some Other Race _____

Your child's race/ethnicity:

Please choose one or more of the following:

- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or Other Pacific Islander
- White
- Some Other Race _____

APPENDIX D
Theories of Intelligence Scale (Child and Adult Forms)

Theories of Intelligence Scale for Children—Self Form

Directions: Please read each sentence below and then circle the *one* number that shows how much you agree with it. There are no right or wrong answers.

1. You have a certain amount of intelligence, and you really can't do much to change it.

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

2. Your intelligence is something about you that you can't change very much.

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

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

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

4. No matter who you are, you can change your intelligence a lot.

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

5. You can always greatly change how intelligent you are.

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

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

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

Theories of Intelligence Scale—Self Form for Adults

This questionnaire has been designed to investigate ideas about intelligence. There are no right or wrong answers. We are interested in your ideas.

Directions: Please read each sentence below and then circle the *one* number that shows how much you agree with it.

1. You have a certain amount of intelligence, and you really can't do much to change it.

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

2. Your intelligence is something about you that you can't change very much.

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

3. No matter who you are, you can significantly change your intelligence level.

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

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

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

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

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

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

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

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

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

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

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

APPENDIX E
Task Choice Goal Measure

Directions: We have different problems here for you to choose from. There is no right or wrong answer—different students make different choices. Just put a check in front of your choice (only choose **one**).

I would like to work on:

_____ Problems that aren't too hard, so I don't get many wrong.

_____ Problems I'll learn a lot from, even if I won't look so smart.

_____ Problems that are pretty easy, so I'll do well.

_____ Problems that I'm pretty good at, so I can show that I'm smart.

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BIOGRAPHICAL SKETCH

Erin Clevenger (maiden name Zellars) is originally from the small town of Cross Creek, Pennsylvania and lived there until the age of 18, when she and her family moved for the warmer climate of Florida. She attended New College of Florida in Sarasota, FL and earned a B.A. in psychology. She went on to earn a M.A. in psychology at the University of West Georgia in a humanistic-focused program, then continued her education at Florida State University in the Combined Doctoral Program in Counseling Psychology and School Psychology. Erin completed her pre-doctoral internship at Berea Children's Home and Family Services in Cleveland, Ohio. After graduation, Erin plans to become a licensed psychologist and focus on therapy and assessment. She lives with her husband, Nick, and two rescue dogs, Pixie and Olive. She has a passion for rescuing and rehabilitating shelter dogs and hopes to incorporate animal-assisted therapy into her practice one day.