RELATIONSHIP BETWEEN TEACHERS' BELIEFS AND STUDENT

ACHIEVEMENT IN MIDDLE SCHOOL MATHEMATICS

A Record of Study

by

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ABSTRACT

The purpose of this study was to determine whether there was a relationship between teachers' beliefs and student achievement in middle school mathematics. A total of 35 teachers chose to participate from nine separate middle schools in an urban school district in Texas. Additionally, 1,095 data from students from economically disadvantaged households were analyzed in conjunction with their teacher's data. The independent variables were two surveys that measured teachers' beliefs about intelligence and classroom goal orientation. The dependent variables were students' scores and yearly progress made on the state math exam (STAAR). Data were analyzed using Pearson product-moment correlations for both dependent variables.

Results of the study indicated that there was a statistically significant positive correlation between a teacher's beliefs and their student's yearly progress in math. However, no significant relationship was found between a teacher's beliefs and their students scale scores on the STAAR math exam. Further results revealed that there was a statistically significant negative relationship between a teacher's classroom goal orientation and student scale scores and progress made in math in one year. These findings show that the beliefs that teachers hold about intelligence and approaches to instruction may be related to student achievement levels in middle school math. The study concludes with implications and limitations of the study and makes recommendations for future research on teacher beliefs and student achievement.

DEDICATION

To Kim

Kim, you believed in me when I didn't believe in myself; your never ending patience and wisdom helped me through my toughest times and made me a stronger person. Thank you for always being there to listen to me vent, allowing me to cry, and for always being my biggest cheerleader. I truly know that I would not be the person I am today without you.

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I also want to extend my gratitude to Dr. Carol Dweck, whose research on the Implicit Theory of Intelligence has changed my life and the lives of so many of my students, staff, friends, and family. And a special thanks to the middle school math teachers who had the courage to participate in this study.

Finally I want to thank my mom and dad for always believing in me and never giving up on their crazy little girl. Both of you continue to be THE example of hard work, perseverance, and commitment. I know that I would never have had the strength to be who I was meant to be without your love and support. I love you both!

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CHAPTER I

INTRODUCTION

Background

Despite the Coleman report in 1966 that stated that poverty was one of the most important factors in determining school success, some educational practitioners and researchers have challenged this notion (Ehrenberg, Brewer, & Rand Corp, 1995). In fact, current theory posits that the classroom teacher has the ability to counteract the effects of low socio-economics and help all students achieve. Because the classroom teacher is so important, research efforts continue to look for the characteristics that allows certain teachers to produce higher achievement scores year after year, regardless of the income levels of the students in their classrooms.

One of the most significant studies that demonstrated that the classroom teacher can mediate various student characteristics was a longitudinal study by Sanders and Rivers (1996). Sanders and Rivers (1996) found that students who were assigned to more effective teachers made considerable gains in math achievement than students assigned to ineffective teachers. Specifically, they found that, "students benefited from yearly assignments to effective teachers by achieving a range of approximately 50 percentile points in math which could determine future assignments of remedial versus accelerated courses" (1996, p. 7). Yet another study supporting that the classroom teacher can impact student achievement was conducted by Wright and Others (1997) who found that regardless of class size, socio-economic level, type of school, and

previous achievement levels the most important reason for student success was the classroom teacher.

Despite current theory confirming that an effective teacher can positively impact student achievement, there is still not consensus on the characteristics of effective teachers. Moreover, it would appear that there are more effective teachers in elementary school than middle school due to the marked decline in student achievement (Anderman, Midgley, & ERIC Clearinghouse on Elementary and Early,Childhood Education, 1998). One can logically conclude that there must be differences between elementary and middle school teachers because of the marked decline. Regardless, student achievement scores drop in middle school and more specifically, student's math scores are lower in middle school. Therefore, determining effective teacher characteristics that increase student achievement in middle school math is vital.

Statement of Problem

What are the characteristics that make some teachers effective? Conventional wisdom would suggest that certain factors such as years of teaching experience and/or the type of certification would make some teachers more impactful than others. However, these attributes have been extensively studied and the results have been inconclusive at best (Boyd, Goldhaber, Hamilton Lankford, & Wyckoff, 2007). Because there is still not a definitive answer, researchers have continued to look for solutions.

The most notable study in the area of teacher certification is by Darling-Hammond (2000) who found that the strongest correlate of student achievement is teacher certification. Additional research (Goldhaber & Brewer, 2000a; Wayne &

Youngs, 2003) supports the conclusion that teacher certification matters in high school math and science courses. In addition, recent research by Schmidt, Burroughs, and Cogan (2013) also supported that the key to improving student achievement was to look at teacher preparation programs. However, Schmidt et. al's study merely suggested that increasing the type of courses might improve performance but provides no definitive answers.

Conversely, Hanushek has continued to maintain that the type of certification a teacher holds or the number of years they have taught (beyond a teachers second year) has little to no bearing on student achievement (Hanushek, 1971; Hanushek, 2011a). Hanushek maintains that teacher quality is the key, but does not provide any irrefutable remarks regarding how to improve teacher quality.

Therefore, it is apparent that only studying teacher certification and years of experience will not solve the mystery of the relationships between effective teachers and student achievement. Research has identified that individual beliefs that teachers hold may impact student achievement (Rosenthal & Jacobson, 1968; Pajares, 1992; Pomerantz & Ruble, 1997; Good & Brophy, 2000). Because student achievement is impacted by teacher beliefs more research is needed to ascertain which beliefs impact student achievement.

So what are the teacher beliefs that have been shown to increase student achievement? There have been many studies looking at specific characteristics that increase student achievement in the classroom. Good and Brophy (2000) outlined many strategies that teachers should utilize to be effective such as teacher expectations,

motivation, differentiation, and active teaching. In addition, there are hundreds of professional development sessions and books such as Marzano's, (2000), "What Works in Classroom Instruction" devoted solely on pedagogy that teachers could use to improve student achievement. However, even Marzano (2007) stated that researchers will never be able to identify specific pedagogy that works with every student in every class because the "art" part of teaching will always be a factor.

So what is the "art" part of teaching? Teaching is called a form of art because the individual teacher's beliefs play a large part in teaching. Therefore, discovering which specific beliefs effective teachers possess is crucial in discovering why some teachers are effective and others are not even if they are using the same pedagogical strategies.

Research on what makes an effective teacher has been studied extensively. However, there is a relatively small amount of research on teacher beliefs because it is nebulous to look at the "art" of teaching whereas it is cleaner to look at the "science" of teaching. The "art" of teaching are the nuances that a teacher brings to their classroom instruction such as; personality, innate beliefs, experiences. Whereas the "science" of teaching is the actual pedagogy a teacher uses such as; lecture, cooperative learning, small group, Venn diagrams, etc. Pintrich (1990) stated that studying the beliefs of educators would be crucial in truly understanding teachers. One belief that researchers have found to be important is for teachers to possess is a high self-efficacy. In research by Ryan and Pintrich (1997), researchers found that a teacher's belief in their ability to impact their students learning was a vital component in their student's ultimate success or failure. Additionally, teacher's efficacy beliefs have been found to influence the

expectations they set for their students and their willingness to persist with their students (Chong, Klassen, Huan, Wong, & Kates, 2010).

Another key belief that individuals hold is their Implicit Belief about Intelligence (Dweck, 2000). In recent years, Dweck as modified the name of the self-theory regarding intelligence to more practical term called Mindset. Mindset studies are relatively new in compared to efficacy studies but many leading scholars believe that it might be a crucial element in determining teacher success.

In Dweck's research she has identified that there are two unique beliefs regarding one's intelligence that individuals hold: Incremental theorists (Growth Mindset) believe that intelligence can be grown and is malleable over time; compared to Entity Theorists (Fixed Mindset) who believe that one's intelligence is set at birth and does not grow over time. Furthermore, years of research has established that the one's mindset one impacts the goal orientation they possess.

Goal orientation research has been studied extensively over the past twenty years by leading researchers (Butler, 2007; Dweck, 2000; Pintrich, 2004). These researchers argue that the type of goal orientation an individual subscribes to impacts their approach to a task. Specifically, mastery oriented individuals exhibit adaptive patterns (strive to learn and increase their skill level) compared to performance oriented individuals who demonstrate maladaptive behaviors (helplessness and task avoidance). Therefore, the type of goal orientation a teacher possesses impacts their view of their students and their belief that they can impact student learning. However, the majority of the research linking mindset to goal orientation has been with children and college students.

Amazingly, there is little to no research that has focused on the mindset that teachers possess and their goal orientations and how these beliefs might impact student achievement.

Studying the beliefs that teachers hold is difficult. There have been numerous studies on teachers' self-efficacy but it is still unclear how or why some teachers possess a high self-efficacy or a low self-efficacy. Tschannen-Moran and Hoy (2001) have stated that despite all of the different measurements on self-efficacy it is still an abstract construct. There is still a need for researchers to utilize different ways to measure teacher beliefs and how they may impact student achievement.

Because isolating characteristics of effective teachers is so difficult, it stands to reason that certain subjects are especially vulnerable to needing the best teachers. Math education in the United States has been an area of concern ever since Sputnick in the 1950's. Researchers such as Schmidt, Burroughs, & Cogan (2013) have compared the United States student's math scores against international benchmarks and the U.S. consistently is lower than other developed nations. Furthermore, in 2009 the Organisation of Economic Co-operation and Development (OECD) found that 17 countries scored higher than the U.S on the Programme for International Student Assessment (PISA) in mathematics (OECD, 2010).

In addition to international benchmarks, there is a consistent pattern of declining performance occurring in math scores from elementary school (K-5) to middle school (6-8) (Anderman et al., 1998). The transition from elementary school to middle school has also been shown to decrease student motivation (Anderman, Maehr, & Midgley,

1999) because of teachers utilizing strategies that group students by ability and competition rather than by mastery of the content. These teacher behaviors have been shown to negatively impact students and are linked as a cause for low student achievement in math in middle schools (Eccles, 1993).

Nevertheless, some middle school math teachers are able to reverse the trend and help their students become successful. So, why are some teachers able to succeed when others are failing? Why do some teachers persevere and orient their classrooms towards mastery orientations while other teachers give up more easily and set up their classroom towards performance orientations?

Statement of Purpose

My study was designed to determine the strength of relation between a middle school math teacher's mindsets and/or their goal orientation and their students' performance on a standardized state exam in mathematics.

Significance of the Study

This study had practical implications for hiring practices as well as professional development opportunities for teachers. The research attempted to demonstrate that a teacher's implicit beliefs about the nature of intelligence positively or negatively impacted student achievement. Furthermore, the researcher attempted to discover if the type of classroom goal orientation a teacher subscribed to would impact their student's achievement. Therefore, by demonstrating that certain teacher beliefs impact student achievement in middle school math, teacher preparation programs can focus on teaching these belief systems to aspiring teachers. Furthermore, professional development

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programs within existing schools could teach current practitioners the beliefs and goal orientations that positively correlate to increased mathematics achievement in middle school. The data collected from this study will not only add to the body of research on effective teacher characteristics but also provide a new way of looking at how teacher's implicit beliefs and classroom goal orientations impact classrooms in middle school mathematics.

Theoretical Framework

Most research on teacher effectiveness has centered on the process-product theoretical model (Brophy, 1987; Wayne & Youngs, 2003; Wright & Others, 1997). The process-product model focuses on the relationship between classroom processes (teaching) and products (what students learn). This education research has centered on the question of what are the conditions that allow some students to learn while others do not. Moreover, the process-product model also involves connecting the thought processes of teachers to how they behave and how this impacts student achievement. However, this model alone does not adequately address how a teacher's implicit beliefs or classroom goal orientation impacts their classroom environment and student achievement. To provide another framework that more adequately addresses belief systems, I will briefly describe how an adaptation of Eccles (1993) expectancy-value theoretical model is an alternative method of examining beliefs and achievement (Pintrich, 1990).

The expectancy-value theoretical model consists of three facets: (1) an individual's beliefs about the value of a task, (2) one's individual beliefs and their ability

to perform that task and (3) one's feelings about the task. The theory states that the interaction of the three facets determines what activities to participate in and whether or not individuals will persist in the face of difficulty (Pintrich, 1990). Therefore, determining the type of goal orientation (mastery or performance) teachers ascribe to will establish if teachers are willing to try different pedagogical approaches when faced with obstacles to student learning.

The study of teacher's beliefs is also related to the expectancy-value model regarding the expectancy component. Teachers who believe that they are in control of their students learning are more willing to persevere and put forth effort when students struggle. Conversely, teachers who do not believe that they are in control of their students learning are more likely to give up and not persist with students who are struggling with mathematics concepts. These belief systems are the crucial components in the research on the implicit theory of intelligence and classroom goal orientations. Therefore, by analyzing how teacher's implicit beliefs and goal orientation impact student achievement, I intend to add to the body of research on teacher preparation and professional development.

Research Questions

1) Is there a relationship between a teacher's mindset and their economically disadvantaged students' scores on the standardized state math exam?

2) Is there a relationship between a teacher's mindset and the yearly progress their economically disadvantaged students made in math from the previous year on the standardized state math exam?

3) Is there a relationship between a teacher's mastery and performance goal orientation and their economically disadvantaged students' scores on the standardized state math exam?

4) Is there a relationship between teacher's mastery and performance goal orientation and the yearly progress their economically disadvantaged students made in math from the previous year on the standardized state math exam?

5) Is there a relationship between a teachers' mindset and their goal orientation?

Limitations and Delimitations

Several specific limitations are noted so that the reader understands areas out of my control.

1. The participants chosen were a sample of convenience and not a random sampling of middle school educators in Texas. Rather the participants chosen were all from a middle school inTexas so the results of the study are only suggestions and cannot be applied to all middle school math teachers.

2. The Implicit Theory of Intelligence Scale (Dweck, Chi-yue Chiu, & Ying-yi Hong, 1995) excludes roughly 15% of all eligible participants which decreased the sample size. To ensure that only respondents with clear theories are included participants whose average scores fall between 3.1 and 3.9 are excluded. Dweck et. al. (1995) posits that roughly 15% of all respondents do not show a propensity toward the dichotomous views.

3. Due to time constraints a longitudinal study was not applicable.

In addition to the limitations, there were several choices that I made for my study. Specifically, I have also chosen to do a quantitative study rather than a qualitative study. The reason for this is because virtually all of the previous research on the Implicit Theory of Intelligence and Goal Orientation has been quantitative, therefore I was able to better utilize past research to ground my findings.

Finally, I chose to only study middle school teachers and not elementary or high school teachers. The reason for this choice is because research on middle school students has been well documented as one of the most difficult time periods for children (Anderman et al., 1999; Anderman et al., 1998; Ryan & Patrick, 2001). Additionally, math is a subject that students consistently struggle with and many teachers struggle to teach it in a way that students understand.

My study focused on surveying 35 middle school math teachers in a Texas school district. The participants took two surveys, (1) Implicit Theory of Intelligence and (2) Patterns of Adaptive Learning Styles (PALS). By analyzing the results of the surveys and tying the teacher's individual responses to their economically disadvantaged student's achievement on a standardized achievement test (STAAR) and their math progress from the previous year, I hope to add to the body of literature on characteristics of effective teachers. Therefore, by isolating specific belief systems that effective teachers possess practitioners can incorporate these into professional development opportunities and possibly even hiring practices. Furthermore, higher education teaching programs could use the results to help aspiring teachers.

Assumptions

Several assumptions are made regarding the participants and methodology so that the research can exist.

1. The participants completing the two surveys understand the purpose of the study and answered the items truthfully. I can assume this because the participants will be told that their results would remain anonymous and that their confidentiality would be preserved at all times. Additionally, the participants are volunteers who were advised that they could withdraw from the study at any time without repercussions.

2. The sample chosen was representative of the population that I will make inferences about. I can assume this because my study is referencing middle school math teachers and all of the participants are middle school math teachers.

3. The methodology chosen is logical and appropriate for the nature of this study. I can assume this because previous research has utilized similar methodology.

Researcher's Perspective

In 2007 I attended a professional development workshop given by Dr. Debbie Silver. Dr. Silver's message centered on Carol Dweck*'s* book *Mindset* and how practitioners could utilize the theories outlined in the book to positively impact student achievement. As I listened to Dr. Silver, I was immediately captivated by the originality of the concepts and how the focus was on how to improve one's perseverance when

faced with obstacles (students, teachers, parents) rather than on implementing a new teaching strategy such as cooperative learning or journaling.

As a twenty year public education veteran, teaching strategies and education based computer programs dominate the professional development conference landscape. In fact, at every conference there is someone showing the latest and greatest teaching strategy that will make all students successful. However, one does not have to be in the profession long to know that there is not a magic formula for student success. In contrast, research has shown that the same teacher can utilize the same strategy with the same type of students and get vastly different results.

I can confidently say that I believe that I was a successful high school geography teacher for over ten years. However, my belief in this lies only in qualitative data from my students, parents, and appraisers. This is mainly due to the fact that my classes did not have a standardized test at the end of the year with which to measure my effectiveness against other geography teachers. Nonetheless, in my current capacity as a middle school principal I work with teachers who have students who take several standardized tests at the end of the year and I am constantly looking for factors that positively correlate to student achievement. As I sat and listened to Dr. Silver in that workshop a light bulb went off in my head that maybe it is teacher beliefs and not simply pedagogy that cause some teachers to be more successful than others.

Although, it is painfully evident that there is not a panacea that can be given to teachers to make them successful, I believe that if we can isolate specific teacher

behaviors that are positively correlated to student achievement, we can help more students succeed.

Organization of the Study

Chapter I provided a rationale for the need to study individual teacher characteristics and behaviors as they relate to student achievement. In addition, this chapter has provided the theoretical framework for guiding the research as well as the questions the research will attempt to answer. Chapter II will present a review of literature pertaining to the Implicit Theory of Intelligence, criticisms of the theory, goal orientation and implicit theory relationship, characteristics of effective teachers, and research on the middle grade learner. Next, Chapter III will address the methodology of the research as well as the data collection methods, design of the research and the type of data analysis that will be used. Additionally, the participants, context of the study, and survey instrument will be defined. Moreover, the reliability and validity of the surveys will be discussed and several hypotheses will be stated.   Chapter IV will present an overview of the findings that resulted in the study. Finally, Chapter V will complete the study by presenting a discussion of the implications of the study along with areas for future research.

Definitions of Terms

Implicit Theory of Intelligence Scale – used to determine the extent to which a person holds a growth or fixed mindset (Dweck et al., 1995).

Mindset- an implicit belief that one holds regarding the malleability of intelligence

Growth mindset (incremental) - a belief that the amount of intelligence one is born with is not stagnant and that with effort and perseverance one can increase their level of intelligence

*Fixed mindset (entit*y) - a belief that the amount of intelligence one is born with is stagnant and that it is not within one's control to affect their level of intelligence

Patterns of Adaptive Learning Scale (PALS) - used to determine the type of goal orientation that a teacher possesses (mastery or performance).

Goal Orientation- a framework that explains how individuals not only respond to an event but what they understand from the event which will determine how they will react to the event.

Mastery approaches- teachers emphasize the importance of recognizing student effort and create learning tasks that are differentiated based on students ability level. Teachers also exhibit adaptive behaviors such as being open to criticism.

Performance approaches- teachers emphasize the importance of recognizing students who outperform others and student competition. Teachers also exhibit maladaptive behaviors such as criticism avoidance.

Middle School - students and teachers in grade sixth thru eight.

CHAPTER II

REVIEW OF LITERATURE

Introduction

As a former teacher and current principal, I believe studying specific qualities of teachers is a key component in discovering what factors effective teachers possess. Moreover, research has been very clear that the biggest factor in determining academic achievement is the classroom teacher (Wayne & Youngs, 2003). Wright (1997) demonstrated that students who are assigned to ineffective teachers will not progress academically at the rate of students with effective teachers (Wright & Others, 1997). Therefore, it is imperative that there is research on discovering specific characteristics of effective teachers and how these traits positively impact student achievement.

Educators are continually searching for ways to increase student achievement. There has been extensive research dedicated to looking for specific characteristics that effective teachers possess such as teacher certifications and the college degree they obtained. Specifically, in a nationwide quantitative research study, Darling-Hammond (2000)found that positive student outcomes are associated with teachers who are fully certified and have a degree in the field they are teaching (2000, 23). Marszalek (2010) similarly concluded that teachers who teach in positions that match their credentials and are fully certified positively influence student achievement. Yet another work offering support to specific teacher characteristics is a longitudinal study involving over 14,000 students which concluded that there was a positive relationship between achievement levels and teacher quality (Heck, 2007). However, though Darling-Hammond, Heck and

Marszalek's studies have linked teacher certification to student achievement, they agree that more research needs to be conducted on other characteristics that effective teachers possess.

Though there has been research that has found positive correlations between teacher certifications, type of college degree and student achievement, there is still not consensus among researchers that definitively state that these are the only characteristics that determine teacher effectiveness. Another main area that has been studied extensively is how a teacher's self-efficacy impacts student achievement. Self-efficacy is a theory that states that how one views their ability to perform a task is related to how they will perform in that task (Bandura, 1999). Because teaching is such a personal endeavor, researchers looking at self-efficacy have found a positive relationship between teachers who possess a high self-efficacy and their student's achievement (Pajares, 1996; Ross, 1992). Additionally, research on collective efficacy by Goddard, Hoy, and Woolfolk (2000) found that when teachers believed that their colleagues had the ability to impact student achievement, then the overall school achievement was higher than schools where teachers only had a high self-efficacy but did not believe in the ability of their peers. However, how teachers come to have a high or low self-efficacy is still an area of debate. Tschannen-Moran, Hoy and Hoy (1998) have suggested that it is the resources that the teachers possess such as support from staff, quality of facilities, and teaching resources available that contribute to the efficacy judgments of teachers. Moreover, Tschannen-Moran and Hoy (2001) have also stated that efficacy beliefs have been found to be stable over time and that more information is needed in order to figure

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out the factors that could affect one's beliefs. Therefore, more research needs to be conducted on other factors that contribute to a teacher's sense of self-efficacy.

A different way of examining the beliefs that individuals hold is the Implicit Theory of Intelligence. The implicit beliefs that individuals hold have been studied extensively by leading researcher Carol Dweck. In a growing body of research, Dweck and her colleagues have proposed that people hold assumptions about the nature of intelligence. The implicit theory of intelligence states that people either believe that intelligence is something that can be grown and developed or that it is stagnant and fixed at birth (Dweck et al., 1995). According to Dweck et. al, an individual who believes that intelligence can be grown has an incremental view of intelligence where as an individual who believes that intelligence is stagnant has an entity view of intelligence.

Dweck and her colleagues have identified two types of inherent beliefs that individuals possess; incremental (growth mindset) or entity (fixed mindset) theory of intelligence. Both types of implicit theories of intelligence have been studied extensively and researchers have referred to the two terms in both ways because they are synonymous. However, for the purpose of this review, I will forgo the laymen's term (growth mindset and fixed mindset) in favor of the terms cited in research journals; the incremental theory of intelligence and entity theory of intelligence.

In addition, the implicit theories individuals hold about their own ability is linked to how individuals approach achievement situations (Dweck, 1999). In achievement situations individuals who adopt the entity theory also tend to adopt performance goals. Adopting performance goals thereby permits the individual avoid negative judgments of

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their ability and instead focuses on proving competence and gaining approval. Conversely, individuals who possess an incremental theory adopt learning goals (mastery) which emphasizes developing their ability and embracing constructive criticism. Research by Dweck and her colleagues have shown that the way individuals respond to failure is due to the implicit theories they hold along with the goal orientations that complements them (Dweck, Chiu, & Hong, 1995).

Additionally, Dweck and her colleagues have determined by using a specific survey tool, they are able to categorize people as either having an incremental or entity view of intelligence. Researchers have also linked the type of goal orientation one seeks to either incremental theorists or entity theorists. Many studies have been able to conclude that those who hold an incremental view are more likely to have a mastery goal orientation compared to entity theorists who have a performance goal orientation. This type of goal orientation and view of intelligence is central in determining if individuals will persevere in challenging situations.

Persevering in challenging situations is especially important as students' transition from elementary school to middle school. Because middle school students are at the beginning stages of pubertal changes and the nature of the school environment changes, determining strategies which promote success with middle school students is imperative. Anderman and Midgley (1997) have concluded that as students enter middle school they tend to adopt more performance goal orientations than master orientations. Moreover, traditional middle school classrooms not only adopt performance goals but they also move away from mastery oriented goals and endorse ability grouping and

competitiveness which decreases student motivation (Eccles & Midgley, 1988). The movement away from mastery and toward performance is important as it relates to student achievement in middle school. Eccles (1993) and her colleagues have proposed that the declines experienced by many middle school students are due to the characteristics of the classroom environment in traditional middle schools.

Middle school teacher's beliefs about their students have also been shown to have a major impact on student achievement. As students enter middle school, and the environment shifts, so does the student-teacher relationship. Eccles, Lord, and Midgley (1991) proposed that thoughtful efforts must be made to improve the relationships of students and teachers in the middle grades to reverse the negative effects of the transition to middle school. Along with improving the relationships, researchers have proposed that middle school teacher belief systems must be challenged so that there is a better fit between the needs of adolescents and the school organization (Eccles, Lord, & Midgley, 1991; Ryan & Patrick, 2001). Yet another work supporting this research was a longitudinal study of 1,301 students and teachers, which found that the importance of math for low achieving students was directly related to the level of support from their teachers and the student's perception of the of support they received from their teacher (Midgley, Feldlaufer, & Eccles 1989).

Midgley et. al (1989) documented a downward trend in math achievement from elementary school to middle school. The downward trend from elementary to middle school can also be seen on the state math assessment given by the Texas Education Agency, as well as the weaker math performance of students from economically

disadvantaged households (Rivkin, Hanushek, & Kain, 2005). Adding to the research about economically disadvantaged students was a study by McConney and Perry (2010) who found that economically disadvantaged students performed lower than their peers on math exams and that only those who had a high self-efficacy were able to perform better than their non-economically disadvantaged peers.

Yet another work that supports the need to conduct more research in math was a study by Liang (2010). In a study looking at the role of assessment, student characteristics, and math achievement in Canada, Finland, and the United States, researchers found that school in all countries face the same issues. The issues are how to motivate students to give more effort and to believe in themselves (Liang, 2010). Consequently, since teacher beliefs have been found to influence student achievement, then isolating the specific beliefs of successful teachers remains an issue.

Effective math teachers have been found to be teachers who instill a belief in their students that they can succeed. A study involving middle grade students found that classroom practices that nurtured a belief that all students achieved at higher levels than classrooms that did not (Ramdass & Zimmerman, 2008). Moreover, in a study involving 365 students in the 8th grade, researchers found that higher math achievement was correlated to teachers' behaviors more than parent involvement (Levpuscek & Zupancic, 2009). These studies continue to add to the literature that teachers are the largest influence in student achievement and that it is teacher's behaviors more than student demographics that matter most.

Given that the transition from elementary to middle school has shown to result in achievement losses and that mathematics is a subject that student performance is low, it is imperative that there is specific research which determines teacher characteristics that will increase student achievement in middle school math.

Thus, the purpose of this literature review was to examine the research on the characteristics of effective teachers and the impact that the implicit theory of intelligence has on student achievement. The goal of this literature review was to provide the historical background and theoretical framework for the study as well as review the research on the implicit theory of intelligence by Dweck and others, key criticisms of the theory, characteristics of effective teachers, math classrooms, and middle school factors. This study considered how teachers' views regarding intelligence impacted student achievement in middle school mathematics.

Implicit Theory of Intelligence

Many individuals quit or stop trying when they are faced with a difficult challenge while other individuals try harder and even thrive in demanding situations. Likewise, some people do not even attempt a task that they believe too demanding while others seek out tasks that appear thought-provoking or problematic. Leading researcher Carol Dweck has been studying the phenomenon that explains why some individuals quit trying while others endure. Dweck's research has centered on the implicit theory of intelligence as it relates to goal orientation theory. Dweck has proposed that individuals have beliefs regarding the nature of their own intelligence and that these beliefs are crucial in determining the type of goals they will pursue (Dweck & Henderson, 1989).

Dweck and Leggett's (1988) model contends that one's motivation to persevere or quit is determined by their implicit view of intelligence. Moreover, the type of belief one holds determines the type of goal that an individual will pursue and this creates the motivation that decides if they will endure through the task or if they will abandon the task.

Dweck et. al (1995) and her colleagues have found that individuals possess either an incremental view of intelligence or an entity view of intelligence (Dweck et al., 1995). The development of the survey instrument has evolved over time; the original instrument was a two alternative forced-choice format but Dweck and Henderson found that individuals tended to choose more incremental statements indicating to the researchers that there were biases built into the format. Therefore, Dweck and her colleagues developed a questionnaire composed of three questions. Individuals respond on a Likert Scale their level of agreement on: (a) You have a certain amount of intelligence and you really can't do much to change it; (b) Your intelligence is something about you that you can't change very much; and (c) You can learn new things but you can't really change your basic intelligence. The respondents are then scored and categorized with having an entity or incremental view. However, Dweck et. al. (1995) posited that roughly 15% of all respondents do not show a propensity toward the dichotomous views and were excluded from research. Once individuals are categorized Dweck has then determined that the type of intelligence one ascribes to will define the type of goals they will pursue.

Dweck has identified two types of inherent beliefs that individuals possess: Incremental or Entity theory of intelligence. These two types of individual belief systems

have been found to play a crucial role in determining how individuals react to different situations. A review of the key research that describes and supports the two theories follows.

Overview of Theory

The belief that intelligence is something that can be grown and is not stagnant is known as the incremental theory of intelligence. Individuals who possess an incremental theory of intelligence are inclined to exhibit more adaptive patterns of objective pursuit, which includes having a higher level of determination and achievement, as well as better strategies' for handling negative incidences (Ahmavaara & Houston, 2007; Dweck et al., 1995). For example, a student who has an incremental theory of intelligence who receives a low grade on a test might conclude that they did not study enough or used the wrong learning approach and would commit to exhorting more time and effort on the next exam. Thus, this student believes that they are in control of their learning.

Conversely, the belief that intelligence is something that one is born with and cannot be changed is known as the entity theory of intelligence. Those individuals who have an entity theory of intelligence believe that the amount of intelligence one is born with is stagnant and that it is not within their control to affect their intelligence (Dweck et al., 1995). Furthermore, a study by Elliot & Dweck (1988) revealed that entity theorists tend to shut down when faced with difficult situations and do not feel that they are in control of the outcome.

Numerous studies have built on Dweck's theory that one's view of intelligence impacts their goal orientation. The impact of goal orientation has been demonstrated

through research by Dweck and others that individuals who hold an incremental view of their intelligence are more likely to persevere through difficult challenges (Ahmavaara & Houston, 2007; Atwood, 2010; Blackwell, Trzesniewski, & Dweck, 2007; Dweck, 1986; Dweck et al., 1995; Hong, Chiu, Dweck, Lin, & Wan, 1999; Kristjansson, 2008; Robins & Pals, 2002). Similarly, students who have an incremental theory of intelligence are focused on the learning goals and the process of getting smarter, whereas students with an entity theory of intelligence have a performance goal with the final outcome and looking smart (Dweck, 2000).

Entity Theory

A review of the research indicated that individuals who believe intelligence is fixed and unalterable are referred to as holding an entity theory of their intelligence. Entity theorists are also less likely to change their opinion of others once they have made a judgment regarding someone's behavior. In a study of two hundred thirty-two fourth and fifth grade students, researchers were able to conclude that having an entity theory made students in the study more susceptible to making global verdicts about others (Erdley & Dweck, 1993). Additionally, individuals with an entity theory of intelligence feel powerless regarding their learning outcomes. Furthermore, entity theorists think that learning a particular subject is a function of an innate ability (i.e. either one is born good at math or not), and that they have no control over their abilities to be successful in that subject (Dweck et al., 1995). Entity theorists believe they succeed because of luck and that all of their successes or failures are due to uncontrollable causes (Robins & Pals, 2002).Yet, another illustration of this comes from a study by Hong, Chui, Dweck, Lin,

and Wan (1999) who concluded that students who hold an entity theory of intelligence were more inclined to not take a remedial course when faced with failure and tended to exhibit characteristics of a helpless response orientation.

Moreover, in qualitative case study researchers found that students with an entity theory of intelligence exhibit characteristics of learned helplessness and self-handicapping strategies that actually sabotaged any chance of academic success (Miller & Atkinson, 2001). The pre-determined outcome and handicapping strategies have elements which are consistent with Seligman's seminal research on learned helplessness (Seligman & Maier, 1967). Seligman demonstrated that dogs exhibited a learned helplessness response to uncontrollable events. The learned helplessness response exhibited in Seligman's study has served as inspiration for both Dweck and Rosenbaum's work relating to similar response patterns in humans of uncontrollable events. Additional research regarding the relationship between individual reactions to events and the goal they tended to pursue has been conducted. Rosenbaum and Ben-Ari (1985) observed student's reactions to solvable and unsolvable tasks. They concluded that students with low resourcefulness exhibited actions of helplessness that interfered with their ability for goal attainment. Though Dweck's work focuses on how students' beliefs about intelligence affect goal attainment, Kennett and Keifer (2006) were able to link Rosenbaum's and Dweck's work. Kennett and Keifer found that students who believed their intelligence was fixed were more likely to attribute failure to uncontrollable elements such as their lack of ability, thus demonstrating a learned helpless response. Likewise, the sense of helplessness regarding academic success can

also be found in a study where students with learning disabilities showed a belief that intelligence was stagnant (entity theory) and consequently exerted less effort on tasks(Baird, Scott, Dearing, & Hamil, 2009). Baird et al. (2009) studied 1,518 sixth to twelve graders with and without learning disabilities. The authors found that students with learning disabilities who endorsed an entity view exhorted less effort and therefore, showed the same learned helplessness response. Therefore, if holding a belief that an academic outcome is out of a one's control, then persevering in the face of difficult situations is useless for both students with a learning disability and those without.

The lack of perseverance regarding students with entity theorists has been well documented. Studies have found that although entity theorists believe that people can learn new things, they also believe that one's fundamental intellect remains unchanged. Therefore, an entity theory of intelligence fosters reactions of helpless versus mastery-oriented responses to setbacks (Ahmavaara & Houston, 2007; Blackwell et al., 2007; Dweck et al., 1995; Dweck, 2006; Hong et al., 1999). Conversely, mastery- oriented responses to setbacks are found in incremental theorists who view failure as an opportunity to learn more and continue working until the knowledge has been mastered. Whereas entity theorists think that they lack the ability to succeed in a particular area are less motivated and their performance starts to steadily decline in the face of growing evidence that they are just not smart in a particular area (Reich & Arkin, 2006). Thus, intensifying effort under these conditions is a seemingly futile enterprise. Because effort is viewed as pointless, entity theorists end up sabotaging any chance of academic success because they believe that they cannot do anything to alter harmful outcomes and

that success depends on external, uncontrollable factors, such as inherent inability. Thus, research has shown that entity theorists are more likely to believe that there is no point in giving effort and working hard because the outcome is already pre-determined (Ahmavaara & Houston, 2007).

The tendency for students with an entity theory of intelligence to see effort as a pathway for achieving academic success is not the only obstacle that hinders motivation. Rather, the entity theorists are more concerned with competence and performance goals as compared to those with an incremental theory of intelligence who are motivated by learning goals and mastery (Dweck, 1995). This concern with performance inhibits students from challenging themselves beyond their capability because they do not want to fail, even if failing means they would learn more. The entity theory of intelligence student is more concerned with the final outcome (performance) then actually learning. The actual learning is not valued because the primary concern is to look smart rather than to be challenged to improve and negative feedback is seen as a threat (Dweck, 1986). Extensive education research has supported that performance goals are associated with an entity view of intelligence. In a study by Elliot and Dweck (1988), fifth grade children were tasked with determining if having different learning goals (prove competency or improve mastery) were related to having different mindsets. The students were manipulated by the experimenters so that regardless of the child's choice, all children would have the same moderately difficult task. In addition, the children were repeatedly told they were "wrong" as to illicit a failure experience during the task (Elliot & Dweck, 1988). This study yielded the same results as previous studies which showed

that children with an entity theory of intelligence are less likely to take risks if they are likely to be viewed as unsuccessful by others.

In summary, individuals with an entity theory of intelligence have a general belief that the amount of intelligence one is born with is fixed for life. The stability of intelligence that entity theorists belief in has been documented in many studies (Baird et al., 2009; Blackwell et al., 2007; Dweck, 1986; Dweck et al., 1995; Dweck, 2006; Fitzgerald & Mellor, 1988; Graham, 1995; Hong, 1994; Hong et al., 1999; Reich & Arkin, 2006; Robins & Pals, 2002). These individuals show propensity towards performance goals which causes them to only be concerned with the outcome and not the process of learning. In so doing, students with an entity viewpoint shut down when faced with obstacles for fear of embarrassment. Also, they are unlikely to seek out help and learned helplessness responses result in self-fulfilling prophecies based on the lack of effort they put into tasks and the feeling that they have no hope of ever being successful.

Incremental Theory

While entity theorists believe that intelligence is something that one is born with and is a fixed quantity, an incremental theorist believes that intelligence is something that can be grown and thus, not set at birth. Since incremental theory of intelligence individuals believe that one can grow their intelligence, they are more likely to value effort and persevere when faced with challenges (Blackwell et al., 2007; Dweck, 1986; Leondari & Gialamas, 2002). There have been many quantitative research studies which have supported the concept that intelligence can be grown (Dweck et al., 1995; Elliot &

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Dweck, 1988). Therefore, a student who possesses an incremental belief system has the effect of becoming a more successful student.

Dweck et al. (1999) found that students endorsing an incremental viewpoint believe effort is a positive factor that impacts achievement and that intelligence is malleable. Supporting this work is a study of 856 secondary students by Ahmavaara and Houston (2007), who found that students who had an incremental view of intelligence had higher levels of motivation and were more likely to pursue higher levels of education, have higher levels of aspiration, and seek more selective schools than their peers with an entity view of intelligence. Furthermore, Mangels (2006) supported those findings by showing that college students who exhibited an incremental view of intelligence were able to recover quicker when they failed academically than their entity theory classmates. Yet another work building on this research comes from Blackwell (2007) in a study of 373, 7th grade students. Blackwell and her colleagues found that the transition to middle school was especially difficult with students who endorsed an entity belief. They went on to find that students who embraced an incremental viewpoint believed that effort was the answer to failure compared to entity theorist who assigned failure to ability (Blackwell, Trzesniewski, & Dweck, 2007).

In addition to exhibiting more adaptive patterns and higher achievement levels, individuals with an incremental view of intelligence view others in a more positive manner and avoid stereotype threat (Steele, Spencer, & Aronson, 2002). A quantitative study of 139, fourth and fifth grade children demonstrated that children who held an incremental view of intelligence were more inclined to be flexible in their judgments of

others and not stereotype people based on one experience (Erdley & Dweck, 1993). In fact, the study showed that even when presented with positive information that contradicted previous negative information about their peers, children who endorsed an entity viewpoint were less likely to perceive others in a positive manner. The children did not change their ratings and stayed with an overall negative trait image of their peers (Erdley & Dweck, 1993). In addition to having a more positive outlook towards others, incremental theorists are more likely to take responsibility for their own actions. In a study involving children in a physical education class, researchers found that children who endorsed an incremental view were more motivated and managed their own learning (Ommundsen, Haugen, & Lund, 2005). These findings support that having an incremental viewpoint allows individuals to exhibit characteristics that increase the likelihood of success.

Besides valuing effort, the incremental theorist student has also been found to be focused more on mastery and competence development than final outcomes. In a longitudinal study of over five hundred college students who were ethnically, socio-economically, and academically diverse, researchers examined the impact that student's implicit theories had on their response to setbacks (Robins & Pals, 2002). Their findings concluded that students who endorsed an incremental belief system responded to success or failure as something within their control. They further demonstrated that the incremental students in the study believed that they were in control of their academic success and that effort and study skills were they reason they were successful, not luck or chance.

In addition to feeling that they are in control over their learning, incremental theorists respond to negative outcomes in a constructive manner. In multiple studies, researchers have found that students who have an incremental view of their own intelligence are more likely to have a positive view of learning even when they receive a low grade or negative feedback (Dweck & Leggett, 1988; Blackwell et al., 2007). Building on the research by Dweck and Blackwell is a study by Hong et al. (1999, Study 1) with ninety-seven university students. Researchers wanted to discover the relationship between one's implicit view of intelligence and effort versus ability. Hong et al. (1999) found that when the task was related to intelligence, incremental theorists attributed the outcomes more to effort than entity theorists. Therefore, individuals who have a hold an incremental theory of intelligence will work harder and give more effort when faced with challenges compared to an entity theorist who views failure as a rationale to give up.

The relationship between increased effort and an incremental perspective has been well documented. Multiple studies have found that people who believe that through extra effort and a conviction that they can indeed grow their intellect will cultivate a goal orientation which fosters reactions of mastery oriented responses to setbacks (Dweck, 1975; Elliot & Dweck, 1988; Mangels et al., 2006; Robins & Pals, 2002). In addition to a mastery centered approach to learning, students who believe that they can succeed have increased motivation and academic success and continue to rise. Moreover, students who are motivated by learning goals are more willing to challenge themselves beyond their capability because they are not motivated by the need to impress others or

be seen as smart, rather, they are motivated by a desire to learn (Braten & Stromso, 2006; Dweck, 2006; Elliot & Dweck, 1988; Ryan et al., 1998; Stipek & Gralinski, 1996). In fact, Blackwell et al. (2007) demonstrated the associations among beliefs about intelligence, effort, and performance with 319 students in grades 3-6. The authors found that students who believed that they had the power to add to their knowledge in math and social studies showed an increase in their academic scores over the year. Conversely, those that believed their levels of intelligence were stable believed that regardless of the amount of effort one exerted you could never do well in math or social studies and their scores stayed relatively stable over the year.

Students who show a view of their own intelligence as dynamic are more likely to take risks in their academic endeavors and be more resilient, In a several studies, researchers found that students who held an incremental view of their intelligence are rebound better following failures and are academically resourceful when challenged with difficult tasks (Kennett & Keefer, 2006; Mangels et al., 2006). How K-12 children with incremental views of their intelligence impacts their desire to learn was also supported in a study by Hong et. al (1999, Study 3). Hong et al. (1999) found in research on university students that 73% of the incremental theorist participants selected to take a remedial tutorial to improve their performance over an unrelated ability task, whereas 87% of the entity theorists shunned the opportunity for growth.

In view of the research cited, how one views their own intelligence has a major impact in determining the level of persistence they assign to a task, their goal orientation, and even the way they view others. In addition, the vast amount of research

cited is focused on how the learner's implicit view of their own intelligence impacts these different components. However, the implications of how teacher's implicit beliefs impact the manner in which they interact with their students is unexplored. If students who have an incremental view are more likely to persist, be mastery oriented, and view other more positively, than how does a teacher's implicit view of their own intelligence impact their students and classroom instruction?

Goal Orientation and Implicit Theory of Intelligence

Why individuals choose to perform certain academic tasks and decide to avoid others is the concept behind goal orientation theory. Goal orientation has served as a theory that provides the framework that explains how individuals not only respond to events but what they understand from the events and ultimately determines how they will react to the event. Additionally, the specific type of goals individuals seek has been found to play a role in why some individuals are successful and others are not. The type of goals one ascribes to is not only important in students but also in how the classroom teacher approaches tasks assigned to students. The classroom teacher has been repeatedly cited as the prevailing influence in determining academic achievement for students (Darling-Hammond, 2000; Sanders & Rivers, 1996; Wright, Horn, & Sanders, 1997; Wayne & Youngs, 2003). Therefore, the goal orientation beliefs that the classroom teachers hold for themselves will determine the type of pedagogy they adopt. Because of this relationship, classroom environments need to be constructed in a manner that supports the type of goal orientation that allows students to have the most success (Ames, 1992; Maehr & Midgley, 1991).

Goal orientation theory has been studied extensively over the past twenty years by leading researchers (Ames & Ames, 1984; Ames & Archer, 1988; Ames, 1992a; Nicholls, 1979; Cheung, Lauer, & Patashnick, 1989; Pintrich, 2003; Pintrich, 2004; Maehr & Meyer, 1997). These researchers argue that the type of goal orientation an individual subscribes to impacts their approach to a task. Specifically, mastery oriented individuals exhibit adaptive patterns and performance oriented individuals demonstrate maladaptive behaviors (Keys, Conley, Duncan, & Domina, 2012).

Mastery goal orientation is used synonymously in research as learning goals in Dweck's research (Dweck & Leggett, 1988). In a learning goal approach, individuals seek to increase their competency and mastery of the content. In addition, these individuals are more likely to pursue challenging problems and exhibit mastery oriented response to setbacks. The mastery oriented responses include exhibiting adaptive behaviors such as persistence and seeking out assistance from others.

Conversely, in a performance goal approach, individuals are focused on gaining favorable results of their capability and avoiding negative judgments and difficult tasks (Elliot & Dweck, 1988). Additionally, performance oriented individuals tend to focus on the goal of not looking incompetent and their perceived success is dependent on how others perform in comparison. In terms of behavior patterns, performance goal individuals display maladaptive response patterns such as helplessness, task avoidance and even cheating.

Building on the research are multiple studies by leading experts in goal orientation theory. Researchers have demonstrated that individuals with a mastery goal

orientation are more focused on improving their own competencies and mastery of tasks compared to performance goal orientation who are more focused on demonstrating competence and looking smart (Ames & Ames, 1984; Ames, 1984; Ames, 1984; Dweck, 1986; Nicholls, Cheung, Lauer, & Patashnick, 1989). The orientation towards mastery allows individuals to be risk takers and liberates them from the fear of failure. This orientation is linked to students, who have an incremental viewpoint, whereas the individual who is performance goal oriented and who is constantly worried about being negatively judged is linked to students with an entity viewpoint.

Dweck's theory on the implicit view of intelligence has expanded our understanding of the implications of goal orientation as it relates to the implicit theory of intelligence. By demonstrating a causal link between the type of goal orientation one possesses and the type of intelligence that one ascribes to; incremental theory or entity theory, Dweck and Leggett (1988) have been able to demonstrate that the type of intelligence associated with having an incremental view is linked to being oriented toward learning goals whereas an entity view is linked to having a performance goal.

Though traditional goal theorists agree on the two types of orientation, there are voices calling for a revision to goal theory. Most notable are Harackiewicz (1998) and Pintrich (2000) who propose that there are multiple goal perspectives individuals aspire to and that the task determines the type of goal orientation. Furthermore, they note that performance goal orientations have been found to be beneficial in certain settings, most notably in university settings (Harackiewicz et al., 1998). Pintrich and Harackiewicz maintain that the competitive nature of universities allow students to adopt performance

goals and still maintain desired outcomes. However, there is not sufficient research to generalize that this is true of younger students, specifically middle school age students (Midgley, Kaplan, & Middleton, 2001).

Mastery vs. Performance Orientation

The link between entity theorist individuals tending to adopt a performance goal orientation and an incremental theorist adopting a mastery orientation has been documented in several studies. In a study involving undergraduates, Mangels et. al (2006) conducted a neurocognition study aimed at discovering if student's beliefs about their own intelligence influenced their reactions to negative performance feedback. Prior research cited in the previous sections support that entity and incremental theorists process information differently as well as approach learning in different ways. Specifically, the study demonstrated that entity theorist students were less likely to utilize negative feedback than incremental theorist students because they viewed this information as a threat to their self-perceptions. Conversely, incremental theorists were more likely to view negative feedback as an opportunity to improve and exert more effort. Similar to the findings regarding negative feedback as a threat to one's self-worth was a study performed by Elliot and Dweck (1988). In their study, one out of three children who had previously been told they had not done well on a task selected an easier task the next time they were given a choice, none of the children chose the more difficult task. The absence of choosing the more difficult task provides evidence for the proposal that individuals with an entity theory of intelligence associate performance with success and tend to avoid situations that might cause them to fail.

Building on the research that links performance orientation with task responses is a study by Mueller and Dweck (1998) that sought to discover if praising ability versus praising intelligence affected the type of goal orientation children sought. The researchers discovered that children praised for intelligence were more likely to choose future tasks that allowed them to continue to be successful than those praised for their work ethic. What was even more compelling is that the researchers discovered that children who were praised for their work ethic and not their innate intelligence showed signs of adopting an incremental view of intelligence and a belief that they were in control of their own outcomes. The implications of this study for the classroom teacher are important. More research needs to be conducted to see if teachers could change a student's view of their own intelligence from entity to incremental by changing their dialogue, thus allowing students to view their intelligence as something that they can grow and adopt the adaptive behaviors associated with an incremental theorist such as perseverance and work ethic.

The implications of classroom teacher behaviors were studied by Middleton and Midgley (1997) with 703, sixth grade math students which found that students who were lower achieving were more concerned with how they compared to their peers than the higher achieving students. Moreover, the lower achieving students were more likely to endorse performance goal orientations and exhibit self-handicapping strategies such as low task effort and seeking out assistance from their teachers. The desire to be viewed as smart was so powerful that the performance goal oriented students will withdraw effort so that failure is not attributed to lack of ability. Therefore, teachers must be aware of the

maladaptive behaviors of students and employ strategies that protect student's beliefs about the nature of intelligence.

In a study with fifty-two fifth grade children, Stone (1999) also found that students who endorsed an entity theory were more likely to espouse a performance goal orientation. Furthermore, the entity theorist students showed a higher concern for how they were being judged than incremental theorist students and a belief that the outcome of the task was a global indictment on their level of intelligence. This study is consistent with previously cited work regarding entity theorists adopting performance goals and choosing to avoid tasks that would make them appear less smart than their peers (Stone, 1999).

The desire for performance-oriented students to be viewed as smart is an important component for classroom teachers to understand. In a longitudinal study with 516 students and 25 teachers, researchers aimed at discovering why some students sought out teacher assistance when they were struggling and why others did not (Ryan, Gheen, & Midgley, 1998). Ryan et al. found that in classes that emphasized competition and performance goals, students were less likely to seek help. Therefore, teachers who endorse an entity viewpoint might be likely to endorse teaching strategies that emphasize competition and performance goals, which could inhibit their students learning.

Yet another study offering support to the negative impact of performance orientation is a study by Baird et al. (2009). Baird et al. found that students with learning disabilities were more likely to endorse performance goals and have an entity view of intelligence. Furthermore, the learning disabled students believed that exerting effort

implied that they were not as intelligent as their non-learning disabled peers; therefore, they sabotaged any chance of success by adopting maladaptive strategies of helplessness and lack of effort. This study continues to offer support regarding the impact classroom teachers have on creating environments that value effort and growing intelligence, not natural ability. Moreover, if the classroom teacher endorses an entity theory of their own intelligence, it stands to reason that they would perpetuate performance oriented pedagogy focused on competition and looking smart and inadvertently reject valuing effort and mastery.

In addition to performance oriented students sabotaging success by lack of task effort and not seeking assistance, students who adopt performance-orientated responses believe that learning occurs quickly or not at all. A study by Braten and Stromso (2006) comprised of both undergraduate and master's students found that the students beliefs' regarding the speed with which they acquired new information was linked to the type of goals they pursued. Braten and Stromso discovered that students who believed that learning either happened quickly or not at all were more likely to adopt performance goals and were also more likely to view intelligence as stable over time. This study showed how goal orientation is directly linked to one's view of intelligence.

Similarly, goal orientation has been shown to impact the types of learning strategies that students adopt. Stipek and Gralinski (1996) found that students who held a belief that intelligence is stable and unchanging were more concerned with performance. Additionally, the students in the study used more superficial strategies such as copying and guessing when completing classroom tasks (Stipek & Gralinski, 1996). Perhaps the

most salient evidence linking goal orientation and entity theorists comes from Dweck, Chiu, and Hong (1995). In a review of research, Dweck et al. (1995) determined that individuals who view intelligence as static and unchanging are more likely to view performance outcomes as an indication of their intelligence. Thus, the tendency of entity theorists to globalize self-judgment results in helpless reactions to negative feedback. Therefore, if students believe that the final outcome is the only thing that matters, then steady growth has no meaning to them. Thus, if learning does not occur quickly and immediate results are not seen, then providing effort is a futile endeavor. Proving competence is so permeating for the entity theorist that it also impacts their personal characteristics. Individuals with an entity theory of intelligence believe that traits are unchangeable and view any negative situation, social or academic, as a measure of their own shortfalls which negatively affects their self-perception (Middleton & Midgley, 1997). This negative effect on their self-perception has the consequence of a self-fulfilling prophecy and therefore any failure is viewed as a reflection of them as a person (Ahmavaara & Houston, 2007; Middleton & Midgley, 1997; Reich & Arkin, 2006). The desire to not be seen as a failure starts a continuous cycle of wanting to be seen only as a success and that if an entity theorist fails they attribute it to factors out of their control.

On the other hand, students with an incremental theory of intelligence are more likely to respond positively to gradual gains. Since incremental theorists are more focused on mastering the goal and not the performance only, they are more likely to put forth more effort into a task. In addition, mastery-oriented individuals are less likely to exhibit the self-destructive habits of entity/performance-oriented individuals because

unlike entity theorists, incremental theorists will seek out assistance from others and exert more determination to a task (Baird, Scott, Dearing, & Hamil, 2009). This has also been found to persist into adulthood, where university students who exhibited characteristics of an entity theory of intelligence were less likely to take remedial courses even if they were showing signs of failure (Hong, Chiu, Dweck, Lin, & Wan, 1999). Two other studies of university students found that students with an entity theory of intelligence were less resourceful when faced with challenges and displayed a helpless response in the face of difficulty (Kennett & Keefer, 2006; Robins & Pals, 2002). Consequently, incremental theorists who tend to adopt mastery-oriented goals exhibit characteristics that promote academic success; whereas, entity theorists who adopt performance-oriented goals can sabotage their success because of their goal of looking smart and avoiding failure.

Yet another work offering support of the effect of goal orientation was a study by Grant and Dweck (2003) involving university students. In the longitudinal study of the university students, researchers found evidence supporting that students who adopted learning goal orientations were more likely to display adaptive behaviors such as planning, persistence, and self-motivation. Conversely, performance- oriented students exhibited helpless responses, loss of both self-worth and intrinsic motivation. Therefore, the type of goal orientation students adopt impacts student's behavior regarding if they embrace adaptive or maladaptive responses to setbacks.

Finally, in longitudinal study of at-risk middle school students, researchers found that a mastery oriented goal orientation was the only goal orientation that was a positive

predictor of mathematics achievement (Ames, 1992b; Keys, Conley, Duncan, & Domina, 2012). This study is especially significant because unlike most studies, standardized test scores were the measure used to determine achievement, not teacher assigned grades. Consequently, classroom teachers that adopt instructional strategies that focus on mastery oriented goals can help students achieve at higher levels in mathematics compared to teachers who emphasize competition and ability.

The link between entity theorist individuals adopting performance goal orientations and incremental theorists adopting mastery orientations has been well documented. More research needs to be conducted on the effect that this has on classroom environments as well as instructional strategies that promote mastery orientations and an incremental view of intelligence. This research is vital to understanding what role teachers can play in changing educational outcomes of students.

Criticisms of Implicit Theory of Intelligence

The multitude of well-documented studies citing support for how one's view of intelligence impacts goal orientation which then influences behavior patterns has its critics. The major criticisms as follows: the theory of intelligence is too simplistic, the dualistic nature of the theory (incremental or entity), performance goals might be prevailing in both incremental and entity viewpoints, and that the entity theory might not be completely a negative construct as previously cited researchers have theorized (Bouffard, Bouchard, Goulet, Denoncourt, & Couture, 2005; Braten & Stromso, 2006; Graham, 1995; Harackiewicz & Elliot, 1995; Kennett & Keefer, 2006; Kristjansson, 2008; Werth, Markel, & Förster, 2006).

Despite extensive research over decades, Kristjansson (2008) points to the fact that the student questionnaires that Dweck and her colleagues have developed are geared toward eliciting divisive answers. Despite, Dweck's continuous efforts to adjust and change the measurement tool and a multitude of research verifying the tool, Kristjansson contends that categorizing students as having an entity or incremental theory of intelligence in such neatly packaged dichotomous terms is unrealistic. In his paper, Kristjansson explains further that the measurement tool is flawed because when he asks his students questions regarding their intelligence or personality he rarely gets either/or answers.

Supporting Kristjansson's argument that Dweck's measurement tool is too simplistic is a commentary by Graham (1995). Graham remarked in *Psychological Inquiry* that the simple three-item measurement tool was not sufficient enough to draw conclusions on complicated behaviors such as persistence or beliefs about intelligence. Additionally, Graham further criticizes the research regarding the behaviors that entity or incremental theorists possess by stating that anyone who struggles over an extended period with an academic task will eventually give up regardless of whether they view their own intelligence from an incremental or an entity viewpoint. Finally, Graham posits that Dweck et al.'s work lacks the complexity of a general theory due to its focus on how individuals differ and ignoring general laws of achievement motivation (Graham, 1995).

Building on the criticism of the dichotomous view is Harackiewicz and Elliot (1995) who state that they are skeptical in believing that 85% of all participants fit neatly

into having either an incremental view or an entity view of intelligence. Rather, in the same publication as Graham (1995) they assert that Dweck and her colleagues have not clearly established a difference in the questionnaire for holding an entity or incremental view. Their main contention comes from the fact that participants are categorized as having an incremental viewpoint simply because they reject aspects of the entity viewpoint.

Another challenging evaluation of Dweck's work is the attempt to link the implicit theory of intelligence to goal orientation (Dweck & Leggett, 1988). Though several studies have empirically demonstrated that students with an entity theory of intelligence are driven toward performance goals and students with an incremental theory of intelligence are motivated by learning goals (Baird et al., 2009; Elliot & Dweck, 1988; Mangels et. al, 2006; Mueller & Dweck, 1998), researchers Braten and Stromso (2006) found contradictory information. In a study involving 105 business students ranging in age from 18-32 years old, researchers found that one's view of their own intelligence, entity or incremental, did not impact their approach to learning (Braten & Stromso, 2006). Rather, regardless if a person had an entity or an incremental view of their intelligence, the nature of a degree in business administration led the participants to embrace performance goals more readily. The adoption of performance goal orientations for the business administrators was therefore, not seen to produce the negative results that Dweck and other researchers have contended.

In addition, Dweck and her supporters claim that having an entity theory of intelligence and thus being concerned with performance goals lead to students to not put

forth effort in the face of difficulties (Diener & Dweck, 1978; Dweck, Chi-yue Chiu, & Ying-yi Hong, 1995). On the contrary, in a study involving post-secondary students, Bouffard (2005) found that one's view of their own intelligence did not hinder students from putting forth effort if the performance goal was something that the student had a strong desire to attain (Bouffard et al., 2005). Moreover, there was no significant relationship between the student's beliefs about their own intelligence and the type of goal orientation they sought.

Though Kennett and Keefer (2006) demonstrated support for the implicit theory of intelligence as it relates to explaining poor academic performance and avoid challenging tasks, they found contradictory information regarding student's goal orientation being linked to the type of intelligence they held. Researchers found that regardless of whether intelligence was viewed as entity or incremental, college students were not willing to forgo their academic grade in order to be challenged by the professor (Kennett & Keefer, 2006). Furthermore, Kennett and Keefer suggested that Dweck's conception of goal orientation might be limited to only experimental settings. Thus, contrary to the multiple studies citing support that a students' view of their own intelligence affects motivation, goals, and behavior (Blackwell et al., 2007; Heyman & Dweck, 1998; Hong, Chiu, Dweck, Lin, & Wan, 1999; Mueller & Dweck, 1998), Kennett & Keefer (2006) suggest that the nature of the goal itself might be a larger indicator of motivation than one's view of their own intelligence.

Finally, a few critics have found fault with Dweck's assessment of the negative consequences of holding an entity viewpoint (Harackiewicz & Elliot, 1995; Werth,

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Markel, & Förster, 2006). Specifically, Harackiewicz and Elliot (1995) speculate that entity theorists might be advantaged over their incremental counterparts regarding positive feedback. Positive feedback received that contradicts the entity theorists' belief that their intelligence is fixed and unchangeable might serve to motivate the entity theorist because they would now believe that they held that intelligence. In other words, individuals with an entity view of their intelligence may be likely to become motivated when they perform well in something that they had previously believed they did not possess an innate ability for, thus increasing work ethic. On the other hand, positive feedback would serve to neither positively or negatively motivate an incremental theorist because their motivation is intrinsic. Both commentaries by Harackiewicz and Elliot (1995) and Graham (1995) are not backed up by empirical data, merely conjecture.

Finally, in a study involving 108 employees in a large German business, researchers concluded that managers who held an entity viewpoint were judged more favorably than managers who had an incremental viewpoint (Werth, Markel, & Förster, 2006). Though this does not specifically contradict Dweck and her colleague's research regarding entity theorists and a static view of their own intelligence, it does question the possibility that having an entity view can be positive. Werth, Markel and Förster (2006) found that leaders who were perceived as holding an entity viewpoint were viewed more favorably by their employees. The researchers concluded that having an entity viewpoint allowed the employees to view their entity leaders as more consistent and stable than incremental theorist leaders. Therefore, although an incremental viewpoint has been shown to empirically enhance student achievement in the school setting, this research

questioned what impact one's view of intelligence has for leaders in the workplace. However, more research on this would need to be conducted in order to make that global generalization.

In conclusion, though there are some critics who question the measurement tool used to categorize individuals as having an incremental or entity view of intelligence, the majority of the voices in the field support Dweck's innate theory of intelligence and her measurement tool. Additionally, the direct link between goal orientation and implicit view of intelligence was not found in relation to business students the data presented throughout this review supports that there is a link with adolescents. Finally, the concept that holding an entity viewpoint might also be positive in certain settings needs to be researched more. Thus, despite some criticisms of the implicit theory of intelligence as well as its relationship to goal orientation, the vast amount of research cited supports the claims that one's view of intelligence affects the type of goal orientation and the adaptive or maladaptive behavior patterns which can positively or negatively impact student achievement.

Effective Teacher Characteristics

The factors that make some students more successful than others are topics that have been researched at length. In addition, researchers continue to debate on what the specific classroom factors are that impacts student achievement. The argument regarding which aspects of the classroom teacher impacts student achievement has been studied extensively by leading researchers (Darling-Hammond, 2000; Darling-Hammond, Holtzman, Gatlin, & Heilig, 2005; Brophy, 2010; Hanushek, 1971; Hanushek, 2011a).

Specifically, Darling-Hammond's work has focused on the role of teacher certification and preparation, while Brophy's efforts have centered on effective teacher characteristics, and Hanushek's work concentrated on policy regarding class size reduction, high stakes accountability, and the importance of teacher quality. Though the authors differ in their focus, they all agree that the classroom teacher has a significant impact on student achievement (Wright, 1997).

Therefore, since the classroom teacher is the most significant component impacting student achievement, many education practitioners have looked at instructional methodology as a way of improving classroom instruction. In addition, educational practitioners focus on instructional methods rather than on teacher beliefs is because it is easier to tell teachers to use a specific teaching strategy than to change a teacher's innate beliefs or characteristics. For example, in Marzano's book "What Works in Classroom Instruction," the focus is on specific strategies that teachers should use to become effective teachers (Marzano, 2000). Additionally, Tomlinson's work on differentiation has become standard practice for educators (Tomlinson, 2005). Conversely, well-known educational researchers who have focused on the beliefs of teachers and how those beliefs impacts student achievement are relatively unknown to practitioners. Many of the well-respected researchers in the world of academia are virtually unknown to the average teacher and administrator. Researchers such as; Ames, Bandura, Brophy, Darling-Hammond, Dweck, Eccles, Ladson-Billings, Pajares, Pintrich, Midgley, and Weiner, who focus more on teachers and students beliefs rather than specific strategies such as cooperative learning or flexible grouping are rarely referenced

when practitioners are looking to improve instruction or administrators are selecting professional development opportunities.

Regardless, there are many researchers who continue to understand that teacher beliefs are a critical component in improving student achievement. The seminal work by Rosenthal and Jacobson (1968) found that students achieved at the level of the expectations of their teachers. Rosenthal and Jacobson's 1968 study attempted to tackle the role of how an individual teacher's attitude and expectations of their students affected achievement. Rosenthal theorized that a person's biased expectancies could influence reality and cause the teachers to unconsciously act in ways that would encourage some students' success over others (Rosenthal & Jacobson, 1968). In this study, elementary school teachers were told that some of their students had higher IQ's than others, when in actuality the students had been selected at random with no regard to IQ's. The results of the study showed that if teachers believed that some students were smarter (had higher IQ's) than others than they had higher expectations of the students. This resulted in some students showing gains in IQ than others students. The implications of this study are that teacher's expectations of their students' abilities directly predispose their actions and behavior toward students and result in lower or higher achievement for their students.

Rosenthal's work was further supported by Good and Brophy (2000) who contended that high expectations had a positive effect on student achievement. Teacher's beliefs in having high expectations for all students leads to self-fulfilling prophecies of students and impacts the way in which the students interpret events in the in the

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classroom. Additionally, when teachers believe their students have the ability to achieve, students are more likely to have the same perception (Pomerantz & Ruble, 1997). Yet another work supporting high expectations was a study involving two science classes. Researchers determined that students in a lower tracked science class benefited from their teacher's high expectations of their ability (Pickens & Eick, 2009). Pajares (1992) further proposes that teacher's belief systems are a very important construct in determining student achievement.

Adding to the research regarding teacher effectiveness is an inquiry regarding specific teacher characteristics that correlate to student success. In a review of twenty one studies regarding the relationship between teacher characteristics and student achievement, Wayne & Youngs (2003) concluded that teachers who have superior communication with their students are more effective. Yet another work supporting that teachers' verbal skills positively correlate to student achievement is a review of literature and policy by Darling-Hammond (2000). Thus, more research needs to be conducted to determine how to improve teacher communication or recruit teachers who have high communication skills.

However, teacher effectiveness is more than just having the ability to communicate; therefore, multiple studies have been done to isolate other teacher factors that influence student achievement (Hanushek, 1971; Heck, 2007). In a review of information from fifty states, Darling-Hammond (2000) concluded that effective teachers were fully certified and had a degree in the field they were teaching. However,

Darling-Hammond admitted that other factors needed to be looked at further to fully explain student achievement.

Other teacher characteristics that have been successful linked to student achievement are determination and life satisfaction. In a longitudinal study of 390 novice teachers, Duckworth, Quinn, and Seligman (2009) were able to conclude that teachers who possessed fortitude expanded more effort to helping their students succeed. Additionally, the researchers hypothesized that teachers with a higher life satisfaction rating engaged their students more by displaying greater levels of enthusiasm. Nevertheless, the authors explain the limitations of their study because they did not include veteran teachers or instructional approaches.

The perception of how students perceive their teacher's concept of them is a major factor in determining success or failure. Additionally, a characteristic of effective teachers are those who establish quality teacher/student relationships. Studies have found that teachers who take a personal interest in students and believe in their students' abilities have higher achievement results (Eccles, 1993; Wayne & Youngs, 2003). Conversely, teachers who are less personal and facilitate an environment of performance over mastery are less effective (Eccles, 1991). Yet another work supporting the effects of personalization is Brophy (2010). Brophy outlined in quantitative and qualitative findings that teachers who were actively engaged with their students had higher achievement gains. Therefore, a teacher's ability to relate to each of their students is a vital component in determining success.

It is evident from the research cited that there is not one factor that determines if a teacher will be successful or not. However, research continues to point that teacher quality is the single biggest factor in academic success of all students (Sanders & Rivers, 1996). However, research on characteristics of effective teachers is still inconclusive. More research needs to be conducted to determine specific characteristics that all teachers must possess in order to positively impact student achievement. Additionally, the marked transition for children as they pass from elementary to middle school has been well documented. Therefore, more research on the specific characteristics that teachers who teach middle school needs to be conducted to address the decline in student achievement between elementary to middle school.

Mathematics

Math has been well documented as a subject in which students struggle (Center on, 2009; Fordham, 2009; National Council of Teachers of Mathematics, 2007; Rivkin, Hanushek, & Rain, 2005). However, in an article by (Protheroe, 2007), the National Council of Teachers of Mathematics (NCTM) states that good teaching is the key to math instruction. The good teaching that Protheroe (2007) refers to is specific teacher behaviors that effective teachers possess such as; acceptance of divergent ideas, challenging and interesting questions, and a positive attitude about math and a belief that their students can learn.

In addition to good teaching the NCTM has established that all middle school math teachers should focus on building on the current knowledge of students, comprehending cause and effect, thinking hypothetically, and concrete and abstract

reasoning (National Council of Teachers of Mathematics, 2007). Along with a focus on specific areas the Third International Mathematics and Science Study (TIMSS) study involving over half a million students from all over the world found that there was a strong positive relationship between students who enjoyed math and their achievement regardless what country they were from (Beaton, Boston College, Chestnut Hill, MA Center for the Study of Testing, Evaluation, and, Educational Policy, International Association for the Evaluation of, Educational Achievement, & Others, 1996). Additionally, a study by Levpusceck and Zupancic, (2009), stated that students who enjoy math achieved at higher levels than students who did not enjoy math. The researchers went on to emphasize that teachers who promoted a belief that their students could succeed and provided opportunities for students to experience success than students achieved at a higher level.

Building on the literature on effective math instruction, Liang (2003) also found that student's belief in their ability and the effort that the student contributes plays a significant role in whether or not students were successful. Moreover, in a meta-analysis of student performance in math, Walberg and Bast (2003) concluded that learning was influenced by a variety of factors including the quality of teacher and the self-concept of the student. These studies add to the research that the classroom teacher and their ability to influence their students considerably impacts student achievement in math.

Finally, current research points to the behaviors that math teachers exhibit are important in math achievement. Specifically, in an experimental design study with 42 math students in 5th and 6th grade, Ramdass and Zimmerman (2008) found that effective

math instruction involves teachers nurturing the belief that their students could be successful. Furthermore, Ramdass and Zimmerman (2008) determined that teachers need to provide frequent feedback and allow for students to self-evaluate what they have learned. These findings are especially important because they continue to emphasize it is belief systems that impact math achievement.

Middle School

Traditionally, there has been a direct link between students entering middle school and a decline in academic performance (Eccles, 1993; Cleary & Chen, 2008, Friedel, Cortina, & Midgley, 2010). Middle school students' beliefs about their ability to be successful also decline through the early years of adolescence. Therefore, teachers' beliefs play an even more significant role in assisting students through this transitional period. Perhaps the most significant aspect regarding the influence that teachers can have is that middle school students' beliefs about their ability can still be changed during adolescence (Wigfield, Lutz, & Wagner, 2005).

In addition to the transition to middle school being marked by a decline in students' beliefs in their abilities, Anderman and Maehr (1994) concluded that performance in mathematics is especially at-risk. The decline in mathematics was supported in a longitudinal study of 1,301 students and teachers in math (Midgley, Feldlaufer, & Eccles, 1989). Midgley and her colleagues determined that when students perceived their math teachers to be less supportive they declined in motivation and persistence. This was especially true of low-achieving students who may be especially likely to quit trying if the middle school environment is not supportive.

Yet another study supporting the need for middle school math teachers to believe in their student's ability to succeed was a study by Woodward and Brown (2006). In a study with 53 middle school students, researchers concluded that when students had more positive attitudes about math, they were more likely to persist. This study is important because when one links this study with other literature on student achievement, teachers who believe in their students and create opportunities for success help facilitate student's beliefs about math.

Along with the importance of teacher beliefs in middle school the aspect regarding the transition from elementary school to middle school. The transition from elementary to middle school is marked by an increased emphasis on ability grouping, public evaluation, and social comparisons (Eccles, Lord, & Midgley, 1991). In a meta-analysis, Eccles et. al (1991) concluded that middle school teachers judged performance of their students more than elementary students.

Middle school teacher's judging and comparing students is a characteristic of how a teacher orients their classroom. In a study on teacher's classroom goal orientation in middle school math completed by Friedel, Cortina, and Midgley, (2010) researchers sought to examine the effects of teacher's goal orientation and their student's efficacy beliefs. The study consisting of 929 students in 6th and 7th grades found that 7th grade math teachers who emphasized mastery classroom goal structures (emphasis on student growth and learning and not competition) were able to positively influence their student's efficacy beliefs. The focus on mastery goals and performance goals is related to the goal orientation literature previously discussed. Thus, if middle school teachers

focus more on performance goals then the likelihood of task persistence and efficacy is less likely than if mastery oriented goals were applied.

Perhaps the most salient study supporting the negative effect on middle school students and a focus on performance goals was a study by Anderman (1999). Students who attended a school that focused primarily on competition and ability grouping showed a student decline in motivation. Conversely, the students who attended the school that emphasized task goals, also known as mastery oriented goals were less likely to be unmotivated to learn. Another study supporting mastery goal orientation for middle school math teachers was a study with 880 suburban middle school students by Cleary and Chen (2009) who found that mastery goal oriented classrooms increased student performance and engagement and allowed more choice and autonomy which ultimately increased student's motivation.

Middle school has repeatedly been viewed as a negative stopping point between elementary and high school. However, researchers and middle school educators continue to look for ways to decrease this negative view and reverse the downward trend so many students face. Teachers that instill a belief about their students and reinforce mastery oriented learning have shown to counteract the negativity associated with the middle years.

CHAPTER III

METHODOLOGY

This chapter includes an overview of the methodology used to conduct the research on teacher's implicit theory of intelligence and goal orientation as it positively or negatively impacts student achievement in middle school mathematics. The chapter is divided into six subsections. The first subsection contains the introduction of the study including an overview of the reason for the study and the research questions that guided the study as well as a description of the independent and dependent variables. The second section explains the context of the study as well as the rationale for the district selected. After the context of the study is explained, a summarization of the data sources for the study including the reason for the sample selected will be explained. After the data sources are explained there will be a description of the type of instruments chosen as well as the validity and reliability of the instruments. The next section, will explain the data collection methods and procedures used to collect the data. Finally, I will explain the types of data analysis tools that will be used to interpret and generalize findings.

Introduction

Although there is an overwhelming amount of research that has quantitatively linked students' mindsets to their goal orientation and their subsequent success or failure in the classroom, there has been little to no research conducted on how a teacher's Mindset and classroom goal orientation could impact their student's achievement. Therefore, my study looked at how individual teacher beliefs impacted student

achievement. Additionally, I considered how teacher's goal orientations impacted their student's achievement.

The theoretical model that I drew from to frame this study was based on the expectancy-value model. The expectancy-value model states that the interaction of one's individual belief about the value of a task along with their belief in their ability to perform the task determines whether they will persist in the task (Pintrich, 1990). Therefore, by conducting a study measuring student achievement outcomes and determining if there is a correlation between teachers implicit beliefs and goal orientation I will be able to quantify if certain teacher characteristics result in higher or lower student achievement scores on a standardized math test.

The research questions were identified after a thorough review of literature on the Implicit Theory of Intelligence and Goal Orientation. The study was designed to answer the following:

1) Is there a relationship between a teacher's mindset and their economically disadvantaged students' scores on the standardized state math exam?

2) Is there a relationship between a teacher's mindset and the yearly progress their economically disadvantaged students made in math from the previous year on the standardized state math exam?

3) Is there a relationship between a teacher's mastery and performance goal orientation and their economically disadvantaged students' scores on the standardized state math exam?

4) Is there a relationship between teacher's mastery and performance goal orientation and the yearly progress their economically disadvantaged students made in math from the previous year on the standardized state math exam?

5) Is there a relationship between a teachers' mindset and their goal orientation?

School District Context

The school district selected for the study was a large urban district. The district chosen was selected because of the high number of students who qualify for free and reduced lunch. Additionally, due to the size of the district there were eleven different middle schools from which to gain participants. Moreover, the size of the district allowed for a diverse group of over 100 participants to be asked to join the study. Additionally, because I was an employee of the district in which the study was conducted, I was able to access the potential participants as well as the student achievement data needed to perform the study.

In addition to the size of the district and access of a large number of middle school math teachers, another reason for the selection of this particular district is due to the vast range of achievement scores on the state standardized math test. Middle school math pass rates amongst students who qualified for free/reduced lunch ranged in 2012-2013 from six schools lower than a 73% pass rate to five schools with a pass rate of over 80%. Therefore, students who qualified for free and reduced lunch were considerably less successful in some schools than others. Thus, the question remains why are some teachers more effective in helping low-socio economic students succeed in math while other teachers are less successful?

Measures

There will be two independent variables in this study. The first independent variable is a teacher's Implicit Theory of Intelligence. The Implicit Theory of Intelligence Scale (Appendix A) will be used to measure whether a teacher has a growth or fixed mindset. Once the teachers have filled out the survey, based on teacher responses, the teachers will be coded as either having a growth or a fixed mindset. However, as previously noted, it is expected that roughly 15% of the participants will not show a propensity towards either mindset. Therefore, those teachers who do not score as having either a growth or fixed mindset will not be allowed to participate in the study. The Implicit Theory of Intelligence Scale was chosen because it is the instrument that Dweck and Henderson (1989) have used in past quantitative studies to determine whether an individual has a growth or fixed mindset.

The second independent variable that will be measured is the type of goal orientation the teacher ascribes. Using the Patterns of Adaptive Learning Scale (PALS) (Appendix B) (Midgley et al., 2000) survey instrument, teachers will be categorized has having a Mastery-goal approach or Performance-goal approach to instruction based on their responses. The PALS instrument will be utilized because of its ability to categorize participants has either being performance-goal or mastery goal oriented. However, only the teacher portion of the PALS instrument will be used and not the student portion. The reason for using only the teacher portion is because my study will only be focusing on teacher orientations and not student orientations.

The dependent variable for the study is economically disadvantaged student's math STAAR (State of Texas Assessment of Academic Readiness) scores. Economically disadvantaged student scores will be tied to their classroom teachers and my study will analyze how teacher's mindsets and goal orientation impact their economically disadvantaged student's achievement. Another dependent variable was the percent of students who made yearly progress on the state exam for each teacher participant.

The study will not control for years of experience and type of certification of the teacher because the research on this topic is still inconclusive (Darling-Hammond, 2000; Duffrin, 2006; Goldhaber & Brewer, 2000b; Hanushek, 1971; Hanushek, 2011b). In fact, Duffrin (2006) found that only 10% or less of student achievement gains could be attributed to teacher's credentials (education level, certification, and years of experience) and Hanushek (2011) found that neither higher levels of education nor advanced degrees were related to teacher effectiveness. However, it is noteworthy that there are studies that have found that a combination of teacher's education level, type of certification, and years of experience accounted for student achievement variations more than the socio-economic level of students (Ferguson & Womack, 1993; Strauss & Sawyer, 1986). Therefore, an overall analysis of research does merit controlling for either of these variables.

Data Source

The population for the study is all middle school math teachers in Texas. The sample population selected was the middle school math teachers in an urban school district in Texas. There were a total of 110 middle school math teachers from 11

different middle schools in the selected district who were eligible to participate in the study. In addition, the demographic make-up of the schools varied greatly, however, the studies parameters call for only studying teachers of economically disadvantaged students. Therefore, the qualifying factor of economically disadvantaged of the students will allow for a closer comparison of student scores.

There were not any additional requirements for teachers to possess to participate in the study besides being a middle school math teacher in the 2013-2014 school year in the selected district who had students who would be taking the state math exam. For the purpose of the study, middle school is defined as grades 6th, 7th, and 8th. Although the district does have a standardized scope and sequence that all teachers are required to follow the district does not have a scripted method of delivery instruction. Therefore, all of the teachers in the study vary greatly in their approach to lesson design and pedagogy and approach math using standard practices of direct instruction, lecture, small group activities, hands-on activities, and cooperative learning. Furthermore, the district schedule for each teacher was three sections of 90 minutes for instruction every day with a range of total students from lowest at 52 students to a high of 87 students with a class size average of 23:1.

Instrumentation, Reliability and Validity of Surveys

Theory of Intelligence Scale

Teachers' Implicit Theories of Intelligence will be measured using a three-item scale developed by Dweck and Henderson (1989). The development of the survey instrument has evolved over time; the original instrument was a two alternative forced-

choice format but Dweck and Henderson (1989) found that individuals tended to choose more incremental statements indicating to the researchers that there were biases built into the format. Therefore, Dweck and Henderson (1989) developed a questionnaire composed of three questions: (a) You have a certain amount of intelligence and you really can't do much to change it; (b) Your intelligence is something about you that you can't change very much; and (c) You can learn new things but you can't really change your basic intelligence. Respondents indicate their level of agreement using a 6-point Likert-scale ranging from 1(strongly agree) to 6 (strong disagree). The respondents are then scored and individuals whose average is 4.0 or above are categorized as having a growth mindset whereas individuals whose average score is 3.0 or below are categorized as having a fixed mindset. To ensure that only respondents with clear theories are included participants whose average scores fall between 3.1 and 3.9 are excluded. Dweck et. al. (1995) posits that roughly 15% of all respondents do not show a propensity toward the dichotomous views.

The reliability of the Implicit Theory of Intelligence measurement tool can be found in six validation studies (Dweck et al., 1995). Across the studies the Implicit Theory measure had high internal reliability: alphas ranged from .94 to 98, which shows a high internal consistency for the instrument. Additionally, the Test Re-test reliability of the measure over a 2-week interval was .80, which suggests that the measure has stability.

The validity of the Implicit Theory of Intelligence instrument has also been studied by Dweck et al. (1995). Dweck and her colleagues address the validity of having

an instrument that contains only three-items by stating that by continuing to repeat and rephrase the same idea respondents could get confused and bored and skew results. Though this could lead to low internal reliability, the results stated in the previous paragraph dispel this notion.

In addition to high internal reliability, factor analysis in five studies was performed for validity of the instrument (Dweck et al., 1995). The results of the studies found that the implicit theory measure formed clear separate factors. Discriminate validity studies further indicated that the instrument is distinct from measures of cognitive ability (Scholastic Aptitude Scores), confidence in self (Confidence in Intellectual Ability), and self-esteem (Self-Esteem Inventory). Furthermore, the same validation studies found that the implicit theory of intelligence measure is independent of respondents' sex, age, or political affiliation.

Patterns of Adaptive Learning Scales (PALS)

The type of goal orientation a teacher is oriented towards will be measured using the teacher portion of the PALS (Midgley et al., 2000). Midgley and her colleagues developed the questionnaire which is comprised of 94 student questions and 29 teacher questions relating to goal orientation and efficacy. Midgley and her colleague have stated that researchers may use portions of the instrument that best fit their research question. Therefore, because my study is focused solely on individual teacher goal orientation, I have elected to only use the nine-item instrument geared toward teacher mastery approaches to instruction and teacher performance approaches to instruction.

The mastery approach and performance approach to instruction questionnaire is comprised of nine questions. The items referring to a mastery approach to instruction emphasize the importance of recognizing student effort and learning tasks that are differentiated based on ability level. Examples of the items included in this scale are: "I make a special effort to recognize students' individual progress, even if they are below grade level" and "I consider how much students have improved when I give them report card grades." In contrast the performance approach to instruction emphasizes the importance of recognizing students who outperform others and student competition. Examples of the items included in this scale are: "I help students understand how their performance compares to others" and "I display the work of the highest achieving students as an example." Both mastery and performance approaches to instruction are scored using a five-point anchored scales ranging from 1 (strongly disagree) to 5 (strongly agree). The respondents are scored and categorized has having a propensity towards mastery or performance approach to instruction based on which average scores is highest.

The PALS survey was developed and tested for validity and reliability with seven different samples. The seven different samples of goal related approaches to instruction were from studies conducted with elementary and middle school math teachers in the Midwest. The demographic make-up of the teachers was 70% European American and 30% persons of color.

Exploratory factor analysis was used to guide the construction of scales and the internal consistencies of each of the scales were assessed using Cronbach's alpha. The

mastery approach and the performance goal orientation Cronbach alpha scale were both

.69. Additionally, confirmatory factor analysis indicated that the sub-scales demonstrate

discriminant validity (Midgley et al., 1998). Furthermore, the PALS scales have been

found to be stable over time and have demonstrated solid internal consistency.

Procedures

Participants were recruited after obtaining IRB approval. The researcher

contacted the district's superintendent and obtained the approval to conduct research

using middle school math teachers in 11 different schools and their students' scores on

the state STAAR math exam. Once approval was obtained, the researcher sent an email

to middle school math teachers in the district using their personal email address to

request participation. Furthermore, the researcher trained an alternative certified person

to send the email request to the 14 eligible participants that the researcher supervised

during the time of the study. Additionally, the researcher attached a copy of the IRB

approved consent form and requested that the participants scan and send their signed

consent forms to the same email address that the request to participate came from.

Once the researcher received the signed consent forms from voluntary

participants, participants were sent the two survey instruments (Implicit Theory of

Intelligence and Patterns of Adaptive Learning) via email after business hours. The

participants returned the surveys to the researcher through email. Once the surveys were

collected they were scored and a data file was sent to the district. The district then

assigned an anonymous letter to each participant and attached the individual teachers'

student data to their survey. Finally, the district matched the teacher records to their students' data and gave the information to the researcher.

Data Analysis

Descriptive and inferential statistics were run for all data collected using SPSS version 22.0, (SPSS, 2013). Descriptive statistics (mean and standard deviation) were analyzed on two teacher surveys: Implicit Theory of Intelligence and Patterns of Adaptive Learning Scales (PALS).

Teacher scores were computed for both surveys by calculating the sum of the individual item responses for each survey. After the calculation was performed, composite scores were created for both surveys and computing the mean of the responses to the items on each scale.

The study utilized a simple bivariate correlational design to determine if there is a relationship between a teachers' beliefs about their own intelligence and the type of goal orientation a teacher ascribes to and their economically disadvantaged students' achievement on a standardized exam. All statistical tests were conducted at the .05 level of significance.

Student's scale math scores from the State of Texas Assessment of Academic Readiness (STAAR) and student progress on the STAAR math exam were the dependent variable in the study. Moreover, only economically disadvantaged students' test scores were included in the study. The independent variables were the teachers' mindset and teachers' goal orientation.

CHAPTER IV

RESULTS AND ANALYSIS

The purpose of the study was to investigate the relationship between a teachers'
mindset and goal orientation and their economically disadvantaged students' scores and
progress on the state math exam. The chapter includes an overview of the study, the data
collection procedures used, general demographic information regarding teacher and
student populations, descriptive analysis of survey instrument, outcomes of the proposed
hypotheses, and a brief overall summary.

Overview of the Study

The mindset that teachers possess regarding intelligence was measured using
Dweck and Henderson's Theory of Intelligence Survey (Appendix A) (Dweck et al.,
1995). Additionally, the teachers' goal orientation was measured using the teacher
portion of the Patterns of Adaptive Learning Scales (PALS) (Appendix B) (Midgley et
al., 2000). The sample for the study included teachers (n =35) teaching middle school
math during the 2013-2014 school year and economically disadvantaged students (n
=1,095) enrolled in their middle school math class during state testing in the Spring of
2014. Moreover, the sample included teachers from nine different middle schools in the
selected district.

Demographic Information of Participants

The teachers in the study represented a somewhat small percentage of the total
middle school math teachers in the district and a small percentage but a large number of

economically disadvantage students. Table 1 illustrates that nine middle schools in the

district had teachers who chose to participate in the study.

Table 1

Demographics of Participants

	n	% of Total Eligible
Number of Teacher Participants	35	36%
Number of Different Schools that Participated	9	82%
Number of Economic Disadvantaged Student Participants	1095	29%

Moreover, the teachers in the study represented a cross-section of the middle

school teachers in the district and represented schools with a small average class sizes.

Additionally, due to the high percentage of students who qualify for free/reduced lunch

at each of the middle schools, there was a high number of economically disadvantaged

student data was used. In addition to the percent of economically disadvantaged

students, Table 2 displays the average years of teacher experience in the participating

schools was a minimum of seven years and a high of almost 12 years.

Table 2

Demographics of Participants Schools

School	Avg. Size of Math Class	% of Economically Disadvantaged Students	Avg. Years of Teacher Experience
1	20.5	60.8	11.1
2	18.4	40.6	10.3
3	19.1	55.2	11.9
4	18.6	42.0	7.5
5	21.7	58.1	8.2
6	18.6	60.7	10.0
7	17.6	59.2	8.5
8	19.8	76.5	9.9
9	24.4	69.5	7.1

Finally, because prior research suggests that gender impacts one's beliefs about intelligence (Dweck Leggett, 1988), gender of the participants is represented in Table 3. The gender of the participants was over three quarters female and less than one quarter male. However, it is important to note that the breakdown is similar to the overall gender of middle school teachers in the district with the majority of middle school teachers being female.

Table 3

Teachers' Gender

Gender	*N*	%
Female	27	77
Male	8	23
Total	35	100

The student data represented in the study is not student specific. Rather, the demographic data in Table 4 illustrates the percent of students in the district that qualify for free/reduced lunch per federal guidelines. Additionally, individual student scores were not reported because only the teacher's economically disadvantaged students overall scores (scale score average and percent of students who made yearly progress) were received by the investigator.

Table 4

District Demographics of Students

Socio Economic Status	% of Students
Economically Disadvantaged	56.3
Non-Economically Disadvantaged	43.7

Descriptive Analysis of Survey Instruments

Teachers' mindset was measured using the Theory of Intelligence Survey developed by Dweck and Henderson (1989). The Theory of Intelligence Survey attempts to measure one's beliefs about the nature of intelligence. Specifically, the survey measures if the respondent has an incremental (growth mindset) or an entity (fixed mindset) about the nature of intelligence. A growth mindset individual believes that intelligence is something that can be cultivated and is not set at birth. However, a fixed mindset person believes that intelligence is set at birth and is permanent.

Dweck and Henderson's Theory of Intelligence Survey is a three-item instrument which asks respondents to indicate the extent to which they Strongly Agree (A= 1) or

Strongly Disagree (F= 6) with each of the statements on a six-point Likert Scale. The items are scored (1-6), with 6 being the highest score. Scores 1.0 - 3.0 indicate a fixed mindset whereas 4.0 - 6.0 indicate a growth mindset. Participants scoring in between 3.1 - 3.9 are considered to not have a strong propensity toward one mindset or the other. In addition, the higher the growth mindset score the stronger the respondent's belief that intelligence can be grown and the lower the score the stronger the respondent's belief that intelligence is stagnant and unchangeable.

In order to check for internal consistency of the Theory of Intelligence Survey, the researcher analyzed the Cronbach alpha of the survey. Scale reliability was established and found to be acceptable (Gliem & Gliem, 2003) $\alpha = .899$. Across previous studies the Theory of Intelligence Survey had high internal reliability; alpha's ranged from .94 to 98 on six validation studies, which confirms a high internal consistency for the instrument (Dweck et al., 1995).

Overall, an overwhelming majority (89%) of teachers who participated in the study had scores that placed them in the growth mindset category. Table 5 explains that 20% of the teachers had the highest possible score of 6.0 towards a growth mindset. Conversely, a very small percentage of teachers had a fixed mindset (12%) and only one teacher did not express a tendency towards either a growth or fixed mindset. Having only 2% of the respondents not have a distinct theory is vastly different than the research results of Dweck and her colleagues who found that roughly 15% of all respondents do not have a propensity to either a growth or fixed mindset (Dweck et. al. (1995). The overall mindset scores are based on a 1-6 Likert scale. The participants scored an overall

$M = 4.94$ ($SD = 1.04$) and the minimum observed scores was a 2.0 with the overall

maximum participant score of 6.0.

Table 5

Teachers' Score on the Theory of Intelligence

Theory of Intelligence Score	Frequency	%	Cumulative %
2.0	1	2.9	2.9
2.7	1	2.9	5.7
3.0	2	5.7	11.4
3.7	1	2.9	14.3
4.0	2	5.7	20.0
4.3	2	5.7	25.7
5.0	10	28.6	54.3
5.3	3	8.6	62.9
5.7	6	17.1	80.0
6.0	7	20.0	100.00
Total	35	100.0	

Individual questions on the three-item questionnaire reveal that there was very

little difference in the overall average responses on each question. Table 6 reveals that

this is due in part because the vast majority of teachers exhibited a propensity towards a

growth mindset which slanted the overall means of the data. A possible explanation for

this will be explained in the limitations discussion in Chapter V.

Table 6

Theory of Intelligence Survey: Means and Standard Deviations

Item	*n*	*M*	*SD*
You have a certain amount of intelligence and you really can't do much to change it.	35	4.89	1.16
Your intelligence is something about you that you can't change very much.	35	4.97	1.09
You can learn new things, but you can't really change your basic intelligence.	35	4.97	1.17

In addition to the Theory of Intelligence survey, teachers were asked to complete the portion of the PALS survey which measures individual teacher's beliefs about how they approach instruction in their classroom developed by Midgley et al., (2000). The PALS survey consisted of nine items that measured teacher's perception of how their classroom goal orientation on a five-point Likert Scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

In order to check for internal consistency of the PALS Survey, the researcher analyzed the Cronbach alpha of the survey. Scale reliability was established and found to be $\alpha = .793$. According to Gliem and Gliem (2003) the alpha level of .793 is an acceptable level. Across previous studies the PALS Survey portion for the mastery goal and the performance goal orientation reliability was $\alpha = .69$ (Midgley et al., 1998).

On average teachers scored higher towards the mastery goal approach to learning than the performance goal approach to learning. Additionally, the minimum and the maximum performance goal scores are reported in Table 7 along with the Mastery Scores of $M = 3.8$ $SD = .79$) and performance scores of $M = 2.7$ ($SD = .64$).

Table 7

Goal orientation Survey: Means and Standard Deviation

	N	Minimum	Maximum	*M*	*SD*
Teacher Mastery Score	35	2.0	5.0	3.8	.79
Teacher Performance Scores	35	1.2	4.4	2.7	.64

The nine items are arranged in a manner on the survey so that the mastery goal approach and the performance goal approach items are dispersed in a random order. There are four mastery goal approach questions and five performance goal approach questions and the average score on each item were calculated for each teacher. The scores on both scales indicate the teacher's approach to instruction in specific areas related to student learning. Table 8 illustrates the mean and standard deviations for each of the question items. The items are re-arranged in order to group the performance goal and mastery goal approaches. Results of the teachers surveyed indicated that all four mastery items scored higher than the five performance approach items.

Table 8

Goal Orientation Individual Item Responses

Item	Mastery or Perform Item	n	M	SD
1. I give special privileges to students who do the best work.	P	35	2.46	1.01
3. I display the work of the highest achieving students as an example.	P	35	2.66	.87
6. I help students understand how their performance compared to others.	P	35	2.46	1.09
7. I encourage students to compete with each other.	P	35	2.80	1.07
8. I point out those students who do well as a model for the other students.	P	35	3.14	1.19
2. I make a special effort to recognized students' individual progress even if they are below grade level.	M	35	4.26	.78
4. During class, I often provide several different activities so that students can choose among them.	M	35	3.14	1.06
5. I consider how much students have improved when I give them report card grades.	M	35	3.80	1.02
9. I give a wide range of assignments, matched to the students' needs and skill level.	M	35	3.60	1.00

Overall, the majority of the teachers surveyed had a strong tendency towards a mastery goal approach compared to a performance goal approach. An analysis indicates that of the 35 teachers who participated, 91% had a higher mastery goal approach score than a performance goal approach. Additionally, only 2% had the same score on both the mastery goal and performance goal approach. Moreover, Table 9 indicates that more

teachers also had a higher overall score mastery goal approach than their performance

goal approach. Whereas Table 10 shows that most teachers did not have a strong

performance goal approach.

Table 9

Mastery Goal Scores on PALS Survey

	Frequency	%	Cumulative %
2.0	1	2.9	2.9
2.5	2	5.7	8.6
2.8	2	5.7	14.3
3.0	3	8.6	22.9
3.2	1	2.9	25.7
3.3	3	8.6	34.3
3.5	2	5.7	40.0
3.8	5	14.3	54.3
4.0	4	11.4	65.7
4.3	2	5.7	71.4
4.5	4	11.4	82.9
4.8	4	11.4	94.3
5.0	2	5.7	100.0
Total	35	100	

Table 10

Performance Scores on PALS Survey

	Frequency	%	Cumulative %
1.2	1	2.9	2.9
1.6	1	2.9	5.7
1.8	1	2.9	8.6
2.0	2	5.7	14.3
2.2	1	2.9	17.1
2.4	7	20.0	37.1
2.6	8	22.9	60.0
2.8	1	2.9	62.9
3.0	5	14.3	77.1
3.2	3	8.6	85.7
3.6	3	8.6	94.3
3.8	1	2.9	97.1
4.4	1	2.9	100.0
Total	35	100	

Hypotheses Results

The research study utilized inferential statistics to analyze five different research questions. The level of significance was tested at $\alpha = .05$ for each of the five research questions.

1) Is there a relationship between a teacher's mindset and their economically disadvantaged students' scores on the standardized state math exam?

2) Is there a relationship between a teacher's mindset and the yearly progress their economically disadvantaged students made in math from the previous year on the standardized state math exam?

3) Is there a relationship between a teacher's mastery and performance goal orientation and their economically disadvantaged students' scores on the standardized state math exam?

4) Is there a relationship between teacher's mastery and performance goal orientation and the yearly progress their economically disadvantaged students made in math from the previous year on the standardized state math exam?

5) Is there a relationship between a teachers' mindset and their goal orientation?

Hypotheses One

Is there a relationship between a teacher's Mindset and their economically disadvantaged students' scores on the standardized state math exam?

The Pearson Product-Moment correlation coefficient was used to test this hypothesis. The teacher's mindset survey results and the scale score average of their economically disadvantaged students' scores on a standardized math test were calculated. The results of the analysis showed that there was no statistically significant correlation ($r = .104$, $n = 35$, $p = .553$, two tails) between a teachers' mindset and their economically disadvantaged students scale score average on the standardized state math exam. Therefore, Table 11 illustrates that regardless of the teachers mindset score, the scale score average was not affected.

Table 11

Correlation Chart: Theory of Intelligence and Scale Score Average

		Teacher Mindset	Economic Disadvantage Students Scale Score Average
Teacher Mindset	Pearson Correlation	1	.104
	p		.553
	n	35	35

Hypotheses Two

Is there a relationship between a teacher's Mindset and the yearly progress their economically disadvantaged students made in math from the previous year on the standardized state math   exam?

The Pearson Product-Moment correlation coefficient was used to test this hypothesis. The teacher's mindset survey results and the percent of students' who made yearly progress on a standardized math test were calculated. A statistically significant correlation ($r = .342$, $n = 35$, $p = .004$, two tails) was found between a teachers' mindset and their economically disadvantaged students yearly progress on the standardized state math exam. The higher the growth mindset score a teacher possessed the higher the number of students who made yearly progress on the state math exam which is shown in Table 12. The coefficient of determination ($r^2 = .117$) can be interpreted that approximately 11.7% of the variability in students' yearly progress can be determined by their teachers mindset. However, due to the small size of the sample, the adjusted variance can only account for 9% of a student's yearly progress.

Table 12

Correlation Chart: Theory of Intelligence and Yearly Progress

		Teacher Mindset	% of Students who Made Yearly Progress in Math
Teacher Mindset	Pearson Correlation	1	.342
	p		.044
	n	35	35

Hypotheses Three

Is there a relationship between a teacher's mastery and performance goal orientation and their economically disadvantaged students' scores on the standardized state math exam?

The Pearson Product-Moment correlation was used to test this hypotheses. The results discovered that there was a statistically significant negative correlation between a teachers' performance goal orientation and the scale score average of their economically disadvantaged students. The results of the analysis found that there was a negative correlation ($r = -.366, n = 35, p = .031$, two tails) between a teachers' performance goal orientation and their economically disadvantaged students scale score average on the standardized state math exam. In view of the information, teachers who had a performance oriented approach to learning had a negative correlation to their students scale score average.

The researcher was also interested to see if individual question items on the PALS survey showed any statistical significance. All nine items were individually examined using the Pearson Product-Moment correlation. The results of the analysis found that two of the five performance goal approaches to instruction were significant. A

significant correlation was found for performance item one (P1) and performance item two (P8). Additionally, a statistically significant negative correlation for P1 (*I give special privileges to students who do the best work.*) ($r = -.508$, $n = 35$, $p = .002$, two tails). Therefore, economically disadvantaged students scored lower on average when they had teachers who agreed or strongly agreed that giving students who did their best work special privileges compared to students of teachers who did not believe in this practice. On the other hand, P8 (*I point out those students who do well as a model for the other students.*) had a statistically significant positive correlation ($r = .343$, $n = 35$, $p = .043$). Meaning, economically disadvantaged students scored higher on average when they had teachers who singled out high achieving students as an example. Consequently, there is conflicting data regarding the correlation between performance oriented approaches to instruction and students scale scores.

Finally, the Pearson Product-Moment correlation found that there was no statistically significant correlation ($r = -.114$, $n = 35$, $p = .514$, two tails) between a teacher's mastery goal orientation and the scale score average of their economically disadvantaged students'. As a result, Table 13 displays there was no correlation between teachers who possessed a mastery oriented approach to learning and their economically students scale score average.

Table 13

Correlation Chart: Goal Orientation and Scale Score Average

		Teacher Score	Economic Disadvantaged Students Scale Score Average
Teacher Mastery	Pearson Correlation	1	-.114
	p		.514
	n	35	35
Teacher Performance	Pearson Correlation	1	-.366
	p		.031
	n	35	35

Hypotheses Four

Is there a relationship between teacher's mastery and performance goal orientation and the yearly progress their economically disadvantaged students made in math from the previous year on the standardized state math exam?

The Pearson Product-Moment correlation was also used to test this research question. The teacher's mastery goal orientation survey results and the yearly progress their economically disadvantaged students made in math from the previous year were calculated. After reviewing the statistics, there was no statistically significant correlation ($r = .099$, $n = 35$, $p = .572$, two tails) between a teachers' overall score on the mastery goal survey and their students yearly progress. Hence, regardless of the teachers overall mastery goal approach to instruction, the number of students who met progress was not affected.

Additionally, the teacher's performance goal orientation survey results and the yearly progress of their economically disadvantaged students made in math from the previous year were calculated using the Pearson Product-Moment correlation. The results of the analysis shown in Table 14 that there was no statistically significant correlation (r = -.224, n = 35, p = .195, two tails) between a teachers' performance goal orientation and their students early progress.

Similar to the analysis performed in the previous research question, the researcher individually investigated the nine items in the PALS survey to determine if a specific question was significant using the Pearson Product-Moment correlation. The findings revealed that there was a statistically significant negative correlation for P1 (*I give special privileges to students who do the best work.*) and yearly progress (r = -.473, n = 35, p = .004, two tails). Thus, teachers who believed that giving special treatment to some students had less number of students make yearly progress than teachers who did not believe in this practice. Additionally M2 (*I make a special effort to recognize students' individual progress, even if they are below grade level.*) had a statistically significant positive correlation (r = .417, n = 35, p = .013, two tails) with a coefficient of determination of .17. Therefore, teachers who believed that making a special effort to recognize students' progress had more students make yearly progress than teachers who did not believe this was an effective instructional strategy.

Table 14

Correlation Chart: Goal Orientation and Yearly Progress

		Teacher Score	% of Students who Made Yearly Progress
Teacher Mastery	Pearson Correlation	1	.099
	p		.572
	n	35	35
Teacher Performance	Pearson Correlation	1	-.224
	p		.195
	n	35	35

Hypotheses Five

Is there a relationship between a teachers' mindset and their goal orientation?

A final Pearson Product-Moment correlation was performed to determine if there

was a significant relationship between a higher mindset score and a higher score on

either the mastery goal approach or the performance goal approach. The results

determined that there was a statistically significant positive correlation ($r = .343$, $n = 35$,

$p = .043$, two tails) between teachers with a high growth mindset score and teachers who

had a high mastery goal approach to instruction and also had a low performance goal

approach to instruction. Additionally, by analyzing the three individual items on the

Theory of Intelligence survey, Table 15 indicates that there was a statistically significant

positive correlation ($r = .340$, $n = 35$, $p = .046$, two tails) found between item one (*You

have a certain amount of intelligence and you really can't do much to change it.*) and the

difference between an individual teacher's mastery goal score and their performance

goal score. As a result, teachers who believe that intelligence is something that can be

grown have more distinct mastery approaches to instruction than those who believe that intelligence is stagnant.

Table 15

Theory of Intelligence and Difference between Goal Orientation Score

		Teacher Score	Difference between Goal Orientation Score Progress
Overall Mindset Score	Pearson Correlation	1	.343
	p		.043
	n	35	35
Mindset Item 1	Pearson Correlation	1	.340
	p		.046
	n	35	35

Summary

The study was comprised of 35 middle school math teachers in a public school district in Texas. Additionally, the study included state math results for 1,095 economically disadvantaged students from nine different middle schools in one district during the Spring of 2014. The study used two survey instruments: Theory of Intelligence Survey and Patterns of Adaptive Learning Scales (PALS). Descriptive statistics were calculated and reported for teachers.

Math teachers who participated in the study were primarily female with an average of nine years of teaching experience. The average class size was 23:1 in each of the participant's classrooms. All teachers in the study had a majority of their students qualifying for free/reduced lunch.

Inferential statistics were calculated for five research hypotheses. All five research questions were tested using the Pearson Product-Moment correlation. The results of the study revealed that there was a statistically significant correlation between teacher's mindset and their student's math progress from the previous year. Moreover, a statistical significant negative correlation was found between teachers with a performance classroom goal orientation and the scale score average of their students. Finally, statistically significance was found between the type of mindset a teacher possessed and their classroom goal orientation.

However, despite significance being found in three of the five research questions. No statistical significance was found between a teacher's mindset and the scale score average of their students. In addition, no statistical significance was found between teacher's classroom goal orientation and their student's math progress from the previous year.

CHAPTER V

CONCLUSION

This chapter includes a discussion of the findings for each research question, implications of the study compared to past research, limitations of the study, recommendations for future research, and a summary.

The purpose of this study was to determine if there was a relationship between individual teachers' belief systems and their students' achievement. The specific belief systems that the researcher investigated were teachers' innate beliefs about intelligence (mindset) and their goal orientation. Previous research has positively linked one's belief about intelligence (mindset) with the type of goal orientation in students. However, little to no research has been conducted solely looking at the type of mindset and goal orientation that a teacher possesses and how it relates to student achievement. Therefore, the following research questions guided this study:

1) Is there a relationship between a teacher's mindset and their economically disadvantaged students' scores on the standardized state math exam?

2) Is there a relationship between a teacher's mindset and the yearly progress their economically disadvantaged students made in math from the previous year on the standardized state math exam?

3) Is there a relationship between a teacher's mastery and performance goal orientation and their economically disadvantaged students' scores on the standardized state math exam?

4) Is there a relationship between teacher's mastery and performance goal orientation and the yearly progress their economically disadvantaged students made in math from the previous year on the standardized state math exam?

5) Is there a relationship between a teachers' mindset and their goal orientation?

Hypotheses Results

Hypotheses One

<u>Is there a relationship between a teacher's mindset and their economically disadvantaged students' scores on the standardized state math exam?</u>

There was no statistically significant relationship between a teacher's mindset score and their economically disadvantaged student's scores on the state math exam. Moreover, regardless if the teacher had a growth or a fixed mindset there was no statistically significant impact on their students' scores either positively or negatively. This finding is in direct opposition to the multitudes of past research that has found a positive relationship between individuals who possess a growth mindset and student achievement (Blackwell, Trzesniewski, & Dweck, 2007; Good, Aronson, & Inzlicht, 2003; Hong et al., 1999; Stipek & Gralinski, 1996). However, most of the research in the area has been with individual students and how their mindset impacted their achievement. Conversely, this research focused solely on the individual teacher's mindset and how it impacted their student's achievement regardless of their student's mindset.

Despite the fact that there was no significant correlation in the relationship between a teachers' mindset and their students' math achievement, survey data revealed

that 31 of the 35 teacher's possessed a growth mindset. Therefore, 89 percent of the

teachers felt that they were in control of their students learning which relates to the

expectancy-value theoretical model. The expectancy-value model is the framework for

studying teacher beliefs in that the majority of teachers believed that intelligence was

something that could be grown and was not set at birth. As a result, by having this belief

teachers thought they could grow their students' intelligence in math. Subsequently,

although there was not a positive relationship between the teachers' mindset and student

achievement the teacher's still believed that intelligence could be grown.

A belief that intelligence can be grown (growth mindset) is a crucial component

for teachers because research has shown that growth mindset individuals are more likely

to take responsibility for their actions (Ommundsen, Haugen, & Lund, 2005).

Furthermore, because it is so important for teachers to never give up on their students,

growth mindset individuals have been found to persevere when faced with obstacles and

provide more effort towards a difficult task (Dweck, 2006). This is important because

research has concluded that teachers who do not give up are more effective teachers

(Duckworth, Quinn, & Seligman, 2009). The concept of the importance of teachers

having a growth mindset will be discussed in the next research question.

Hypotheses Two

<u>Is there a relationship between a teacher's mindset and the yearly progress their</u>

<u>economically disadvantaged students made in math from the previous year on the</u>

<u>standardized state math exam?</u>

Hypotheses 2 concentrated on the relationship between a teacher's mindset and the percent of their economically disadvantaged students who made yearly progress in math. A significant positive relationship was found for teachers who possessed a growth mindset and the percent of students who made progress. In fact, the higher the growth mindset score a teacher possessed the stronger the relationship was between the percent of students who made yearly progress on the state math exam. Moreover, there was also a statistically significant relationship with two out of the three question items on the survey and student's yearly progress. Teachers' who believed that intelligence was something that could be both grown and that could be changed in individuals had a higher percent of economically disadvantaged students who made progress than teachers who had a lower scores or fixed mindset.

These findings have been supported in many previous studies which have found a positive relationship between individuals who possess a growth mindset and student achievement (Blackwell, Trzesniewski, & Dweck, 2007; Good, Aronson, & Inzlicht, 2003; Hong et al., 1999; Stipek & Gralinski, 1996). Furthermore, because individuals who possess a growth mindset believe that they can grow their intellect, teachers' who have faith in growing intellect would manifest this towards their students and help them make progress regardless of previous successes or failures.

Growth mindset teachers hold the belief that intellect can be grown; therefore, this impacts their behaviors in the classroom. The behaviors that growth mindset teachers would most likely exhibit are modeling learning on a daily basis and not making statements that would make their students think that effort was futile. Instead,

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one might hear a growth mindset teacher say: "*I can tell you worked hard on the math problem" or "You put forth a lot of effort on that assignment, what did you learn?"* This is compared to a teacher with a fixed mindset who would be more likely to praise the outcome and not the process. An example of feedback that a fixed mindset teacher might give is: *"You are so smart" or "You didn't even have to try and you got the math problem correct"*. Providing feedback to students is part of teaching, thus, teachers who believe in the malleability of intelligence are more likely to give feedback that motivates students to want to persevere and work hard.

In addition to providing feedback that motivates students; effective teacher literature is fairly conclusive that having high expectations for all students is a key to student achievement (Good & Brophy, 2000, Pomerantz & Ruble, 1997; Pickens & Eick, 2009; Rosenthall & Jacobson, 1968). Because teachers who have a growth mindset believe that intelligence can be grown, these teachers have high expectations for all students therefore it was not a surprise to the researcher that students who had teachers with a growth mindset were more likely to make yearly progress in math than their peers who had teachers with a fixed mindset.

Additionally, because it is has been found that economically disadvantaged students perform lower than their peers on math exams (McConney & Perry, 2010), having teachers who have a growth mindset is especially important for economically disadvantaged students. Equally important to note is that fixed mindset teachers who have students who have historically performed lower on math exams would be more likely attribute failure to the student and not to their own ability. Moreover, because

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fixed mindset individuals tend to exhibit behaviors of helplessness (Robins & Pals, 2002), teachers with fixed mindsets would be less likely to persevere and put forth more effort with a struggling math student than growth mindset teachers.

Hypotheses Three

Is there a relationship between a teacher's mastery and performance goal orientation and their economically disadvantaged students' scores on the standardized state math exam?

Hypotheses three highlights the relationship between teachers' goal orientation (mastery or performance) and students' math scores. The researcher discovered that there was no relationship between teachers' mastery goal approach to learner and their students overall scores on the state math exam. These findings contradict previous research on mastery goal orientations which espouse those individuals who adopt mastery goal approaches to instruction are more likely to adopt adaptive patterns of behavior than performance goal individuals
(Keys, Conley, Duncan & Domina, 2012). Moreover, literature cites that mastery goal individuals are more likely to persist and seek out assistance from others which should allow teachers with this goal orientation to persevere with their students.

However, an analysis of the relationship between performance goal teachers and student scores found that the higher a teacher scores on the performance scale the lower their economically disadvantaged students scored on the state math exam. This statistical evidence supports several past studies that have found that performance oriented individuals are more likely to give up when faced with challenges and exhibit self-handicapping behaviors such as low effort (Baird, 2009; Dweck et al., 1995; Middleton

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& Midgley, 1997). For that reason, teachers who adopt performance goal approaches to instruction are less likely to value giving more effort to struggling math students because they would view it as futile.

Along with the overall negative relationship between performance oriented teachers and student scores, the researcher found that 2 of the 5 individual items were statistically significant. Performance question #1 (*I give special privileges to students who do the best work.*) revealed that teachers who selected a 4 or a 5 (5 = strongly agree) on this item had students whose scores were lower than teachers who selected a lower score of a 1 or a 2 (1 = strongly disagree). These results support the findings from previous research regarding performance goal orientation and student achievement (Ames, 1992b; Keys, Conley, Duncan, & Domina, 2012). Teachers who believe that they should give special privileges perpetuate competition and ability. Competition and ability are aspects of performance goal approaches which continue to show in this study as well as past studies to inhibit student success. Furthermore, teachers who endorse the performance belief of privileges for some knowingly or unknowingly lower their expectations for some students. This is especially important because effective teacher research consistently points to high expectation for all students as being a critical component to student success (Bain & Others, 1989; Good & Brophy, 2000; Rosenthall & Jacobson, 1968).

In contrast to the negative relationship between P1 and students scale score average, performance question #8 (*I point out those students who do well as a model for the other students*) had a positive relationship. The positive relationship between

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teachers who selected a 4 or a 5 (5 = strongly agree) on this item had students whose scores were actually higher than teachers who selected a lower score of a 1 or a 2 (1 = strongly disagree) on this item. Although this finding is in direct opposition to most previous research that has established that students with a performance goal orientation adopt maladaptive behaviors such as low task effort (Elliot & Dweck, 1988), there has been other goal orientation research stating otherwise. Specifically, research by Harackiewicz (1998) and Pintrich (2000) have demonstrated that performance goal orientations can be beneficial in certain settings. Harackiewicz (1998) found that performance goals can be beneficial in university settings where competition is the norm. However, the finding that teachers who believe that pointing out successful students as a model to their unsuccessful peers had a higher scale score average has not been true of any studies involving middle school aged students (Midgley, Kaplan, & Middleton, 2001). Therefore, the small sample size of the group best explains why this may be true in this study but not be generalizable.

Hypotheses Four

<u>Is there a relationship between teacher's mastery and performance goal orientation and the yearly progress their economically disadvantaged students made in math from the previous year on the standardized state math exam?</u>

Hypotheses 4 looked at the relationship between the teachers' goal orientation and the percent of their students that made yearly progress on the state math exam. The analysis of the data revealed that there was no significant relationship between the type of goal orientation (mastery or performance) and the yearly progress their students made.

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However, the researcher also performed a separate analysis of each the 9 goal orientation items to determine if a specific question on the survey was significant. Out of the 9 items, 2 out of the 9 showed a statistically significant relationship. P1 (*I give special privileges to students who do the best work*) was found to have a negative relationship to students' yearly progress. Thus, teachers who agreed or strongly agreed with this statement had less number of students make yearly progress than teachers who disagreed or strongly disagreed with this statement. Building on the previous discussion regarding P1 in research question 3, the researcher found it especially interesting that both students' scale score and yearly progress were negatively impacted when teachers believed that giving special privileges to some students was an effective teaching practice.

Along with P1 having significance, mastery item #2 (M2) on the PALS survey showed a statistically significant positive relationship with the percent of students who made yearly progress. Thus, teachers who believed that making a special effort to recognize students' progress had more students make yearly progress than teachers who disagreed with recognizing individual progress. Nevertheless, the overall analysis did not show a relationship between teachers overall mastery approach or overall performance approaches to instruction.

Therefore, despite research reviewed for this study which concluded that students with a mastery goal approach achieved at higher levels than students who adopt a performance goal orientation (Baird, 2009; Middleton & Midgley, 1997; Stone, 1999), these conclusions were not true for teachers. Consequently, although this research does

not mirror past research on how goal orientation affects student outcomes, it did attempt to address how goal orientation impacts teachers' approaches to instruction. Furthermore, because researchers have concluded that the classroom teacher has the biggest impact on student achievement (Sanders & Rivers, 1997; Wright & Others, 1997; Wayne & Youngs; 2003) it would stand to reason that teacher's approaches to instruction would impact student achievement. The researcher will discuss possible reasons why this was not found in this study in the limitations section.

Hypotheses Five

Is there a relationship between a teachers' mindset and their goal orientation?

The last Hypotheses looked at the relationship between teachers' mindset and their goal orientation. The researcher empirically concluded that there was a positive relationship between teachers who had a growth mindset and the gap between teacher's mastery and performance score. In other words, the higher teachers scored towards having a growth mindset the teachers were more likely to utilize mastery goal approaches to instruction. This is important because it adds to the research that links growth mindset with mastery goal orientations (Baird, 2009; Dweck, 1986; Stone, 1999). Teachers with a growth mindset believe that their own intelligence can be grown so they are more likely to exhibit classroom behaviors such as; recognizing students' individual progress, providing different activities to help grow intelligence, giving a range of assignments to match students' skill development, and noting student improvement when assigning grades.

Although the researcher was unable to ascertain any statistical significance showing the relationship between teachers with a fixed mindset and performance goal orientations, based on the links between growth mindset and mastery goal one would conclude that the relationship might exist if the sample size was larger (this will be discussed further in the limitation section).

Implications

The results of the study are mixed regarding the relationship between a teachers' mindset and goal orientation and their students' math achievement. However, the most noteworthy finding is that there is a statistically significant positive relationship between teachers with a growth mindset and the percent of their students in math who made progress in 1 academic year. This finding adds to the field of teacher beliefs in that there appears to be a relationship between one's innate beliefs and student outcomes in an academic setting (Ahmavaara & Houston, 2007; Dweck, 2006). Moreover, the results of this study on mindset and student progress is fairly unique in the field, because the vast majority of previous research has focused solely on how a students' mindsets impacts their achievement and there is little to no research on how the student's teachers' mindset may or may not impact their achievement. This is especially important in light of the research that supports that the classroom teacher is the single biggest influence on student achievement, even more than students' race, gender, or socio-economic level (Rivers & Sanders, 1996; Wright & Others, 1997). However, more research needs to be completed studying how teachers' mindset impacts students' achievement because although the study was found to be significant, only a small percentage of the variability

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in yearly progress could be attributed to the relationship. Therefore, more studies need to be performed with a larger sample which could increase the correlation and isolate behaviors that positively relate to student success.

Another significant result of the study was the negative relationship found between teachers who were performance goal oriented and their students' score on the state math exam. Teachers' who with a high performance goal orientation had their students score lower than teachers who had a higher mastery goal orientation. This fact supports the current research on goal orientation. The research on goal orientation espouses that students who adopt performance goals (Keys, Conley, Duncan & Domina, 2012) demonstrate maladaptive behaviors such as reduced effort on tasks. Based on this study, the maladaptive behaviors observed in students can also be attributed to teachers who adopt performance goal approaches to instruction. Examples of negative performance goal approaches that these teachers might use are; believing that effort should not be rewarded, encouraging competition amongst students, and not preparing lessons that allow for a wide range of abilities. Because teachers' goal orientations are linked to the different pedagogical approaches they use in their classroom, studying these approaches in more detail and including their students' goal orientation theories might give greater insight on which specific approaches are most effective. This study adds new insight into how teachers' goal orientations relate to student performance regardless of their students' goal theories.

Although there was no correlation between mastery oriented teachers and students' score on the state math exam, there was a positive correlation revealed between

one question on the mastery scale and students yearly progress. This finding was interesting in that the question was relating to teachers making a special effort to recognize students' individual progress, even if the student was not performing at the grade level in which they enrolled. There was a significant positive relationship between teachers who strongly believed that making the effort to recognize positive gains in their students was an important part of their pedagogy. Not surprising were the findings that those teachers had a higher percent of their students make yearly progress in math. Additional research is needed with more participants in order to see if this is something that can be generalized for all middle school math teachers or if was just in the district and state where the research was performed. While this finding is not directly correlated to previous studies regarding individuals with a mastery goals orientation have high effort levels, an inference can be drawn between those teachers who responded in a mastery manner and the special effort that they made which resulted in a higher percent of their students' making progress than teachers who did not believe in this practice.

Lastly, this study illustrated that there was a positive relationship between teachers' who scored higher on the growth mindset survey and teachers who scored as having a mastery goal approach to learning. This study not only adds to the extensive body of research which has positively linked students who have a growth mindset and mastery goal orientation (Blackwell et al., 2007; Robin & Pals, 2002; Hong et al., 1999), but it also adds to the rarely researched issue of the effect of teacher mindsets and goal orientations. Almost all of the past research in this area has studied students' self-theories and not teachers. By only looking at teachers, the researcher sought to fully

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endorse the concept that regardless of the students' beliefs or math ability, all students can learn and make progress with an effective teacher with a growth mindset and a mastery goal orientation.

There are many practical implications of this study. Because previous research is still inconclusive regarding the specific characteristics effective teachers possess, this study adds another dimension to the research. Previous studies on teacher beliefs have mainly centered on teachers self-efficacy (Pajares, 1996; Ross, 1992; Tschannen-Moran & Hoy, 2001) and on the collective efficacy of schools (Goddard, Hoy, & Woolfolk, 2000). Although both of these concepts have contributed greatly to the area of education there have been less practical implications for the research because it is still unclear how to increase teachers or schools efficacy. But the research on teacher mindset and goal orientation may provide the avenue with which to show teachers a concrete way of looking at intelligence (growth mindset) that leads to higher student achievement. Moreover, the mastery goal approach to learning is a specific set of beliefs that can be easily translated into teacher pedagogy (Ex. All teachers need to make a special effort to recognize students' individual progress, even if they are below grade level and teachers should give a wide range of assignments, matched to students' needs and skill level).

Teaching Dweck's concept of mindset to aspiring teachers in teacher preparation courses could not only help future educators be more successful when they enter the field by giving them a worthwhile tool but also rebuff people who do not embrace a growth mindset from ever entering the profession. In addition, current teachers could be taught the concepts in professional development sessions, which would give them

another viable tool with which to increase student achievement. Lastly, the concepts have already been empirically shown to increase student achievement when taught to students in a controlled setting (Blackwell, Trzesniewski, & Dweck, 2007); therefore, teaching them to both students and teachers could transform education.

Limitations

Middle school teachers' demographics vary greatly in the United States. Therefore, the biggest limitation in this study was the lack of demographic information that was made available to the researcher. Specifically, the study would have been greatly enhanced if information about each of the participants would have been made accessible (race, years of experience, type of certification, content knowledge, and school context). Additionally, the researcher was not able to obtain student survey information (relating to the students' mindset and goal orientation) or student demographic information which might enrich the findings of the study. These limitations keep the researcher from depicting any further conclusions regarding the effect teacher beliefs has on student achievement in middle school math.

Another limitation to the research was the number of teachers who participated ($N = 35$). Despite the researcher ensuring anonymity only 32% of the eligible middle school math teachers in the selected district chose to participate in the study. The reason for the low participation rate could be attributed to the low math scores in many of the middle schools in the district. Therefore, teachers might have been leery of participating due to insecurities they already possessed about their teaching ability. This conjecture is further supported by the number of teachers who did choose to participate who

possessed a growth mindset and a mastery goal orientation. Roughly 89% of all participants had a growth mindset and approximately 79% had a strong mastery goal orientation. Therefore, because of the nature of individuals who possess fixed mindsets and performance goal orientations it is not surprising that there were so few teachers with those beliefs that chose to participate. Furthermore, because teachers have been taught to believe that all students can learn, Dweck's survey instrument might not be valid with teachers.

The last limitation of the study was the lack of information about the students' math ability prior to this school year. The researcher chose to analyze teacher beliefs and the scale score averages of economically disadvantaged students. The decision to only study economically disadvantaged students has been discussed in length in previous sections, but a brief explanation is that the researcher believed that only looking at this group of students would help level the playing field for the teachers. Nonetheless, without having more information regarding the students' math ability the analysis of these research questions were flawed. An example of this flaw is that a teacher might have all of the highest achieving economically disadvantaged students because they teaching honors math. Therefore, most if not all of their students' would have a higher math ability coming into the year than teachers who did not teach any honors classes.

Recommendations for Future Research

There is increased pressure for educator accountability from all aspects of society including; parents, students, politicians, and business leaders. The accountability culture calls for more research that enables schools to help all students reach their highest

potential. Several leading researchers have maintained that studying the beliefs of

educators is the crucial element in determining student achievement for all students

(Pajares, 1992; Pintrich, 1990). In fact, Dweck (2010) states that it is important for

administrators to promote a growth mindset culture which not only allows but

encourages teachers and students to make mistakes and try again in order to help all

students (regardless of race, gender, socio-economic status) to reach their fullest

potential. As a result, the following provides recommendations for further research in the

area of teacher beliefs.

The first recommendation for further research to be conducted is examining the

school-wide context that exists within individual schools. By examining the school

culture research could determine if specific structures and/or policies promote or

discourage teachers' and students' mindsets and goal orientations. Thereby, a

determination of specific structures or policies would enable a greater number of

educators to be more purposeful in making school wide decisions.

Another recommendation for future research is to use qualitative measures to

determine the effects of mindsets and goal orientation on student achievement. This is

important because the overwhelming amount of research performed in these areas have

used quantitative tools. The use of qualitative tools could provide valuable insight that a

forced-choice survey questionnaire is unable to deliver. This could be especially

valuable given the inherent nature of most educators who are taught that they should

"believe" that intelligence is something that can be grown and without probing

questions, the survey results on the current measure might not provide the actual beliefs that the teaches possess.

The final recommendation is to expand the number of teachers in the studies and include teachers' demographic data such as; years of experience, content knowledge, type of certification, age, race, and gender so that there could be more control factors. The existence of more control factors would allow generalized findings. The allowance of more generalized findings would increase the likelihood of educational practitioners to not only take notice of the importance of educator mindsets and goal orientations but to possible incorporate the concepts into higher education and professional development.

Summary

The purpose of this study was to determine if there was a relationship between teachers' mindset, goal orientation and their students' achievement in middle school math. The results showed that there was a relationship with teachers' mindset and the percent of their students who made math yearly progress. Additionally, the results illustrated that there was a negative relationship between teachers with a performance goal orientation and their students' scores on the state exam. However, the study did not show a significant relationship between teacher mindsets' or mastery goal orientations on student's scores.

The results proved that a relationship exists between teacher beliefs and student achievement and adds important findings to the field. Specifically, because the study focused solely on individual teacher beliefs and did not take into account individual student beliefs the study varies from most previous work in the field which has primarily

focused on student beliefs. Future research in the area of teacher beliefs, especially

mindset and classroom goal orientation, could be a key element in increasing student

achievement for all students.

REFERENCES

Ahmavaara, A., & Houston, D. M. (2007). The effects of selective schooling and self-concept on adolescents' academic aspiration: An examination of dweck's self-theory. *British Journal of Educational Psychology, 77*(3), 613-632.

Ames, C. (1992a). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*(3), 261-71.

Ames, C. (1992b). *Home and school cooperation in social and motivational development*. University of Illinois: Champaign College of Education. Champaign, Illinois.

Ames, C., & Ames, R. (1984). Goal structures and motivation. *Elementary School Journal, 85*(1), 39-52.

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80*(3), 260-67.

Anderman, E. M., & Maehr, M. L. (1994). Motivation and schooling in the middle grades. *Review of Educational Research, 64*, 287-309.

Anderman, E. M., Maehr, M. L., & Midgley, C. (1999). Declining motivation after the transition to middle school: Schools can make a difference. *Journal of Research & Development in Education, 32*(3), 131-147.

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

Anderman, L. H., Midgley, C., & ERIC Clearinghouse on Elementary and Early,

   Childhood Education. (1998). *Motivation and middle school students.*

Atwood, J. R. (2010). *Mindset, motivation and metaphor in school and sport: Bifurcated*

   beliefs and behavior in two different achievement domains. Online Submission.

   Retrieved from http://lib-

   ezproxy.tamu.edu:2048/login?url=http://search.ebscohost.com/login.aspx?direct=tru

   e&db=eric&AN=ED509344&site=ehost-live.

Baird, G. L., Scott, W. D., Dearing, E., & Hamil, S. K. (2009). Cognitive self-regulation

   in youth with and without learning disabilities: Academic self-efficacy, theories of

   intelligence, learning vs. performance goal preferences, and effort attributions.

   Journal of Social & Clinical Psychology, 28(7), 881-908.

Bandura, A. (1999). In Baumeister R. F. (Ed.), *Self-efficacy: Toward a unifying theory of*

   behavioral change. New York, NY, US: Psychology Press.

Beaton, A. E., Boston Coll, Chestnut Hill, MA Center for the Study of Testing,

   Evaluation, and, Educational Policy, International Association for the Evaluation of,

   Educational Achievement, & Others, A. (1996). *Mathematics achievement in the*

   middle school years. IEA's third international mathematics and science study

   (TIMSS).

Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of

   intelligence predict achievement across an adolescent transition: A longitudinal

   study and an intervention. *Child Development, 78*(1), 246-263.

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

Boyd, D., Goldhaber, D., Hamilton Lankford, & Wyckoff, J. (2007). The effect of
certification and preparation on teacher quality. *The Future of Children, 17*(1,
Excellence in the Classroom), 45-68.

Braten, I., & Stromso, H. I. (2006). Predicting achievement goals in two different
academic contexts: A longitudinal study. *Scandinavian Journal of Educational
Research, 50*(2), 127-148.

Brophy, J. (2010). Teacher effects research and teacher quality. *Journal of Classroom
Interaction, 45*(1), 32-40.

Brophy, J. E. (1987). Synthesis of research on strategies for motivating students to learn.
Educational Leadership, 45, 40-48.

Brophy, J. E. (2010). Advances in teacher effectiveness research. *Journal of Classroom
Interaction, 45*(1), 17-24.

Butler, R. (2007). Teachers' achievement goal orientations and associations with
teachers' help seeking: Examination of a novel approach to teacher motivation.
Journal of Educational Psychology, 99(2), 241-252.

Center on, E. P. (2009). *General achievement trends: California.* Center on Education
Policy.

Cleary, T. J., & Chen, P. P. (2009). Self-regulation, motivation, and math achievement in

    middle school: Variations across grade level and math context. *Journal of School*

    Psychology, 47(5), 291-314.

Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of

    state policy evidence. *Education Policy Analysis Archives, 8.*

Darling-Hammond, L., Holtzman, D. J., Gatlin, S. J., & Heilig, J. V. (2005). Does

    teacher preparation matter? evidence about teacher certification, teach for america,

    and teacher effectiveness. *Education Policy Analysis Archives, 13*(42).

Diener, C. I., & Dweck, C. (1978). An analysis of learned helplessness: Continuous

    changes in performance, strategy, and achievement cognitions following failure.

    Journal of Personality and Social Psychology, 36, 451-462.

Duckworth, A. L., Quinn, P. D., & Seligman, M. E. P. (2009). Positive predictors of

    teacher effectiveness. *Journal of Positive Psychology, 4*(6), 540-547.

Duffrin, E. (2006). What makes a good teacher? *Catalyst Chicago, 18*(4), 17-18.

Dweck, C. (1975). The role of expectations and attributions in the alleviation of learned

    helplessness. *Journal of Personality & Social Psychology, 31*, 674-685.

Dweck, C. (2006). *Mindset: The new psychology of success*. New York: Random House.

Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist,*

    41(10), 1040-8.

Dweck, C. S. (1999). *Self-theories: Their role in motivation, personality, and*

    development. New York, NY, US: Psychology Press.

Dweck, C. S. (2000). *Self-theories: Their role in motivation, personality, and development, essays in social psychology.* Psychology Press.

Dweck, C. S., Chi-yue Chiu, & Ying-yi Hong. (1995). Implicit theories and their role in judgments and reactions: A word from two perspectives. *Psychological Inquiry, 6*(4), 267.

Dweck, C. S., & Henderson, V. L. (1989). *Theories of intelligence: Background and measures.* (Reports - Research; Tests/Questionnaires; Speeches/Meeting Papers.). Kansas City, MO.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*(2), 256-73.

Eccles, J. S. (1991). What are we doing to early adolescents? the impact of educational contexts on early adolescents. *American Journal of Education, 99*(4), 521-42.

Eccles, J. S., & Midgley, C. (1988). In Ames R. E., Ames C. (Eds.), *Research on motivation in education* [Stage/Environment Fit: developmentally appropriate classrooms for early adolescents.]. New York: Academic Press.

Eccles, J. S. (1993). Negative effects of traditional middle schools on students' motivation. *Elementary School Journal, 93*(5), 553-74.

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

Erdley, C. A., & Dweck, C. S. (1993). Children's implicit personality theories as predictors of their social judgments. *Child Development, 64*(3), 863-878.

Fitzgerald, J. M., & Mellor, S. (1988). How do people think about intelligence? *Multivariate Behavioral Research, 23*(2), 143.

Ferguson, P., & Womack, S. T. (1993). The impact of subject matter and education coursework on teaching performance. *Journal of Teacher Education, 44*, 55-63.

Fordham, T. B. (2009). *The accountability illusion: Texas*. Thomas B. Fordham Institute. Washington, D. C.

Friedel, J. M., Cortina, K. S., Turner, J. C., & Midgley, C. (2010). Changes in efficacy beliefs in mathematics across the transition to middle school: Examining the effects of perceived teacher and parent goal emphases. *Journal of Educational Psychology, 102*(1), 102-114.

Gliem, J. A., & Gliem, R. R. (2003). Calculating, interpreting, and reporting cronbach's alpha reliability coefficient for likert-type scales. Midwest Research to Practice Conference in Adult, Continuing, and Community Education, Ohio, USA, pp. 82–88.

Goddard, R. D., Hoy, W. K., & Hoy, A. W. (2000). Collective teacher efficacy: Its meaning, measure, and impact on student achievement. *American Educational Research Journal, 37*(2), 479-507.

Goldhaber, D. D., & Brewer, D. J. (2000a). Does teacher certification matter? high school teacher certification status and student achievement. *Educational Evaluation and Policy Analysis, 22*(2), 129-45.

Goldhaber, D. D., & Brewer, D. J. (2000b). Does teacher certification matter? high

   school teacher certification status and student achievement. *Educational Evaluation*

   and Policy Analysis, 22(2), 129-145.

Good, T., & Brophy, J. (2000). *Looking into classrooms* (8th ed.). Menlo Park, CA:

   Addison-Wesley Longman, Inc.

Graham, S. (1995). Implicit theories as conceptualized by an attribution researcher.

   Psychological Inquiry, 6(4), 294.

Hanushek, E. (1971). Teacher characteristics and gains in student achievement:

   Estimation using micro data. Paper presented at the *Papers and Proceedings of the*

   Eighty-Third Annual Meeting of the American Economic Association, , 61(2) 280-

   288.

Hanushek, E. A. (2011a). The economic value of higher teacher quality. *Economics of*

   Education Review, 30(3), 466-479.

Hanushek, E. A. (2011b). The economic value of higher teacher quality. *Economics of*

   Education Review, 30(3), 466-479.

Harackiewicz, J. M., Barron, K. E., & Elliot, A. J. (1998). Rethinking achievement

   goals: When are they adaptive for college students and why? *Educational*

   Psychologist, 33(1), 1-21.

Harackiewicz, J. M., Barron, K. E., Pintrich, P. R., Elliot, A. J., & Thrash, T. M. (2002).

   Revision of achievement goal theory: Necessary and illuminating. *Journal of*

   Educational Psychology, 94(3), 638-645.

Harackiewicz, J. M., & Elliot, A. J. (1995). Life is a roller coaster when you view the world through entity glasses. *Psychological Inquiry, 6*(4), 298.

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

Heck, R. H., & Hallinger, P. (2009). Assessing the contribution of distributed leadership to school improvement and growth in math achievement. *American Educational Research Journal, 46*(3), 659-689.

Heyman, G. D., & Dweck, C. S. (1998). Children's thinking about traits: Implications for judgments of the self and others. *Child Development, 69*(2), 391-403.

Hong, Y. (1994). *Predicting trait versus process inferences: The role of implicit theories.* (Unpublished doctoral dissertation). Columbia University.

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

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

Keys, T. D., Conley, A. M., Duncan, G. J., & Domina, T. (2012). The role of goal orientations for adolescent mathematics achievement. *Contemporary Educational Psychology, 37*(1), 47-54.

Kristjansson, K. (2008). Education and self-change. *Cambridge Journal of Education, 38*(2), 217-230.

Leondari, A., & Gialamas, V. (2002). Implicit theories, goal orientations, and perceived competence: Impact on students' achievement behavior. *Psychology in the Schools, 39*(3), 279.

Liang, X. (2010). Assessment use, self-efficacy and mathematics achievement: Comparative analysis of PISA 2003 data of finland, canada and the USA. *Evaluation & Research in Education, 23*(3), 213-229.

Levpuscek, M. P., & Zupancic, M. (2009). Math achievement in early adolescence: The role of parental involvement, teachers' behavior, and students' motivational beliefs about math. *Journal of Early Adolescence, 29*(4), 541-570.

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

Marszalek, J. M., Odom, A. L., LaNasa, S. M., College, D., & Adler, S. A. (2010). Distortion or clarification: Defining highly qualified teachers and the relationship between certification and achievement. *Education Policy Analysis Archives, 18*(27).

Maehr, M. L., & Meyer, H. A. (1997). Understanding motivation and schooling: Where we've been, where we are, and where we need to go. *Educational Psychology Review, 9*(4), 371-409.

Marzano, R. J., Gaddy, B. B., Dean, C., & Mid-Continent Research for Education, and Learning. (2000). *What works in classroom instruction.*

McConney, A., & Perry, L. B. (2010). Socioeconomic status, self-efficacy, and

mathematics achievement in australia: A secondary analysis. *Educational Research

for Policy and Practice, 9*(2), 77-91.

Middleton, M., & Midgley, C. (1997). *Avoiding the demonstration of lack of ability: An

under-explored aspect of goal theory.* Paper presented at the Annual Meeting of the

American Educational Research Association, Chicago, IL.

Midgley, C., Maehr, H. L., Anderman, E., Anderman, L., Freeman, K., & Gheen, M., et

al. (2000). *Manual for the patterns of adaptive learning scales*. Ann Arbor, MI:

University of Michigan.

Midgley, C., Feldlaufer, H., & Eccles, J. S. (1989). Student/teacher relations and

attitudes toward mathematics before and after the transition to junior high school.

Child Development, 60(4), pp. 981-992.

Midgley, C., Kaplan, A., Middleton, M., Maehr, M. L., Urdan, T., Anderman, L. H.,

Roeser, R. (1998). The development and validation of scales assessing students'

achievement goal orientations. *Contemporary Educational Psychology, 23*(2), 113-

131.

Midgley, C., Kaplan, A., & Middleton, M. (2001). Performance-approach goals: Good

for what, for whom, under what circumstances, and at what cost? *Journal of

Educational Psychology, 93*(1), 77-86.

Miller, S. D., & Atkinson, T. S. (2001). Cognitive and motivational effects of seeking

academic assistance. *Journal of Educational Research, 94*(6), 323-34.

Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology, 75*(1), 33-52.

National Council of Teachers of Mathematics. (2007). *The learning of mathematics: 69th NCTM yearbook [2007 NCTM yearbook (69th)]* National Council of Teachers of Mathematics.

Nicholls, J. G. (1979). Quality and equality in intellectual development: The role of motivation in education. *American Psychologist, 34*(11), 1071-1084.

Nicholls, J. G., Cheung, P. C., Lauer, J., & Patashnick, M. (1989). Individual differences in academic motivation: Perceived ability, goals, beliefs, and values. *Learning and Individual Differences, 1*(1), 63-84.

OECD (2010). *Pisa 2009 results: Executive Summary.*

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

Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research, 62*(3), 307-32.

Pickens, M., & Eick, C. J. (2009). Studying motivational strategies used by two teachers in differently tracked science courses. *Journal of Educational Research, 102*(5), 349-362.

Pintrich, P. R. (1990). Implications of psychological research on student learning and college teaching for teacher education. In W. R. Houston (Ed.), *Handbook of research on teacher education* (pp. 826-857). New York: Macmillan.

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

Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review, 16*(4), 385-407.

Pomerantz, E. M., & Ruble, D. N. (1997). Distinguishing multiple dimensions of conceptions of ability: Implications for self-evaluation. *Child Development, 68*(6), 1165-80.

Protheroe, N. (2007). What does good math instruction look like? *Principal, 87*(1), 51-54.

Ramdass, D., & Zimmerman, B. J. (2008). Effects of self-correction strategy training on middle school students' self-efficacy, self-evaluation, and mathematics division learning. (cover story). *Journal of Advanced Academics, 20*(1), 18-41.

Reich, D. A., & Arkin, R. M. (2006). Self-doubt, attributions, and the perceived implicit theories of others. *Self & Identity, 5*(2), 89-109.

Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). Teachers, schools, and academic achievement. *Econometrica, 73*(2), 417-458.

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

Rosenbaum, M., & Ben-Ari, K. (1985). Learned helplessness and learned resourcefulness: Effects of noncontingent success and failure on individuals differing in self-control skills. *Journal of Personality and Social Psychology, 48*(1), 198-215.

Rosenthal, R., & Jacobson, L. (1968). *Pygmalion in the classroom: Teacher expectations and pupils' intellectual development*. New York: Holt, Rinehart, & Winston.

Ross, J. A. (1992). Teacher efficacy and the effects of coaching on student achievement. *Canadian Journal of Education, 17*(1), 51-65.

Ryan, A. M., Gheen, M. H., & Midgley, C. (1998). Why do some students avoid asking for help? an examination of the interplay among students' academic efficacy, teachers' social-emotional role, and the classroom goal structure. *Journal of Educational Psychology, 90*(3), 528-35.

Ryan, A. M., & Patrick, H. (2001). The classroom social environment and changes in adolescents' motivation and engagement during middle school. *American Educational Research Journal, 38*(2), 437-460.

Sanders, W. L., & Rivers, J. C. (1996). *Cumulative and residual effects of teachers on future student academic achievement*. Research Progress Report. Knoxville: University Of Tennessee Value-Added Research and Assessment Center.

Seligman, M. E., & Maier, S. F. (1967). Failure to escape traumatic shock. *Journal of Experimental Psychology, 74*, 1-9.

Schmidt, W., Burroughs, N., & Cogan, L. (2013). *World class standards for preparing teachers of mathematics.* Michigan State University: Center for the Study of Curriculum.

SPSS for Windows, Rel. 22.0. 2013. Chicago: SPSS Inc.

Steele, C. M., Spencer, S. J., & Aronson, J. (2002). Contending with group image: The psychology of stereotype and social identity threat. *Advances in experimental social psychology, vol. 34* (pp. 379-440). San Diego, CA, US: Academic Press, San Diego, CA.

Stipek, D., & Gralinski, J. H. (1996). Children's beliefs about intelligence and school performance. *Journal of Educational Psychology, 88*, 397-407.

Strauss, R. P., & Sawyer, E. A. (1986). Some new evidence on teacher and student competencies. *Economics of Education Review, 5*(1), 41-48.

Stone, J. E. (1999). *The effects of theories of intelligence on the meanings that children attach to achievement goals. Dissertation Abstracts International: Section B: The Sciences and Engineering,* 384.

Tschannen-Moran, M., Hoy, A. W., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*(2), 202-48.

Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*(7), 783-805.

Tomlinson, C. A. (2005). Differentiating instruction: Why bother? *National Middle School Association.*

Walberg, H. J., & Bast, J. L. (2003). *Education and Capitalism: How Overcoming Our Fear of Markets and Economics Can Improve* (Vol. 521). Hoover Press.

Wayne, A. J., & Youngs, P. (2003). Teacher characteristics and student achievement gains: A review. *Review of Educational Research, 73*(1), 89-122.

Werth, L., Markel, P., & Förster, J. (2006). The role of subjective theories for leadership evaluation. *European Journal of Work & Organizational Psychology, 15*(1), 102-127.

Wigfield, A., Lutz, S. L., & Wagner, A. (2005). Early adolescents' development across the middle school years: implications for school counselors. *Professional School Counseling*, *9*(2), 112-119.

Woodward, J., & Brown, C. (2006). Meeting the curricular needs of academically low-achieving students in middle grade mathematics. *Journal of Special Education, 40*(3), 151-159.

Wright, S. P., & Others, A. (1997). Teacher and classroom context effects on student achievement: implications for teacher evaluation. *Journal of Personnel Evaluation in Education, 11*(1), 57-67.

IMPLICIT THEORIES OF INTELLIGENCE SCALE

These questions have been designed to investigate ideas about intelligence. There are no right or wrong answers. I am just interested in your ideas.
Using the scale below, please indicate the extent to which you agree or disagree with each of the following statements by filling in the letter that corresponds to your opinion.

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

    A. Strongly agree
    B. Agree
    C. Sort of agree
    D. Sort of disagree
    E. Disagree
    F. Strongly disagree

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

    A. Strongly agree
    B. Agree
    C. Sort of agree
    D. Sort of disagree
    E. Disagree
    F. Strongly disagree

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

    A. Strongly agree
    B. Agree
    C. Sort of agree
    D. Sort of disagree
    E. Disagree
    F. Strongly disagree

APPENDIX B

PATTERNS OF ADAPTIVE LEARNING SURVEY (PALS)
TEACHER SURVEY

Circle the __NUMBER__ that best fits the statement.

1. I give special privileges to students who do the best work.

1	**2**	**3**	**4**	**5**
STRONGLY DISAGREE		SOMEWHAT AGREE		STRONGLY AGREE

2. I make a special effort to recognize students' individual progress, even if they are below grade level.

1	**2**	**3**	**4**	**5**
STRONGLY DISAGREE		SOMEWHAT AGREE		STRONGLY AGREE

3. I display the work of the highest achieving students as an example.

1	**2**	**3**	**4**	**5**
STRONGLY DISAGREE		SOMEWHAT AGREE		STRONGLY AGREE

4. During class, I often provide several different activities so that students can choose among them.

1	**2**	**3**	**4**	**5**
STRONGLY DISAGREE		SOMEWHAT AGREE		STRONGLY AGREE

5. I consider how much students have improved when I give them report card grades.

1	**2**	**3**	**4**	**5**
STRONGLY DISAGREE		SOMEWHAT AGREE		STRONGLY AGREE

6. I help students understand how their performance compares to others.

1	**2**	**3**	**4**	**5**
STRONGLY DISAGREE		SOMEWHAT AGREE		STRONGLY AGREE

Appendix B cont.
Patterns of Adaptive Learning Scales (PALS)

7. I encourage students to compete with each other.

1	**2**	**3**	**4**	**5**
STRONGLY DISAGREE		SOMEWHAT AGREE		STRONGLY AGREE

8. I point out those students who do well as a model for the other students.

1	**2**	**3**	**4**	**5**
STRONGLY DISAGREE		SOMEWHAT AGREE		STRONGLY AGREE

9. I give a wide range of assignments, matched to students' needs and skill level.

1	**2**	**3**	**4**	**5**
STRONGLY DISAGREE		SOMEWHAT AGREE		STRONGLY AGREE