

A STUDY OF THE RELATIONSHIP BETWEEN CAREGIVER EDUCATION  
LEVEL, TIME SPENT ON SCHOOL ACTIVITIES, AND  
MATHEMATICS ACHIEVEMENT

by  
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Liberty University

A Dissertation Presented in Partial Fulfillment  
Of the Requirements for the Degree  
Doctor of Education

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## **ABSTRACT**

This study examined the relationship between caregiver education level and time spent with a caregiver on school activities with regard to how Georgia Middle School students ( $N = 465$ ) achieved on the mathematics section of the yearly Criterion Referenced Competency Test (CRCT) in Georgia. Caregiver education level and time spent with the caregiver on school activities was also examined to determine if a cumulative effect between the two factors could be found in relation to mathematics achievement on the CRCT. A causal comparative design was used and the data was analyzed using the 2009 version 16 of SPSS. A generalized linear model that generated a chi-square value was used to test the hypotheses. The findings were as follows: (a) There was a statistically significant relationship between caregiver education level and student math achievement on the CRCT, (b) There was no statistically significant relationship between time spent with caregiver on school activities and student math achievement on the CRCT, and (c) There was no statistically significant interaction between caregiver education level and time spent with the student on school activities with regard to student math achievement on the CRCT. It is recommended that future research encompass a larger sample, perhaps an entire Georgia district.

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## CHAPTER ONE: INTRODUCTION

Schools have entered the age of accountability. Federal mandates, such as the No Child Left Behind (NCLB) Act of 2001 and the Race to the Top initiative of 2010, aim to make schools examine and improve data sets (Dunn & Allen, 2009; U.S. Department of Education, n.d.). This examination involves new standards and requirements and real consequences for schools that do not comply (Dunn & Allen, 2009; U.S. Department of Education, n.d.). Each year since the inception of NCLB, schools have had the task of making adequate yearly progress (AYP), a measure defined by an increase in the number of students who pass state-mandated tests in a certain number of subgroups (U.S. Department of Education, n.d.).

States, school systems, and individual schools are looking for ways to make sure they continue to be successful in achieving AYP (Dunn & Allen, 2009). States also now have the option of applying for additional federal funding through the Race to the Top (2010) program. To secure this funding, educators are constantly examining ways to improve student achievement as defined by the number of students passing the high-stakes test selected by their state (Chappuis, Chappuis, & Stiggins, 2009; Dunn & Allen, 2009). In order to ensure schools can more reliably improve student achievement, researchers examine the factors that have been thought to have an effect on student achievement. One such factor is the education level of the primary caregiver in the household (Bakker, Denessen, & Brus-Laeven, 2007; Brown & Iyengar, 2008). Another factor is the amount of time the child spends with the primary caregiver performing school-related activities (Desimone, 1999; Griffith, 1996; Jacobs & Harvey, 2005). This study examined both of these factors in an attempt to determine if there was a statistically

significant relationship between the primary caregiver's education level and time spent with the primary caregiver on school-related activities and student mathematics achievement on state mandated tests in Georgia. Once these two factors were evaluated independently, further examination attempted to determine if there was a significant cumulative effect between the two factors (education level and time spent with caregiver) with regard to the Criterion Referenced Competency Test (CRCT) math scores.

As the reader continues through chapter one, introductory information related to this study will be discussed. Chapter two will entail a detailed literature review. Chapter three will review the methodology used to complete the study. Chapter four will concentrate on the results of the study and chapter five will specify the conclusions the researcher came to as a result of completing the study.

### **The Problem**

There is a multitude of research which concluded there is a link between primary caregiver education and student achievement at the college and high school level and in relation to elementary reading readiness (Bakker et al., 2007; Brown & Iyengar, 2008; Hill et al., 2004; Jacobs & Harvey, 2005; Ozturk & Singh, 2006; Walker, Petrill, & Plomin, 2005). However, the researcher found no recent research that specifically examined primary caregiver education and how it relates to mathematics achievement on state-mandated tests for middle school students. There is also a large body of evidence that supported the notion of parental involvement (time spent on school-related activities) and its positive effect on student achievement (Bakker et al., 2007; Cone, Delawyer, & Wolfe, 1985; Desimone, 1999; Hill et al., 2004; Jacobs & Harvey, 2005; Ozturk & Singh, 2006). Once again, however, the researcher found no recent research that examined both

caregiver education level and parental involvement (time spent) in the middle school setting in relationship to student achievement.

### **The Purpose**

The purpose of this study was to examine two factors, primary caregiver education level and time spent with the primary caregiver, to determine whether there was a statistically significant relationship between these two factors and the mathematics achievement of middle school students on state-mandated testing. As a statistically significant relationship was found between caregiver education level and student achievement in math on the CRCT, further examination was conducted to determine if there was a significant interaction between the two factors examined (education level and time spent with caregiver) with regard to math scores on the CRCT given in Georgia.

### **Significance of the Study**

In the current educational climate (post-NCLB, 2001 and the Race to the Top incentive program, 2010), which is very data- and test-driven, this research may prove invaluable to schools looking to develop programs to assist at-risk students. All schools and districts are held accountable for gains in student achievement. The stakes for students, teachers, administrators, and districts are high. School funding, graduation rates, and job placement for teachers and administrators are all tied to student performance. Even with the importance of student performance and achievement, schools do not have infinite resources. Examining factors that may or may not effect student achievement so that time and resources are used in the most efficient manner is key. For the factors in which a statistical relationship was not found, then the completed research can be used to

justify helping researchers and schools focus on other factors that may have a greater effect on student achievement on state mandated tests.

### **Nature of the Study**

This study was a quantitative inquiry that used surveys to gather information. The researcher used the causal comparative method, and the research site was a middle school in Georgia, referred to as Georgia Middle School (pseudonym). Surveys were distributed to the entire school population of 1,215 students, with a total collection goal of 150 usable surveys per grade level (6, 7, and 8), resulting in over 400 usable surveys. Participants—students, parents, or homeroom teachers—placed completed surveys in a lockbox in the teachers’ mailroom or the registration office. Study participants also had the option of completing the survey online.

The purpose of the study was to examine the relationship between math CRCT scores (dependent variable) and the two independent variables: primary caregiver education level and time spent on educational activities with the primary caregiver. The variables were also examined to determine if there was a significant (cumulative) interaction between education level and time spent with caregiver with regard to CRCT math scores.

The researcher matched the surveys with the CRCT data in the Academic Portal, an information clearinghouse maintained by the county that includes students’ test scores. Using raw scaled, continuous CRCT math scores for each caregiver education level grouping, as well as for each *time spent with primary caregiver on school-related activities* category, the researcher analyzed both sets of data using inferential statistics and analysis. Multivariate Analysis of Variance (MANOVA) was attempted initially;

however, the assumptions for normality were untenable, and therefore, the researcher used a non parametric chi-square analysis instead. These steps yielded data to determine the presence or absence of statistical relationships between the variables in question.

### **Research Questions**

The three research questions for this study are

**RQ1:** Is there a statistically significant difference among the primary caregiver educational level groups (*Less than high school, High school/GED/some college/technical, 2-year degree/technical/bachelor's, Some graduate/graduate degree*) and Georgia Middle School students' Criterion Referenced Competency Test math scores?

**RQ2:** Is there a statistically significant difference among time spent with the primary caregiver on schoolwork groupings (*none, 1–30 minutes daily, 31–60 minutes daily, 61–120 minutes daily, 121 minutes or more*) and Georgia Middle School students' Criterion Referenced Competency Test math scores?

**RQ3:** Is there statistically significant interaction between the primary caregiver education level and time spent with the primary caregiver with regard to Criterion Referenced Competency Test math scores?

### **Null Hypotheses**

The associated null hypotheses are

**H<sub>01</sub>:** There is no statistically significant difference between primary caregiver educational level groups and Georgia Middle School students' Criterion Referenced Competency Test math scores.

**H<sub>02</sub>:** There is no statistically significant difference among time spent with the primary caregiver on schoolwork groups and Georgia Middle School students' Criterion Referenced Competency Test math scores.

**H<sub>03</sub>:** There is no statistically significant interaction between the primary caregiver education level and time spent with the primary caregiver with regard to Criterion Referenced Competency Test math scores.

If the all the null hypotheses were found to be true, the dispersal of CRCT math scores would resemble a bell curve in all four categories of education levels and time spent on schoolwork categories used in the research; however, that was not the case.

### **Identification of Variables**

For the purpose of this study, the survey instrument was geared toward the individual who was the primary caregiver of the child(ren) in the previous school year. The CRCT scores available for use in the study were from the previous school year.

***Primary caregiver.*** For this study, the primary caregiver was defined as the adult who provided the majority of the care and supervision for an individual (Rees & Hannaford, 1996). As the adult who provided the majority of care and supervision of the children, the primary caregiver was the adult who attended conferences, contacted teachers, read and signed paperwork, assisted in test preparation, and worked on projects (Rees & Hannaford, 1996).

***Mathematics achievement.*** For this study, student achievement was operationalized as student math scores on the CRCT.

*Time spent with the primary caregiver.* For this study, the primary caregiver was operationalized as time spent with the caregiver completing task related to school (i.e., homework, projects, paperwork, etc.).

### **Summary**

Federal mandates and initiatives, such as NCLB (2001) and the Race to the Top (2010), have raised the bar for public education by forcing schools to work toward improving student achievement (Dunn & Allen, 2009; U.S. Department of Education, n.d.). In order to improve student achievement, the examination of factors that may have an effect on student achievement is necessary. One such factor is the education level of the primary caregiver in the household (Bakker et al., 2007; Brown & Iyengar, 2008). Another factor is the amount of time spent with the primary caregiver on school-related activities (Desimone, 1999; Griffith, 1996; Jacobs & Harvey, 2005). This study examined both of these factors in an attempt to determine if there was a statistically significant relationship between the primary caregiver's education level and time spent with the primary caregiver on school-related activities and student mathematics achievement on state-mandated testing in Georgia and beyond.

## **CHAPTER TWO: REVIEW OF THE LITERATURE**

The pages that follow feature a cross-section of theories, issues, and topics related to student achievement. Federal legislative impact and societal concerns that affect student achievement are examined. The last portion of the chapter is a review of recent studies related to student achievement and the factors that influence it.

### **Theoretical Background: Social Cognitive Theory**

A multitude of theories can be examined in reference to student achievement and the factors that have an effect on it. In reviewing literature that involves information about the research topic, one primary theory appeared to be heavily intertwined with issues that were addressed in the study: social cognitive theory (Bandura, 1989).

Social cognitive theory originated in 1941 with Miller and Dollard and was later expanded upon by Dr. Albert Bandura. Social cognitive theory was initially termed *social learning theory* and focused on external observable behavior (Bandura, 1989; Demirbas & Yagbasan, 2006; Scott & Dadds, 2009). The basic tenet of this theory is that human behavior is learned by observing models. Individuals model how to behave in different situations, and throughout their lives, people act out what they observe (Scott & Dadds, 2009; Stajkovic & Luthans, 1998).

Students, parents, and people in general receive feedback, either positive or negative, based on how they behave. If individuals get what they desire, receive positive feedback for an action, or witness others receiving positive feedback for an action, the likelihood that the behavior will be repeated increases. If individuals receive negative feedback, do not receive what they value or want from an action, or see others receive a

negative consequence, the behavior in question is less likely to be repeated (Demirbas & Yagbasan, 2006; Stajkovic & Luthans, 1998).

Social cognitive theory is an extension of Bandura's earlier work in behavioral and social learning (Bandura, 1977; Stajkovic & Luthans, 1998). The difference between the two schools of thought is that social learning focuses on the ability to acquire certain behaviors simply by being a part of society, whereas social cognitive theory concentrates on the reasoning behind human behavior (Bandura, 1989; Bembenutty, 2010; Stajkovic & Luthans, 1998). Social cognitive theory looks for influences of individual behavior beyond modeling, which is the focus of social learning. Social cognitive theory examines factors such as motivation, attitudes, and self-efficacy (Bembenutty, 2010). Self-efficacy is individuals' understanding of how much effect they can have on their surroundings (Stajkovic & Luthans, 1998). Unless individuals believe that they can collect the necessary knowledge, behaviors, and education to succeed at a task, they will most likely dwell on the fact that they are facing an unsurpassable task, exert insufficient effort, and as a result, fail (Bandura, 1989; Bembenutty, 2010; Stajkovic & Luthans, 1998).

Motivation is understood to be the reason that an individual behaves in a certain manner, and attitude is the emotional response to external stimuli which sets a precedent for how the individual will respond to similar stimuli in the future (Stajkovic & Luthans, 1998).

Social cognitive theory explains behaviors in a triad of influences. According to Bandura (1989), the three reciprocal influences are (a) behavior, (b) environment, and (c) person. Individuals exhibit an action or behavior, there is a reaction by those in their environment or organization, then the individuals interpret and think about the reaction

that the action received. Individuals may rethink their action, reevaluate, or exhibit the same behavior again. In others words, individuals “react to their immediate environment and plan the next set of actions, or regulate future” behavior with forethought (Bandura, 1989, p. 122).

Social cognitive theory is relevant to this study because it highlights the fact that the home life of the individuals participating in this study is an important factor. Good study habits and other behaviors positively associated with student achievement must be modeled at home by a capable and competent caregiver. The schools and the types of behaviors that are taught and modeled there are important as well. Proper study habits must be modeled at school by their teachers and reinforced by their peers (Demirbas & Yagbasan, 2006).

## **Historical Background**

### **U.S. Student Achievement**

Making sure that all students are able to achieve and fulfill their greatest potential is the driving element for this study. Student achievement is also at center of the NCLB (U.S. Department of Education, n.d.) and the Race to the Top initiative (White House, 2010). Federal funding, which is an important source of funding for most schools, is at risk. Examining all factors that may have an effect on student achievement and the perpetuation of the low student achievement is now a necessity. This study examined factors thought to have an effect on student achievement and the perpetuation of low student achievement. An explanation of some of the issues that influence U.S. student achievement is in order.

U.S. student achievement has always been a concern of the U.S. people and to those in Washington (Washington State Office of the Superintendent of Public Instruction, 2008). A specific interest of the U.S. people is how well U.S. students fare against their global counterparts (Loveless, 2001).

Americans have no choice but to be concerned with how well their children can compete with the children of other developed countries. Making sure that our children can keep up with Japan, China, Malaysia, and other countries will help determine whether the United States will lead us into the next millennium in technology or have to play catch-up. (Washington State Office of the Superintendent of Public Instruction, 2008, p. 89)

Testing data has been collected comparing the United States with other nations since the 1960s, when the first set of tests was conducted by the International Association for the Evaluation of Educational Achievement (Levine & Ornstein, 1993). In the 1960s, the results showed that U.S. students scored in the mid-range of scores when compared to the other countries that were also tested. After the initial International Association for the Evaluation of Educational Achievement test, additional tests were developed to measure the math and science achievement of students. Math, specifically, was pinpointed because it is seen as a gatekeeper subject that helps to determine later success in science and other technical fields (Levine & Ornstein, 1993). Math also lends itself to even comparison because its concepts are relatively standard internationally (Levine & Ornstein, 1993).

The results were sobering to U.S. citizens. In two separate studies, U.S. students scored below average in mathematics and science (Loveless, 2001; Levine & Ornstein, 1993). U.S. students have yet to lead other developed countries, such as Japan, Korea,

and others, in math or science since the development of the international test (Loveless, 2001; Levine & Ornstein, 1993). Since these initial findings, there has been a continual push and momentum to improve U.S. student achievement (Loveless, 2001; Levine & Ornstein, 1993).

Improving student achievement is important in order to prepare U.S. students to compete in the global economy: “Without improvements in the educational system in America, our students continue to fall behind in math and science” (Brown Center on Education Policy, 2001, p. 86 ). With the advent of outsourcing and other new ways of doing business, U.S. students will need to complete college and obtain advanced degrees to be able to compete in a job market that is becoming more competitive than ever before (Loveless, 2001; Trumbull, 2008; Washington State Office of the Superintendent of Public Instruction, 2008).

Student achievement in the United States is a complex issue with many facets to its composition (Trusty, Mellin, & Herbert, 2008). Some research suggested that socioeconomics may play a part in the variation in the quality of education that U.S. students receive and may be a factor that prevents the majority of U.S. students from scoring in the highest quartiles on international comparison tests (Bakker et al., 2007; Brown & Iyengar, 2008; Gaylord-Harden, 2008; Griffith, 1996; Johnson, 2008; Massetti, 2009; Trusty et al., 2008). According to Trusty et al. (2008), students in schools with high percentages of children living in poverty are also more susceptible to other factors that have been found to have a negative effect on student learning, such as school violence, class disruptions, and school safety issues.

Disparity in access to challenging quality curriculum is another factor that affects U.S. students' achievement (Schmidt & Cogan, 2009). In their article entitled "The Myth of Equal Content," Schmidt and Cogan (2009) discussed the fact that the way that the U.S. educational system is set up leads to disparities in information distribution. Schools are run by each individual state, and curriculum is developed at the state level. This arrangement in itself leads to disparity. With varying expenditures statewide, school systems with the greatest need often receive watered-down, non-challenging standards (Schmidt & Cogan, 2009).

The issues that affect U.S. student achievement have not gone unnoticed by those in power in Washington, D.C., and others around the nation. A calling for quality education and equal access to quality education has been the cry of many (Schmidt & Cogan, 2009). As a result of public pressure for the improvement in achievement outcomes for all students, the NCLB was signed by former President George W. Bush in 2001. This act has at its center a call for more accountability and choices for parents who live in poor-performing school districts, with the purpose of providing quality education for all (U.S. Department of Education, n.d.). More recently, President Obama enacted the Race to the Top initiative (White House, 2010), which encourages innovation and improved student outcomes. States that are willing to make changes and be innovative are allowed to apply for additional federal funding to help fuel changes that are designed to improve student achievement (White House, 2010).

Knowledge of the issues that affect student achievement and a willingness to continue to improve is key. According to Schmidt and Cogan (2009), "As a country, we must never stop looking for ways to improve the educational outcomes for the children of

America” (p. 46 ). Staying in a continuum of improvement will allow the United States to continue to stay on the forefront of innovation and technology. Studies such as this one and others will allow for the possibility of positive data-driven changes that can help U.S. students succeed and be formidable competitors in the domestic and global marketplace.

### **No Child Left Behind Act of 2001**

Student academic achievement was the driving force behind one the most drastic educational acts to date, the No Child Left Behind Act of 2001 (NCLB). The aim of NCLB is to hold schools accountable and to insure that all school-age children in the United States reach a level deemed as proficient in reading, language arts, and mathematics by the year 2014 (Dunn & Allen, 2009; U.S. Department of Education, n.d.). In order to reach the goal of “100% proficiency by 2014, schools must administer tests developed by an outside entity on a yearly basis” (Dunn & Allen, 2009, p 134). States may also administer benchmark tests and other assessments to gauge student progress toward proficiency at different points in the school year (Chappuis et al., 2009). Information and data from these tests is used to guide school-wide curriculum, personnel, and other important decisions that will help the school ensure that students improve their achievement on the required tests.

In order for a school to be deemed as making sufficient progress toward the 2014 goal of 100% proficiency, it must make adequate yearly progress (AYP). Whether a school meets AYP is determined by the percentage of students in each of the school’s subgroups (socioeconomic, racial, special education, and others) which achieve proficiency-level scores on the test administered by the state on an annual basis (Dunn & Allen, 2009; U.S. Department of Education, n.d.). Those schools that meet the

progressive AYP standard can continue on without the risk of losing federal funding. The schools that fail to make AYP face penalties (Dunn & Allen, 2009; U.S. Department of Education, n.d.). The penalties imposed upon schools not meeting AYP become harsher with each year that the school does not meet the standard. Schools that do not make AYP for one or more years can be forced to offer tutoring and additional support services for their students, lose some of their students to area schools who have made AYP, or be forced to adopt a federally-backed school curriculum, organization, and/or administration package.

There has been recent discussion about allowing schools to meet AYP by showing a predetermined amount of growth toward proficiency for students who were previously deemed as failing; however, currently that proposal is only in the pilot stages (Betebenner, 2009; Dunn & Allen, 2009). All schools that accept federal educational funding are subject to the stipulations under the federal NCLB Act, and all of those schools must comply with NCLB as it is currently written or run the risk of losing their federal funding.

## **Influences on Student Achievement**

### **Caregiver Education Level**

The education level of individuals has strong ties to their socioeconomic status (SES; U.S. Department of Labor Bureau of Labor Statistics, 2011). Evidence also suggested that these two factors may be positively correlated with student achievement (Bakker et al., 2007; Brown & Iyengar, 2008; Rowe, Jacobson, & Van den Oord, 1999). Hauser-Cram (2009) came to similar conclusions about the effects of parental education on student achievement. Parental education level matters and is important to student

achievement; logically, educators and researchers want to know what can be done to mediate the effects. Hauser-Cram (2009) believed there is clearly a need for more detailed study regarding how parents seem to pass on their educational goals and attitudes to their children so that mediation by educators and others involved in shaping young minds for tomorrow can take place. Hauser-Cram (2009) observed, “We know based on previous research that the parents’ education matters, more needs to be done to figure out more details about why and how it has an effect on student achievement”(p. 357). The following discussion of articles and investigations starts to unravel the mystery behind parental education and how it has shown itself, through previous research, to be such a powerful factor.

One major way in which parental education has an effect on student learning has been shown to be the teacher’s perception of the parents. Research has shown that a teacher’s perception of parents has, in some cases, a stronger correlation with student achievement than many other factors (Bakker et al., 2007). Caregivers with lower levels of education often must work multiple jobs or jobs that make it impossible to participate in school events held during the day. This lack of participation often translates into a perception by the teacher that the parents care less about their child’s academic success than might actually be the case (Bakker et al., 2007).

Inquiries by Koedel, Betts, Rice, and Zau (2009) and Schaller, Rocha, and Barshinger (2006) produced data that contradicted the assumption that lower SES/educated parents are not concerned about the education of their children. Both studies demonstrated that when knowledgeable of better alternatives, many low SES

parents will do what they can to ensure that their children receive the best education possible.

Koedel et al. (2009) examined the effects of school choice in California and some of the cultural and social driving forces behind the participants in the program. Koedel et al. found that “parents who participated in the voluntary program did so because they wanted their children to attend schools with a population of higher-achieving students and located in areas with higher-educated parents” (p. 135). This effect occurred even when the parents were not highly educated themselves. The implications of these findings are that researchers and educators are not the only ones who are aware of the importance of education and attending school with students who come from homes with more educated parents. Many low SES/educated parents are aware of the benefits as well and are willing to do what is necessary to get their children into better school environments.

Schaller et al. (2006) also examined methods in which lower SES/educated parents can be aided in helping their children succeed. This investigation examined the achievement and success of the participants compared to other at-risk students whose parents also had high ambitions for them but who did not take part in an early childhood intervention program. In this study, parents who took part in a Dallas early childhood intervention program were found to have ambitious educational attainment goals for their children, but did not necessarily have the tools and knowledge to help their children reach those goals. The investigator pointed out that through partnership and parental education programs and workshops, at-risk children can achieve. The investigation indicated the necessity for more such programs. The Dallas Early Intervention Program acted as a tool

that could be used by parents of lower educational attainment levels to help their children succeed in school.

Brown and Iyengar (2008) conducted a meta-analysis that was aimed at uncovering links between parenting styles and student achievement. In doing so, they scoured over 50 previously completed studies that scrutinized the relationships between student achievement and various factors thought to have an effect on it. What they found was that there is a large body of evidence suggesting that there is a multitude of ways that parents can affect student achievement, both directly and indirectly. Their research revealed research providing evidence “that children from homes with parents with higher levels of education more often transfer their cognitive competencies as well as their attitudes related to the value of education” (Brown & Iyengar, 2008, p. 45). Parental or caregiver education levels have also been tied to more stimulating home activities, fewer behavioral problems, and the child’s perceived locus of control.

Locus of control is important because students who have an internal locus of control often do better in school than those who have an external one. Students with an internal locus of control believe that their actions are more strongly tied to the outcomes that affect them. Students with an external locus of control more often feel as though things happen to them over which they have no power, and they exhibit a higher level of distrust for the system and its authority figures. An external locus of control can lead to a multitude of negative outcomes, all of which can have a detrimental effect on a student’s academic success (Brown & Iyengar, 2008). Locus of control is a perception taught by the adults in the lives of the children in question through a series of observation and interactions between the child and the parental and familial figure (Brown & Iyengar,

2008). Brown and Iyengar (2008) also found that parents who had higher education levels were more likely to parent with a democratic parenting style, which is seen as a middle ground between laissez faire parenting style and authoritarian parenting style. Laissez faire parenting is not hands-on; children are at the helm of their upbringing with very few absolute boundaries. Children do not react well to the absence of boundaries because every other system they are exposed to—most importantly, school—has them. Authoritarian style parenting is the opposite. It does not allow much room for discussion. The parent is the authority figure and sets multiple, inflexible boundaries. As children grow older, they often rebel against this type of parenting style, and one way that they rebel is through poor performance in school. Democratic parenting style allows for more discussion, teaching, and explanation than authoritarian-style parenting, but, unlike laissez faire parenting, sets absolute boundaries. This parenting style has consistently been tied to students who are higher achievers.

Similar to the meta-analysis conducted by Brown and Iyengar (2008), Casanova, Garcia-Linares, De la Torre, and De la Villa Carpio (2005) led an investigation that examined the dispersal of various parenting styles. There are some differences between the two studies, however. First, Casanova et al.'s inquiry is not a meta-analysis; it is an investigation. Second, the Casanova et al. investigation focused on two groups: middle-achieving students and lower-achieving students. They also examined other variables in addition to parenting style distribution, such as SES and family dynamics, and how these factors affect student achievement within the two groups (middle achievement and lower achievement). The authors found that “for children of average achievement levels, SES seemed to have a greater effect; for children that were a part of the lower achievement

group, family factors (parental involvement, expectations, control, and acceptance) seemed to have a greater effect” (Casanova et al., 2005, p. 45). The authors discussed parental education level as a function of SES; however, the direct relationship that parental education had on the two groups would have been clearer if this variable had been isolated specifically. Another variable that would have enriched this study is a third level of achievement (high achievers). The inclusion of high achievers would have provided a richer data set and more complete results.

Another way that parental education level can indirectly affect student achievement is vocabulary acquisition (Kremen et al., 2005; Rowe et al., 1999). The effects of parental education level on vocabulary can last well beyond school-age years into the individual’s adult years (Kremen et al., 2005). Rowe et al. (1999) and Kremen et al. (2005) examined these effects in depth.

Rowe et al. (1999) examined twins who lived in similar and dissimilar environments to ascertain which factors had a greater effect on the vocabulary of the students when genetic factors were controlled. The authors then compared the variables of parental education level and environmental effects to see to what degree they affected the student’s vocabulary acquisition. The authors found that the genetic potential for learning vocabulary was more fully expressed when the parents had a higher education level. The authors also discovered that environmental effects only had a large influence on the students’ vocabulary prowess when their parents had lower educational thresholds. According to Rowe et al. (1999), when students have a parent of lower educational attainment, the environment can rob them of their potential.

Kremen et al. (2005) investigated the word recognition of middle-aged men. Like the Rowe et al. (1999) inquiry, the Kremen et al. study controlled for genetic differences by using twins as the subjects; however, this study is unique in that it is one of few that looked at the long-term effects of parental education and language acquisition using adults as subjects. The findings of this investigation were similar to those of the Rowe et al. study. Kremen et al. concluded that the environment became a factor only when the parent's education level was low.

One important thing that Kremen et al. (2005; middle-aged men study) pointed out that Rowe et al. (1999; twin study) did not was the long-lasting effects that parental education tends to have on the subjects. Kremen et al. (2005) explained, "The effect that parental education level has on the language abilities of their children lasts well into adulthood—well beyond critical periods for developing reading proficiency" (p. 421).

Myberg and Rosen (2009) examined the effect that parental education had on the reading achievement of over 10,000 third graders in Sweden. They found that parental education had a multidimensional effect on the students' reading achievement. They discovered that other factors, such as the number of books at home, early literacy activities, and emergent literacy abilities at the start of school, were all affected by the level of education of the parents. The indirect variables affected by parental education level, in turn, had a direct effect on the achievement of the third graders in the study. The data from this study supports the conclusion that parental education plays a significant role in students' reading achievement (Kremen et al., 2005; Myberg & Rosen, 2009; Rowe et al., 1999).

Reading is not the only subject affected by parental education level; mathematics is affected as well (Ozturk & Singh, 2006). In contrast to Myberg and Rosen (2009) and Kremen et al. (2005), Ozturk and Singh (2006) conducted a study that examined math performance in the United States. The authors completed an investigation in which they scrutinized data from the National Educational Longitudinal Study, conducted in 1988, with a focus on determining if mathematics course selection in high school was dependent on student SES and parent education level. They found that course selection was not dependent simply based on SES or parent education level; however, SES and parent education level had a powerful indirect effect.

Ozturk and Singh (2006) discussed the fact that parents with higher education levels had higher mathematics aspirations for their children. Higher educated parents were more aware of the mathematics class choices and more often encouraged their children to challenge themselves with the more advanced classes. Higher educated parents were more able to provide support to the students taking the classes (e.g., providing tutoring or one-on-one assistance). Lower educated parents were not as likely to be able to help their children with advanced mathematics (Ozturk & Singh, 2006). These findings are significant because advanced course selection is often a strong indicator of college persistence and graduation (Johnson, 2008).

In a study that focused on high school students, Tavani and Losh (2003) examined multiple factors to determine their reliability as predictors of student achievement. The researchers studied motivation, self-confidence, and parental level of education. All factors studied, including parental education, were found to be statistically significant (positively correlating) factors in determining student achievement.

According to the Washington State Office of the Superintendent of Public Instruction (2008), one factor that seems to be repeatedly lacking and to be a function of parental education level is support for student success. In 2008, the Washington state legislature created a task force that was charged to devise an extensive scholarly report and plan to close the achievement gap in their state (Washington State Office of the Superintendent of Public Instruction, 2008). An examination of the data used by the Advisory committee to support their plan showed that “one of the main factors affecting student achievement was the lack of parental support offered to students who had lesser-educated parents” (Washington State Office of the Superintendent of Public Instruction, 2008, p. 133).

The support that is critical for students to navigate the educational system is lacking not because the students’ parents are not concerned, but because lesser-educated parents did not have extensive experience navigating the educational system themselves. As a result, lesser-educated parents find it difficult to help their children find their way successfully. The advisory committee presented data that indicates that the children of lesser-educated parents are at a real educational disadvantage compared to the children of their more educated counterparts.

In a study that examined mathematics achievement, Matthews and Farmer(2008) investigated some of the factors, including parental education level, that influence achievement of academically talented learners in Algebra I classes. The authors focused on Algebra I classes because they are a gateway class into more advanced class work (Matthews & Farmer, 2008).

According to Matthews and Farmer (2008), the successful completion of Algebra I at the middle school level is a strong predictor of academic achievement later on in a child's academic career. The investigators found that parental education had a small effect on mathematics reasoning skills, which in turn had a larger effect on student Algebra I achievement. Matthews and Farmer also discussed the fact that their research studied only gifted learners, a factor that restricted the range of parent education. The researchers believed that if a population of a more evenly distributed range of parents was studied, the effects of parental education might have been greater.

Parental education level has been shown to have a multifaceted effect on many aspects of a person's educational and total childhood experience. Parental education level not only affects student achievement by way of social and learning activity, support, perception, and the many other direct and indirect methodologies discussed in the investigations in the previous paragraphs but has also been shown to have an indirect effect on the health of students. According to Tschumper, Christof, Alsaker, and Alsaker (2006), "The health of a student has an effect on the quality of education he or she receives" (p. 123), and interaction with the primary caregiver on school-related activities can have lasting effects on academic achievement.

St. Sauver et al. (2004) studied parental education level, among other factors, to determine if the frequency of the occurrence of ADHD was a function of parental education level. They found that there was a relationship between parental education level and the occurrence of ADHD in the subjects studied. As parental education level rose, the diagnosis of ADHD went down; as parental education level went down, the diagnosis of ADHD increased. If untreated and/or undiagnosed, this disorder often

resulted in lower academic achievement and more frequent behavior issues. The researchers also found that boys born to parents of lower maternal and/or paternal education level were more likely to be diagnosed with the disorder and to go untreated.

Lastly, in a landmark study published in 2009, Dubow, Boxer, and Huesmann looked at the long-term effects that parental education level had on the occupational choice of individuals as they reach adulthood. The authors reviewed data collected from students when they were close to middle school age, including the educational level of their parents. Dubow et al. controlled for most other factors, including SES and IQ, so that the focus would be purely on parental education level. An important finding was that the education level achieved by the participants' parents by the time the participants were eight years old significantly predicted educational and occupational success for the individual approximately 40 years later, at age 48. Implications from this study point to the importance of early intervention and mediation so that the challenges posed by low parental education do not need to result in a lifetime of struggles for their children.

Parental/caregiver education level is clearly an important factor in the overall success of students, as indicated by the many studies, data, and articles cited previously. Many researchers have examined its effects; however, very few recent studies examined this factor in the middle school setting. The researcher hopes to help fill that void with this study and add to the body of knowledge related to this factor and how it affects students.

### **Adolescent Development and Perception**

Adolescent achievement is at the center of the proposed study. Getting adolescents to reach their full potential academically is the aim of all the schools that

house them. Many factors must be examined in order to enable adolescents to reach their full potential academically. The psychology of the adolescent and issues that are unique to this very important time in an individual's life must be understood. The following studies examined issues unique to adolescent development and provide a framework for understanding the unique challenges involved in helping these individuals to be successful.

One of the most important factors in determining the success of adolescents is the depth of their support system (Ahmed, Minnaert, Van der Werf, & Kuyper, 2008). There is a multitude of evidence to support the notion that adolescents achieve well in school when they have a perception of social support (PSS). Ahmed et al. studied 238 seventh-grade participants to further examine the notion of PSS. The researchers wanted to understand the effects of motivational (belief in their own competence and subjective value) and emotional beliefs (anxiety and enjoyment) and whether they accounted for an empirical link between PSS (from parents, peers, and teachers) and adolescent mathematics achievement.

Ahmed et al. (2008) found that both factors (motivational beliefs and emotional beliefs) had an effect on PSS. Students who had positive motivational and emotional beliefs had higher mathematics achievement levels; students who had negative or neutral motivational and emotional beliefs also had a positive correlation in mathematics achievement. This study showed the importance of social support systems for adolescents. Although all individuals rely on support systems to be successful, it is particularly important to students during the preteen and teenage years and definitely has an effect on their scholastic achievement and overall scholastic career.

Another important factor is goal setting. Roseth, Johnson, and Johnson (2008) examined the effects that different goal setting structures can have on adolescent scholastic achievement. Their study was a meta-analysis in which the researchers examined 148 independent studies with more than 17,000 multinational 13- to 15-year-old-participants. In the meta-analysis, cooperative, competitive, and individualistic goal-setting structures were examined.

Roseth et al. (2008) defined a *cooperative goal structure* as one where the goals of the separate individuals are so linked together that there is a positive correlation between their goal attainments. Competitive goal structures are ones in which individuals experience a negative interdependence between their goals and the individuals that they are linked with; in other words, they perceive that the only way to obtain their goal is for others around them to fail to achieve their goals. Lastly, individual goal structures exist when persons believe that they can achieve their goals independent of any links to those around them—they can achieve whether the group does well or not.

Roseth et al. (2008) found that students had the highest levels of achievement when cooperative goal-setting structures were in place. The data from this study supports the notion that although students during the adolescent years are often beginning to discover themselves and reach for autonomy and an identity outside of their parents and familial settings, they still need the group, or a community concept, in order to reach their greatest academic potential.

Another reoccurring theme in the literature on adolescent development is the need for autonomy. Students whose parents, schools, and families granted autonomy while still setting boundaries seemed to be the most successful academically (Ahmed et al., 2008;

Roseth et al., 2008; Stolz et al., 2004). Stolz et al. studied socialization factors (i.e., connection, regulation, and respect for psychological autonomy) and their relationship with adolescent academic success. The researchers defined *connection* as a basis for the practice and mastery of socialization skills. When children feel a connection to home and family, it allows them to practice, learn, and explore in a safe environment. Regulation as a socialization factor is a means to keep the individual safe and to set rules and boundaries. Lastly, respect for psychological autonomy is adolescents' ability to develop a sense of self without the psychological manipulation and overbearing influence of the adults around them.

Ahmed et al. (2008), Roseth et al. (2008), and Stolz et. al (2004), studied the three socialization factors described within 10 ethnic adolescent groups. The results of their study suggested a consistent association of maternal knowledge, paternal support, and teacher support with higher academic achievement across all of the ethnic groups studied. The Ahmed et al. (2008), Roseth et al. (2008), and Stolz et al. (2004) studies all seemed to suggest similar findings. All three studies suggested that although the definition of psychological identity and autonomy is very important to the proper development of adolescents, guidance and, most importantly, support from parents, peers, and teachers are also necessary parts of the development process that facilitates the academic success of the child. Ingoldsby, Schvaneveldt, Supple, and Bush (2003) examined Chilean and Ecuadorean subjects and their perceptions of parental discipline, autonomy granting, permissiveness, and monitoring. Ingoldsby et al. found a positive connection between autonomy-granting parental behavior as perceived by the adolescents and student achievement. In other words, adolescents who perceived that their parents allowed them

the ability to be individuals—not overly punitive or overly permissive—tended to be higher-achieving students than those students who had opposite perceptions of their parents. Students who perceived that their parents were overly permissive, punitive, or did not allow them some autonomy, tended to underperform academically when compared to students who had a more positive view of their caregivers’ parenting skills.

Lohman et al. (2007) studied differentiation; however, the definition again was related to autonomy. The authors defined *differentiation* as the ability to gain autonomy while still maintaining a healthy level of connectedness to the family, school, or other micro-system important to the development of the adolescent in question. Levels of differentiation were examined in the home and school environments of 693 adolescents.

Once differentiation data were gathered, the academic success of the differing groups was compared. Lohman et al. (2007) found that for students in the *low-low* group (low differentiation at home and school), academic performance, school attendance, and behavior were all areas of concern when compared to the *high-high* group (high differentiation at home and school). The high-high group consistently outperformed the low-low group in all areas thought to affect academic performance. Lohman et al.’s findings are consistent with many others in that autonomy and the definition of one’s self is an important part of adolescent development and their overall academic success (Ahmed et al., 2008; Rosen et al., 2008; Stolz et al., 2004).

Crosnoe and Trinitapoli (2008) went in a different direction than the studies previously discussed. They drew on data from the Child Development Supplement (CDS) of the Panel Study of Income Dynamics to identify multiple types of time-shared profiles and studied how those differing profiles affected the academic achievement of the

adolescents involved. The five profiles described the main types of activities that were present between the family members when they were together. The five profiles were TV-focused, private, outdoors, cultural, and sports-focused. The researchers found that children in the sports-focused profile fared the best academically, followed by the cultural activities, outdoors, private, and TV-focused profiles successively.

The results of the Crosnoe and Trinitapoli (2008) study show that it is important for young children (age 7 to 9) to spend time with their family doing things outside the home (recreational and/or cultural activities) because there is evidence that these types of activities lead to higher math achievement. Older children's (ages 12 to 14) time with family seems to be most beneficial in less public domains, which allows them to develop their own identities but still keep that familial bond important to academic achievement.

Bleeker and Jacobs (2004) completed a study that revolved around adolescent achievement but scrutinized different factors than the studies previously discussed. Their study examined the mother's perception of her child's achievement ability in math and science, and how that perception affected the student's math and science achievement as an adolescent as well as whether that effect was carried into later developmental stages. Bleeker and Jacobs found that mothers' perception had a significant mediating effect on children's perception of their ability in math and science as a young adolescent, and that effect carried over into the high school years and often had an influence on the students' occupational choices as an adult. The Bleeker and Jacobs study points out that adolescence is a time of self-discovery and a time of newfound independence. However, parents continue to have an enormous part to play in the proper development of their

children and in shaping their academic prowess in all subjects, especially math and science.

Levpušček and Zupančič (2009) studied parental involvement as well as the classroom behavior of math teachers and how those factors affected student motivation and academic achievement in math. The researchers gathered data on 365 Slovene adolescents for two scholastic terms and obtained their final grades in math for the school year in which the study was conducted. At the end of the first term, the students reported information on the involvement of their parents (academic pressure and support) in their mathematics achievement. The students also reported on their math teachers' behavior (help, academic pressure, and mastery goals) at the end of the first term.

During the second academic term, the students were surveyed. The students answered questions about their motivational beliefs about math. Levpušček and Zupančič (2009) found that students' perceptions of their math teachers' behavior were accurate predictors of the students' motivational beliefs and their achievement in math. In fact, the students' perception of the math teachers' behavior even superseded the effect of the students' perceived parental support in math when it came to academic achievement. The researchers also found that students' perception of parental pressure regarding their math achievement was negatively correlated with math achievement, which means that the more pressure students perceived, the lower their achievement was in math. Levpušček and Zupančič's findings illustrated the influence and importance of teacher classroom behavior and parental pressure in regard to adolescent academic achievement in math.

Duchesne and Larose (2007) completed a study that also examined factors that had an effect on student motivation. The difference between the Duchesne and Larose

study and the Levpušček and Zupančič (2009) study is that the Duchesne and Larose study focused on the attachment of adolescents and how that related to their achievement. The Levpušček and Zupančič study focused on parental involvement in general as well as on teacher performance. Duchesne and Larose examined the depth and quality of the attachment of adolescents ( $N = 131$ ) to their parents and the relationship of that attachment to the student's academic performance. The results of the study showed that a healthy attachment to both parents was positively related to high academic achievement (Duchesne & Larose, 2007). In other words, as the level of positive attachment increased, so did academic achievement. This study is yet another that shows the importance of guidance and emotional support required to help adolescents achieve at their highest levels.

McNair and Johnson (2009) examined how the different attitudes and perceptions of adolescents regarding various social contexts influenced their academic achievement. The researchers examined specific contextual associations between schools, parents, and home academic characteristics. The researchers also studied adolescents' attitudes toward the importance of school and how these attitudes affected their academic performance. The results of the study revealed a positive association between students' perceptions of school quality and time parents spent with the adolescent and the importance of school. The more time the students spent with their parents and the better their perception of their school, the more important the student thought school was, and vice versa. The researchers also found a positive association between school importance and student performance the following school year.

McNair and Johnson (2009) found that even though adolescents' perceptions of the world around them are in a state of flux as they try to find their own identity, their perceptions are of paramount importance in predicting their academic performance. This finding implies that it is extremely important not to discount adolescents' emotions and feelings toward their educational setting and support systems; indeed, valuing their opinions may be the key to helping them achieve at their highest level.

Maatta, Stattin, and Nurmi (2006) conducted a study on adolescent achievement strategies and how well those achievement strategies predicted the student's level of achievement in school, the presence or absence of behavioral issues, and school adjustment. The Swedish study was conducted with 287 (121 boys and 165 girls) 14- to 15-year-old students from an average-sized town in central Sweden. The researchers found a positive association of maladaptive achievement strategies (high level of failure expectation, task avoidance behaviors) and norm-breaking behavior. They also found a strong association between maladaptive achievement strategies and poor school adjustment and achievement.

These findings show the importance of looking into a child's past experiences in order to understand and perhaps assist them in achieving at a higher level. Task avoidance behavior and high failure expectations are a result of negative previous experiences. Getting lower-achieving students to see beyond the past may unlock the door to a higher achieving future.

In their 2009 study, Perels, Dignath, and Schmitz examined how teaching adolescents self-regulation strategies and the use of these strategies would affect their mathematics achievement. *Self-regulation strategy*, as defined by the researchers, has

three parts: pre-reaction phase/forethought, action phase/pre-performance, and post-action phase/reflection. During the first phase, students learned to set goals and plan how they intend to achieve their goals with respect to the educational concept at hand. In the second phase, students learned to rely on previously learned educational strategies (metacognition, concentration, effort, etc.) to get them through the task at hand. Lastly, the students reflected on whether they achieved their goals and how the process went. During the study, students learned the self-regulation strategy steps and how to apply them to concepts being taught in their math class. There were 53 sixth-grade students in the study. This study showed that there is merit in making adolescents become active participants in the learning process, and that doing so can lead to higher achievement in math: “Students who were taught the self-regulation strategies scored higher on the cognitive test given to them than the control group who were not taught the strategies” (Perels et al., 2009, p. 101).

Schwartz, Gorman, Nakamoto, and McKay (2006) completed a study that examined how popularity and social acceptance affect academic engagement. To examine these effects, the researchers surveyed 342 adolescents and monitored their academic achievement for four consecutive semesters. The investigators discovered that for adolescents who were classified as highly aggressive (via suspension records), as their popularity increased, so did their unexplained absences. Increased popularity for aggressive adolescents was also linked to decreases in grade point average. The investigators also discovered that changes in social acceptance were not always predictive of changes in grade point average or unexplained absences. The results of this study showed that adolescence is much more complex than social standing, popularity,

and acceptance. Studies need to be more in-depth and multidimensional in order to really aid adolescents in reaching their greatest potential academically.

Blackwell, Trzesniewski, and Dweck (2007) scrutinized the effects that different thoughts about intelligence have on adolescent student achievement. This study differed from the others in that it occurred in two steps; in both steps, the researchers looked at two main ways of thinking about intelligence. The first, entity theory, is that intelligence is fixed and one cannot exceed the potential that one is born with. The second, incremental theory, is that intelligence is malleable and can be molded and cultivated. Those who embrace incremental theory believe that, with the right training, individuals can increase their ability to do well academically and increase their intelligence potential. Blackwell et al. examined the beliefs of 373 seventh-grade students to see if their beliefs about intelligence were more in line with entity or incremental theory, and then tracked their academic achievement over the next two years. They found that the math achievement of the group that believed in incremental theory was higher than the group that believed more in entity theory.

Once Blackwell et al. (2007) discovered the implicit link between incremental theory and higher math achievement in adolescents, they devised a second study. In the second study, the researchers split a group of low-achieving math students into two groups: a control group and an experimental group. The experimental group was given in-depth lessons about incremental theory, and the control group was not. Both groups were tracked academically. Over time, the experimental group outperformed the control group in mathematics. The mediation (lessons in incremental theory) appeared to be factor in improving the students' math achievement. This study shows that getting to the

heart of adolescents' belief systems about their own abilities may aid educators in improving mathematics achievement and academic performance overall.

### **Parent/Caregiver Involvement**

The importance of parental involvement in student success is well documented (Desimone, 1999; Griffith, 1996; Jacobs & Harvey, 2005; Jeynes, 2005; Lee, Kushner, & Cho, 2007). Griffith (1996) conducted an inquiry that examined the possibility of a correlation between parental education level and student achievement. Not only did the study find a correlation but also the effects of parental involvement appeared to be unaffected by other factors, such as SES and the racial makeup of the 42 schools examined in the study. In other words, this study found parental involvement was paramount to student achievement.

A study conducted by Keith and Keith (1993) predates the Griffith (1996) study. The Keith and Keith investigation differs in that it used data collected from a previous study; the Griffith study collected data specifically for use with their study. Both inquiries, however, came to similar conclusions: "Parental involvement is key in student achievement" (Keith & Keith, 1993, p. 95). Keith and Keith used data from a national longitudinal study conducted in the 1980s. The researchers found a strong relationship between parental involvement and student achievement, and also cited parental involvement and increased homework completion as a possible reason for the higher achievement of students with highly involved parents.

Jacobs and Harvey (2005) explored parental influence and how it affects student achievement. In contrast to the Keith and Keith (1993) investigation, this study did not intend to establish whether there was a relationship between parental involvement and

student achievement. The Jacobs and Harvey study examined goal setting and the types of parent-student interactions that took place in relation to school achievement. In this study, the schools from which the students came were ranked, based on standardized test scores, into three groups: low-, medium-, and high-achieving schools. The parents of those students were then surveyed on a variety of family and educational makeup factors. The findings show that parents who had higher goals for their students and the schools that they attended had higher-achieving students. Parental expectations, as well as the amount and types of interactions that they had with their children, had a very big effect on how well their children performed (Jacobs & Harvey, 2005).

A study conducted in the United Kingdom by Harris and Goodall (2008) scrutinized the effects of programs that were being implemented to get parents more involved in school activities, versus the effects of parental involvement at home, on student achievement. The study targeted the discovery and understanding of issues that are experienced by parents regarding their involvement in their children's education and discovered which types of involvement made the biggest difference in student academic performance. Harris and Goodall wanted to know what things prohibited or enabled parents to be more involved. The study was able to uncover many issues that parents face when trying to be more involved with their children's schoolwork (e.g., understanding their children's homework, time, work hours). The study also found that although parental involvement of any kind was important (e.g., school visits, Parent-Teacher Association involvement), parents' active involvement at home made the biggest difference in student achievement.

Before Harris and Goodall (2008) conducted their research, Okpala, Okpala, and Smith (2001) examined per-child expenditures, SES, and parent volunteer hours at school to determine whether a relationship between these factors and student achievement existed. They found that SES was a significant factor, student expenditures alone was not a factor, nor was volunteer hours spent at school. Much as the Griffith study of 1996, the Okpala et al. study showed that simply pumping money into a school or district alone will not result in student achievement gains and that SES is a factor. However, parental involvement can overcome many other obstacles and result in academic gains, even when other factors that often negatively impact student achievement exist. The findings of the study supported the idea that quality time spent at home is an important indicator in student achievement, more important than volunteer hours and involvement at the school for issues not directly involving the student.

Parent involvement has many positive effects on a child's overall educational experience, including improving student achievement and decreasing the frequency of disruptive student behavior which can impede academic achievement (Hill et al., 2004). Hill et al. concluded a longitudinal investigation that examined student behavioral problems, aspirations, and achievement. Nearly 500 students between grades 7 and 11 participated in the investigation. Hill et al. found that if a parent was involved in the student's education process, "the student was less likely to have behavioral issues in the eighth grade and was more likely to have higher educational aspirations once they reach the 11th grade" (p. 111). These findings indicated that parental involvement has a multifaceted effect. It positively affects achievement and factors that can contribute to it, and impedes factors that can lower student achievement, such disruptive behavior.

Many inquiries have examined single-parent homes and how this family structure affects student achievement. There have been very few investigations that have examined the effects of the gender of the single parent and the gender of the student in the single-parent household in relation to the involvement of that parent in the educational process (Lee, Kushner, & Cho, 2007). Lee et al. (2007) studied single-parent homes and student achievement outcomes as they relate to the gender of the parent and the child. They used national database information from an educational longitudinal study to scrutinize four single-parent structures/pairings: mother-daughter, mother-son, father-daughter, and father-son. Their findings contradicted those of previous research in that they found that girls paired with highly-involved fathers did better academically than same-sex parent-child pairings and any of the other pairings examined, even when the parent of the same sex was very involved in the child's education. This investigation shows that involvement does not have to come from the mother or the person most often thought to fulfill the caregiver position in order for it to be effective in having a positive effect on student learning.

In another analysis, Jeynes (2005) examined the effects of family structure and how it relates to student achievement. Although many studies have examined family structure as an impact on student achievement, this study also included family structure as a component of parental involvement. Jeynes categorized different types of family structures (e.g., single parent, remarried parents, widowed parents), then examined whether the structure of the family had an impact on the amount of parental involvement the caregivers were able to invest in their children. Unlike the Lee et al. 2007 study, the Jeynes investigation did not look at single-parent households in relation to gender.

Gender and SES were controlled for in this study. The study showed that family structure had a significant effect on the amount and quality of parental involvement and therefore a large effect on student achievement. The researcher found that students who came from single-parent homes, homes of divorce, homes of widows or widowers, or homes in which remarriage took place had lower achievement than children of two-parent homes. Jeynes concluded that single-parent home structures and homes where structural changes have recently taken place provide unique challenges to the parental involvement that is key to student success in school.

In an investigation with students in Hong Kong as the subjects, Chen (2005) examined academic support from the student perspective. The investigator examined how student perception of the strength of their support structures affects their perceived academic success and achievement. Chen found that the students' perception of academic support is very indicative of their perceived and actual achievement. The results showed that the biggest indicator of student achievement is the support that they believe they get from their teachers, followed closely by the perception of support from their parents. Those who perceived higher amounts of support believed that their academic achievements were higher, and, in fact, they were. The opposite was true for students who perceived a low level of support from their teachers and parents. This study shows that perceived and actual support from all perspectives is important in the academic success of students.

Hill and Tyson conducted a meta-analysis in 2009 that analyzed 55 studies. They came to similar conclusions as the studies cited previously in this literature review. Hill and Tyson reviewed the literature and concluded that parental involvement definitely

matters. However, they focused on the type of parental involvement that mattered most for middle school students. The results uncovered that, for middle school students, parental involvement fostered academic socialization.

Hill and Tyson (2009) described academic socialization as “communicating parental expectations for education and its value, linking schoolwork to current events, fostering educational and occupational aspirations, discussing learning strategies, and making plans for the future” (p. 755). This analysis showed that the types of interactions between students, parents, teachers, and the school must be a fluid one. The type of parental involvement must evolve to match the developmental stages of the student in order to maintain its effectiveness.

#### **Related Factor: Socioeconomic Status**

*Socioeconomic status (SES)* is the amount of total monies that can be devoted to each household member. It is understood to be the total amount of income for the household, divided by the number of individuals in the household (Kennedy, Paeratakul, Ryan, & Bray, 2007). The SES of an individual can determine many things about that individual. Directly, it often is determined by what type of job the individual holds. Indirectly, it can determine what neighborhood individuals live in and what type of car they drive, their mode of dress, their social circle, and other factors.

The determinations that SES makes that are most important to this study are the stress that the lack of funds causes on family dynamics, the time that a caregiver has available to spend dedicated to their children’s education, and the way society views individuals based on their SES (Bakker et al., 2007; Gaylord-Harden, 2008). All of these factors can have an effect on student achievement and often relates to the education level

of the parent, which is a factor in this study. Many studies have shown that there is a link between overall student achievement and SES as it relates to parental education level (Bakker et al., 2007; Brown & Iyengar, 2008; Gaylord-Harden, 2008; Griffith, 1996; Johnson, 2008; Massetti, 2009).

Johnson (2008) examined high school factors thought to have a predictive effect on student achievement during college years to see whether they affected student persistence and graduation from college. One of the factors tested was socioeconomic status. Three factors emerged as having a profound effect on student persistence and graduation: (a) the number of students from the high school who took the Scholastic Aptitude Test (SAT), (b) the high school's proximity to the college, and (c) the percentage of students from the high school receiving free and reduced-price lunch. Free and reduced-price lunch is an indicator of the SES of the student population. Johnson found that students who came from schools with a higher percentage of students receiving free and reduced-price lunch were less likely to persist and graduate.

Englung, Luckner, Whatley, and Egeland (2004) conducted an examination that involved low-income elementary school children. They found that a significant factor in student achievement was the quality of instruction that the students received prior to entry into elementary school. Englung et al. also found that children coming from lower SES often did not receive quality instruction prior to entry into elementary school, which had a profound effect on their achievement throughout elementary school.

Bakker et al. (2007) examined parental involvement as self-reported data supplied by parents and as teacher perceptions of parental involvement. They analyzed their data to determine the existence or absence of a correlation between parents' reports of

involvement and teachers' perception of involvement. The researchers found that teachers' perceptions of involvement were more strongly correlated with student achievement than the parents' own perception of involvement. They also spoke about the reasons for teachers' perceptions of parental involvement; here again, SES became a factor. Bakker et al. pointed out that teachers often blame parents for poor student performance and often perceive parents of students with higher SES of having a more vested interest in their children's education. Teachers often perceive that a parent's inability to take off from work or have transportation to school for conferences and/or school functions (which is more often an issue for lower SES and lower-educated parents) as a lack of interest in school and education. These assumptions may influence how lower SES children are educated by the teacher.

Most researchers agree that although poverty is not a definite prerequisite for academic struggles, it puts students at higher risk for being in the lower quartiles of achievement test measures (Bakker et al., 2007; Brown & Iyengar, 2008; Gaylord-Harden, 2008; Griffith, 2001; Johnson, 1996 ; Massetti, 2009). Massetti (2009) examined a literacy project and its effects on the reading readiness of low-income children. She discussed the well-documented issues with reading readiness and low-income elementary children. Massetti also discussed how this factor causes these children to trail behind other children who are more ready to read for the majority of their educational career. The findings indicated that including the literacy project used in her study enhanced the at-risk children's early literacy skills and spoke to the importance of getting high risk/low SES students into Head Start programs to help close the education gap.

In contrast to the previous studies discussed, Nonoyama-Tarumi (2008) conducted a study that took an international look at how SES affects student achievement. Nonoyama-Tarumi wanted to examine the way that SES had been measured in previous studies which examined the relationships between SES and student achievement. When a simple measure of SES (monetary only) was used, the effect of SES on student achievement is not universal; however, “when a multidimensional measure of SES is used, its effects on student achievement is more universal” (Nonoyama-Tarumi, 2008, p. 55). The data from this study suggested that many other international studies which took a less complex look at SES may have underestimated the effects of family background (familial SES) and overestimated the effects of school resources. In short, familial material and social status has a huge effect on student achievement, no matter where you are from nor what your culture.

An older study by Forsyth and Mercer (1970) used international subjects in Great Britain and examined SES and its relationship with student achievement. In this study, unlike the more recent studies, only the fathers’ SES was considered for subjects who graduated from a major British university from 1860 to 1965. The findings of this study indicated that student achievement appeared to be dependent on the SES of the fathers of the graduates. What was interesting about this study was that it showed not only the relationship between SES and student achievement but also that the relationship was stronger with female graduates than male graduates.

Poverty is a complex concept and, as a result, researchers have not been able to pinpoint what aspect of poverty most affects student achievement. Some hypotheses have been gleaned from research, such as the idea that students living in poverty may be

affected from birth because of a lower likelihood of prenatal care (Kennedy et al., 2007). Another hypothesis is that institutional prejudice suffered by students living in poverty may be a powerful influence on student achievement (Gardner, 2007; Garrett, 2009; Nearing, 1929). There are myriad hypotheses indicated by various researchers, and the completed project may point to areas of further study in this area.

### **Summary**

Myriad variables have been studied in relation to student achievement. Some of the most commonly occurring factors in educational literature regarding student achievement are socioeconomic status, parental education level, teacher education level, and parental involvement. The variables chosen as the focus of this study were primary caregiver educational level, time spent with the primary caregiver on schoolwork, and whether there was a statistically significant interaction between these two factors with regard to student achievement.

A review of the literature surrounding the proposed research topic led to one main theory that appears to be heavily intertwined with the issues that were addressed in this research: social cognitive theory. Social cognitive theory is an extension of Bandura's work in social learning (Bandura, 1989; Stajkovic & Luthans, 1998). Social learning focuses on the idea that humans acquire behaviors by being a part of society whereas social cognitive theory is more concerned with the reasons for a set of behaviors (Bandura, 1989; Stajkovic & Luthans, 1998).

A study such as this is important because there is increasing pressure on schools to improve student achievement (NCLB, 2001; Race to the Top, 2010). Poor student achievement is a phenomenon that is very real and has been studied for decades;

however, there has not been as much pressure for schools to improve until the signing of NCLB by President George W. Bush and the introduction of Race to the Top by President Obama. The aim of NCLB and Race to the Top is to hold schools accountable and to insure that all school-age children in the United States reach a level deemed as proficient in reading, language arts, and mathematics (Dunn & Allen, 2009; U.S. Department of Education, n.d.). In order to reach this goal, administrators, parents, teachers, and researchers must all work together.

The completed research can give the school, its district, and others valuable information about the effect of parent education level and parental involvement on student achievement. This information will enable all parties involved to expend energy and resources on programs designed around credible research.

## **CHAPTER THREE: METHODOLOGY**

### **Overview of the Study**

Federal mandates, such as the No Child Left Behind Act of 2001 (NCLB; U.S. Department of Education, n.d.), and incentive programs, like Race to the Top, are forcing schools to take a look at student achievement data and make improvements (White House, 2010). These initiatives are being enforced in a way not previously required by federal government, and there are real consequences for schools that do not comply (U.S. Department of Education, n.d.). The issue in most schools is that each year since the inception of NCLB, schools have had the task of making adequate yearly progress. Making adequate yearly progress (AYP) means to have growth in the number of students who pass state-mandated tests in a certain number of subgroups (U.S. Department of Education, n.d.). The problem is that schools need to make sure that students continue to build on their success. Schools are now charged to continually improve student achievement, as defined by the number of students passing the high-stakes test selected by their state (Chappuis et al., 2009; Dunn & Allen, 2009; U.S. Department of Education, n.d.). As a result of NCLB and the Race to the Top (White House, 2010) incentive program, schools need to examine factors that may influence student achievement. One such factor is the education level of a student's primary caregiver (Bakker et al., 2007; Brown & Iyengar, 2008). Another factor is the time spent with the primary caregiver on school-related activities (Desimone, 1999; Griffith, 1996; Jacobs & Harvey, 2005).

This study examined the following three research questions:

**RQ1:** Is there a statistically significant difference among the primary caregiver educational level groups (*Less than high school, High school/GED/some college/technical, 2-year degree/technical/bachelor's, Some graduate/graduate degree*) and Georgia Middle School students' Criterion Referenced Competency Test math scores?

**RQ2:** Is there a statistically significant difference among time spent with the primary caregiver on schoolwork groupings (*none, 1–30 minutes daily, 31–60 minutes daily, 61–120 minutes daily, 121 minutes or more*) and Georgia Middle School students' Criterion Referenced Competency Test math scores?

**RQ3:** Is there statistically significant interaction between the primary caregiver education level and time spent with the primary caregiver with regard to Criterion Referenced Competency Test math scores?

The null hypotheses for this study were as follows:

**H<sub>01</sub>:** There is no statistically significant difference between primary caregiver educational level groups and Georgia Middle School students' Criterion Referenced Competency Test math scores.

**H<sub>02</sub>:** There is no statistically significant difference among time spent with the primary caregiver on schoolwork groups and Georgia Middle School students' Criterion Referenced Competency Test math scores.

**H<sub>03</sub>:** There is no statistically significant interaction between the primary caregiver education level and time spent with the primary caregiver with regard to Criterion Referenced Competency Test math scores.

## **Design of the Study**

The completed quantitative study was a causal comparative inquiry that used surveys to gather information. The overall investigation focused on gathering numeric information to determine the presence or absence of a statistical relationship between the independent variable, students' mathematics scores on the Criterion Referenced Competency Test (CRCT), and dependent variables, caregiver education level and time spent with caregiver on school-related activities. The study is deemed causal comparative because the objective of the study was to determine if there were statistically significant differences between groups (parental education level and time spent with parents on educational activities groups) that could be linked via student achievement on the mathematics portion of the CRCT.

Quantitative inquiries most often use one of two approaches for gathering information: experimental research design or survey research design (Coughlan, Cronin, & Ryan, 2009). Experimental research design is often used in the medical, pharmaceutical, and applied science fields. Survey research is often used in the educational arena because it lends itself better to time and resource constraints (Coughlan et al., 2009). For these reasons, the survey research method was selected for this study.

Survey research can be broken into two types: population surveys and sample surveys. A population survey gathers information from all the individuals in the population that is being studied. Sample surveys gather information from a representative sample of individuals from the larger population (Coughlan et al., 2009; Draugalis, Coons, & Plaza, 2008; Leeuw, Hox, & Dillman, 2008). The sample survey approach was appropriate for this study, given time and resource constraints (Coughlan et al., 2009;

Draugalis et al., 2008). However, sample research also poses a higher risk of measurement and representation errors (Coughlan et al., 2009; Draugalis et al., 2008; Leeuw et al., 2008). These risks were accounted for whenever possible in the research design, and those not controlled for are discussed as limitations in Chapter 5.

### **Research Site**

The research site for the investigation is Georgia Middle School (pseudonym). Georgia Middle School has a large and very diverse population of students. According to the district website, the total student population as of 2010 was 1,215 students. The school is socioeconomically diverse, with 55% of the student population receiving free and reduced-price lunches (Georgia Middle School principal, personal communication, March 3, 2010). Ethnic diversity information for the school is as follows: 49% African American, 28% European American, 18% Hispanic, 4% Asian, and less than 1% American Indian.

The school is surrounded by homes ranging from \$300,000 to \$1,000,000, but also has students who are bused in from apartment complexes and whose parents are on public assistance. The diverse population of students, in race and socioeconomic status, made Georgia Middle School a good site for the investigation. The diverse population lends itself to a rich and varied data set. A rich, varied data set is important because the results will be applicable to more schools nationwide than if research were conducted on a more uniform population. Lastly, convenience in data collection was also a factor in the choice of Georgia Middle School as the research site. The researcher works as a teacher in the town in which Georgia Middle School is located, and that proximity simplified the data collection process. The researcher's acquaintance with the faculty and principal of

Georgia Middle School facilitated the survey collection process. The principal stated that she had a vested interest in helping achieve the data collection goals and would help in any manner possible.

### **Data Gathering Methods**

Prior to data collection, a research proposal was submitted to the Institutional Review Board of Liberty University and of County Schools (pseudonym) for review and approval. Once approval from both Institutional Review Board offices was granted, the data collection commenced. Data collection took place in a two-week period during the 2010-2011 school year. The researcher obtained a copy of homeroom lists from the administration team at Georgia Middle School and distributed surveys to all the students via the homeroom teachers. The teachers received extra copies of the survey for students who were absent and as replacements for those that were lost in transit to the primary caregiver.

At the end of the first data collection week, the researcher decided to do a second distribution of survey documents on different colored paper to make sure to obtain a good return rate of surveys (above 30%; Ary et al., 2006). The researcher visited the homerooms of teachers with low return rates and distributed an additional 700 surveys to students who had not completed/returned the form previously. Institution of prize raffle for students who returned the surveys encouraged a high return rate.

Completed surveys were placed in one of two lockboxes located in the teacher mailroom and the registration office. The importance of the confidentiality of the caregivers' information was made clear, and the researcher described how the teachers should treat the survey instruments to respect the confidentiality of the participants. This

discussion took place during the weekly Tuesday meeting at Georgia Middle School the week before the start of the study. The lockboxes were checked on a daily basis until collection ceased.

### **Sampling Procedures**

Exactly 1,250 surveys were distributed to all the students on the homeroom rosters in the school with a few extras for each homeroom teacher. Homeroom distribution was appropriate because many papers, surveys, and newsletters are regularly distributed to the students in this manner at Georgia Middle School. This method of distribution was the least disruptive and taxing on the students and teachers. In order to participate, both parents and students signed an informed consent form (see Appendix C), an attachment to the survey instrument (see Appendix D). Parents and students received information regarding the study and their ability to opt out of said study. All information contained in the study regarding consent as well as collection procedures was reinforced daily via the morning announcements at Georgia Middle School. On the survey, participants indicated whether they were willing to be contacted to clarify the information they provided. This measure helped increase the number of usable surveys, however it was not necessary to obtain the minimum number of surveys for a valid study

There was an emphasis on the number of surveys collected and distributed because of the quantitative nature of this study. A large sample population aided in addressing the issues of reliability and validity (Ary et al., 2006). Another concern when sampling individuals for a study which aims to detect relationships or variance as a part of the data analysis is the preference for a random sample. The researcher distributed the surveys to the entire school population ( $N = 1250$ ) during the first day of the study, and

had an additional distribution during the second week for students who had not returned a survey. The effort to ensure that a large population of parents received the survey helped to reach the goal for the number of returned surveys. More usable surveys returned meant less possibility of issues with validity, reliability, and power (Ary et al., 2006). Aiming to obtain a representative sample also made the results of this investigation more applicable to schools and districts nationwide. Four hundred sixty-five surveys in usable condition were collected, a return rate of 37%.

A power analysis was conducted using the G\*Power 3 program in order to calculate the appropriate sample size (Faul, Erdfelder, Lang, & Buchner, 2007). *Power* is the probability of rejecting the null hypothesis when it should, in fact, be rejected, and a power of at least .8 is desirable (Ary et al., 2006). When doing a power analysis, the statistical terms *alpha* and *effect size* also must be taken into account (Ary et al., 2006). Alpha is the probability of obtaining a Type 1 Error (a false positive). This happens when a researcher falsely rejects a null hypothesis (Ary et al., 2006). A value of .05 is an acceptable alpha (Ary et al., 2006).

Effect size measures the strength of the relationship between two factors in a sample population (Ary et al., 2006). A moderate effect size (.25) is acceptable for this type of research and was used in the power analysis. The calculations indicated that a target number of 288 usable surveys is ideal. This number is the number necessary to have alpha of .05, an effect size of .25, and a power of .80. In the completed study, a total of 465 usable surveys yielded a power of .83 and an effect size of .04. All of the numbers indicated (sample size = 465, power = .83, and effect size = .04) were well within the recommended indices specified for this type of research.



Table 1

*Descriptive Statistics for the Criterion Referenced Competency Test Math Score by Ethnicity—Sample Demographics*

| Ethnicity                          | <i>M</i> | <i>SD</i> | <i>N</i> |
|------------------------------------|----------|-----------|----------|
| American Indian or Native American | 803.33   | 20.21     | 3        |
| Asian or Pacific Islander          | 855.36   | 47.98     | 22       |
| African American                   | 825.52   | 36.97     | 188      |
| White                              | 854.45   | 42.75     | 136      |
| Mexican                            | 828.76   | 33.91     | 42       |
| Puerto Rican                       | 861.00   | 0.0       | 1        |
| Other Latino                       | 849.60   | 47.27     | 30       |
| Multiracial                        | 847.56   | 40.40     | 16       |
| Other                              | 811.41   | 32.98     | 17       |
| Prefer Not to Respond              | 820.90   | 20.39     | 10       |
| Total                              | 837.31   | 41.78     | 465      |

## Instrumentation

### Survey

This study used a modified version of the National Survey of Student Engagement (NSSE; Indiana University Center for Postsecondary Research, n.d.; see Appendix D).

The NSSE has been administered on a yearly basis since 1999 to colleges and universities to help them gauge many factors pertaining to student learning. Validity and reliability of this instrument has been extensively studied and addressed by the NSSE Institute.

Measures such as landmark or frame-of-reference questions for items that ask about time have been implemented. Also, the issues revolving around the *halo effect* (in which self-reporting respondents overinflate their responses) are discussed extensively and taken into consideration (Indiana University Center for Postsecondary Research, n.d.). These

and other limitations are discussed extensively with supporting research and data. Factor analysis has established construct validity, and psychometric analyses have been performed following each administration of the NSSE since 1999 (Indiana University Center for Postsecondary Research, n.d.). The reliability coefficient (Cronbach's alpha) for all 22 questions on the modified instrument (which was the 2009 version of the NSSE survey) is .84 or better.

An expert group of three individuals with doctorate degrees in education monitored and advised the modification of the survey instrument to ensure construct validity. The expert group advised that the wording and structure of the survey should not have a Flesch-Kincaid reading level analysis score above eighth grade to help ensure that those surveyed would understand the survey and be able to answer properly. With the help of the expert group, the survey was revised to simplify the wording and structure. The Flesch-Kincaid score of the resulting final survey is 8.7.

Additional modifications included the addition of a signature line for the participants as the expert group did not feel as though implied consent was appropriate for the survey and study. The modified survey provided information that helped identify the student of the caregiver filling out the instrument. The survey was altered in such a manner that the structure and wording of the questions were kept as close as possible to the original structure. The licensure department of the Indiana University Center for Postsecondary Research reviewed and approved the modified document.

The information collected by the survey was broken into categories based on the education level of the parent and amount of time spent on school-related activities. The categories are listed as follows:

**Primary caregiver education level.**

1. Less than high school.
2. High school/GED/some college/technical.
3. 2-year degree/technical/bachelor's.
4. Some graduate/graduate degree.

**Time spent on school-related activities.**

0. None (child works totally independent of caregiver).
1. 1–30 minutes daily.
2. 31–60 minutes daily .
3. 61–120 minutes daily.
4. 121 minutes or more.

Once the surveys were collected and categories established, the student identifying information included by the parent allowed for information about the mathematics achievement of the child on state-mandated testing to be linked with the survey completed by the caregiver. Linking the students with the survey instrument was the last step before data analysis. Inferential statistical analysis allowed for the application and extension of the conclusions that resulted from the data gathered and for a more in-depth understanding of what the data indicated (Ary et al., 2006).

## **Criterion Referenced Competency Test**

Students' math scores emanated from the Criterion Referenced Competency Test, which is a state-mandated test given in Georgia. The CRCT was developed using a reputable and often-repeated methodology. One year was completely dedicated to developing the CRCT. During the second year of test development, the CRCT was reviewed again, statistical data were collected, and test forms were built (Georgia Department of Education, n.d.). The test is also monitored on a quarterly basis and reviewed by the Technical Advisory Committee, which is comprised of five internationally known and published measurement experts. The state insures the validity and reliability of the CRCT (as well as several other measurement instruments used in the state of Georgia) by submitting it to a peer review, which is a comprehensive review process conducted by the U.S. Department of Education (Georgia Department of Education, n.d.). During the peer review process, detailed information about the technical qualities and issues concerning test soundness, reliability, and validity are submitted for review.

The CRCT has passed the federal review process each year since its inception and is reviewed on a yearly basis using the same guidelines. According to Joseph Blessing (personal communication, April 14, 2010) of the Georgia Department of Education's Office of Standards, Instruction, and Assessment, the lowest Cronbach's alpha score for any portion of the CRCT to be used in this study is .86. The test also has a standard error measurement that falls within the range of 2.1–3.4 (J. Blessing, GA state accountability office personal communication, April 14, 2010). Students' math CRCT scores from the 2009-2010 school year were collected via the centralized Academic Portal data system

that is a part of the Georgia Middle School district. Subjects of this study granted permission for collection of this information.

### **Data Analysis Procedures**

The purpose of the study was to determine the existence or nonexistence of a statistically significant relationship between math CRCT scores (dependent variable) and the two independent variables (primary caregiver education level and time spent on educational activities with the primary caregiver). The researcher also examined the two independent variables together to determine the existence of a significant interaction between education level and time spent with caregiver with regard to CRCT math scores.

### **Coding of the Variables**

The survey instruments were collected and divided into four categories based on the primary caregiver's educational level and were coded as follows (parental educational level is a categorical independent variable):

1. Less than high school.
2. High school/GED/some college/technical.
3. 2-year degree/technical/bachelor's.
4. Some graduate/graduate degree.

Time spent with caregiver on school-related activities is a categorical independent variable and was coded as follows:

0. None (child works totally independent of caregiver).
1. 1–30 minutes daily.
2. 31–60 minutes daily .
3. 61–120 minutes daily.

4. 121 minutes or more.

The student's raw scaled, continuous CRCT scores in math were used in the analysis. The total CRCT scores range from 650 to 950.

### **Data Analysis Specifics**

The survey instrument requested identifying information (full name and grade) of the children of the primary caregiver who filled it out. The surveys were then matched by the researcher with the CRCT data in the Academic Portal.

Raw scaled, continuous CRCT scores in math were used for each caregiver education level grouping as well as each *Time spent with primary caregiver on school-related activities* category. Both sets of data were organized and analyzed using the 2009 (16<sup>th</sup> version) of the Statistical package for Social Sciences (SPSS). Initial analysis was a factorial analysis of variance (ANOVA) meant to examine the data for the presence or absence of a relationship between multiple independent variables and CRCT math scores.

The reason that factorial ANOVA was not the final statistical method of choice was that factorial ANOVA assumes equal variances among the groups of the independent variable (homogeneity of variance). In the context of the research, that analysis meant that the variances of the education level and school time with caregiver groups were approximately equal. A Levene's test can be used to test the assumption of equal variances. A significant Levene's test can be ignored when the sample sizes within the groups are approximately equal, which was not the case in this study.

This study resulted in data that produced a significant Levene's test (0.00), suggesting that the assumption of equal variances was violated, which often happens with large sample sizes such as was compiled in this study ( $N = 465$ ). As a result, a Chi Square

analysis, an alternate non-parametric test which does not require the assumption of equal variances, was substituted for an ANOVA. A generalized linear model that generated a chi-square value was used to test the research hypotheses.

These steps allowed the researcher to obtain data to determine the presence or absence of statistical relationships between the variables in question. Use of inferential statistics provided a deeper understanding of the nuances of the data, and this insight allowed for a thorough description and discussion of the implications of the data.

### **Summary**

The completed study investigated the following questions:

**RQ1:** Is there a statistically significant difference among the primary caregiver educational level groups (*Less than high school, High school/GED/some college/technical, 2-year degree/technical/bachelor's, Some graduate/graduate degree*) and Georgia Middle School students' Criterion Referenced Competency Test math scores?

**RQ2:** Is there a statistically significant difference among time spent with the primary caregiver on schoolwork groupings (*none, 1–30 minutes daily, 31–60 minutes daily, 61–120 minutes daily, 121 minutes or more*) and Georgia Middle School students' Criterion Referenced Competency Test math scores?

**RQ3:** Is there statistically significant interaction between the primary caregiver education level and time spent with the primary caregiver with regard to Criterion Referenced Competency Test math scores?

The researcher chose the causal comparative investigative method and used surveys to gather the data necessary to complete the study. Raw scaled, continuous

CRCT scores provided the math scores. Inferential statistics and analysis and Chi square generated using generalized linear model were the statistical methods used to check the hypotheses. These steps allowed the researcher to obtain data to determine the presence or absence of statistical relationships between the variables in question.

## CHAPTER FOUR: RESULTS/FINDINGS OF THE STUDY

### Overview of the Study

The purpose of this study was to examine the relationship between caregiver education level and time spent with a caregiver on school activities with regard to how students achieved on the mathematics section of the yearly Criterion Referenced Competency Test (CRCT) in Georgia. The following null hypotheses were tested:

**H<sub>01</sub>:** There is no statistically significant difference between primary caregiver educational level groups and Georgia Middle School students' Criterion Referenced Competency Test math scores.

**H<sub>02</sub>:** There is no statistically significant difference among time spent with the primary caregiver on schoolwork groups and Georgia Middle School students' Criterion Referenced Competency Test math scores.

**H<sub>03</sub>:** There is no statistically significant interaction between the primary caregiver education level and time spent with the primary caregiver with regard to Criterion Referenced Competency Test math scores.

### Statistical Procedures

The study was a quantitative inquiry employing a causal comparative design. The statistical analysis method was a generalized linear model that generated a Chi Square value. A generalized linear model was apt because the groups analyzed were found to have statistically significant variance among them. The researcher answered the following questions: First, were there significant differences among the groups of the first factor (education level)? This term within Chi Square can be called the *main effect of*

*education level*. Second, were there statistically significant differences among the groups of the second factor (school time with caregiver)? This term within Chi Square may be called the *main effect of school time with caregiver*. Finally, is there a statistically significant interaction between the categories of the first and second factors? This term is also called the *interaction of education level and school time with caregiver*. A significant interaction implies that there were significant differences between the groups of a given factor that only occurred for a given group of the other factor. For example, there may be significant differences between the *Less than high school* and *high school/GED* groups that occur for the *None (child works without my help)* group but not for the *1–30 minutes* group. Knowing what defines significant interaction helps to determine whether there is a relationship between the two factors being examined (caregiver education level and time spent with the caregiver on school related activities).

### **Null Hypothesis 1**

Null Hypothesis 1 stated, *There is no statistically significant difference between primary caregiver educational level groups and Georgia Middle School students' Criterion Referenced Competency Test math scores*. Table 2 shows that parents with a graduate degree tended to have children with higher CRCT math scores. The *Less than high school* group had the lowest CRCT average. Relatively small differences (less than 10% points) existed between the college degree and graduate degree groups. Table 2 illustrates that there are differences among the education level groupings' mean CRCT math scores, possibly refuting the null hypothesis; however, to determine statistically significant differences between the groupings, further tests had to be run.

Table 2

*Criterion Referenced Competency Test Math by School Time With Caregiver and Education Level*

| School time with caregiver         | Education level       | <i>M</i> | <i>SD</i> | <i>N</i> | %  |
|------------------------------------|-----------------------|----------|-----------|----------|----|
| None (child works without my help) | Less than high school | 823      | 32        | 26       | 5  |
|                                    | High school/GED       | 824      | 31        | 56       | 12 |
|                                    | College degree        | 859      | 49        | 52       | 11 |
|                                    | Graduate degree       | 850      | 34        | 13       | 3  |
|                                    | Total                 | 839      | 42        | 147      | 31 |
| 1–30 minutes                       | Less than high school | 820      | 29        | 13       | 3  |
|                                    | High school/GED       | 827      | 36        | 57       | 12 |
|                                    | College degree        | 841      | 35        | 65       | 14 |
|                                    | Graduate degree       | 855      | 52        | 46       | 10 |
|                                    | Total                 | 839      | 42        | 181      | 39 |
| 31–60 minutes                      | Less than high school | 800      | 38        | 5        | 1  |
|                                    | High school/GED       | 822      | 48        | 27       | 6  |
|                                    | College degree        | 829      | 30        | 44       | 9  |
|                                    | Graduate degree       | 875      | 33        | 11       | 2  |
|                                    | Total                 | 831      | 41        | 87       | 18 |
| 61–120 minutes                     | High school/GED       | 832      | 50        | 9        | 2  |
|                                    | College degree        | 849      | 33        | 11       | 2  |
|                                    | Graduate degree       | 841      | 50        | 7        | 2  |
|                                    | Total                 | 841      | 43        | 27       | 1  |
| 121 minutes and up                 | Less than high school | 798      | .         | 1        | 0  |
|                                    | High school/GED       | 840      | 26        | 6        | 1  |
|                                    | College degree        | 820      | 16        | 9        | 2  |
|                                    | Graduate degree       | 862      | 77        | 7        | 2  |
|                                    | Total                 | 837      | 47        | 23       | 5  |
| Total                              | Less than high school | 819      | 31        | 45       | 10 |

|                 |     |    |     |     |
|-----------------|-----|----|-----|-----|
| High school/GED | 826 | 37 | 155 | 34  |
| College degree  | 843 | 40 | 181 | 39  |
| Graduate degree | 856 | 50 | 84  | 17  |
| Total           | 837 | 42 | 465 | 100 |

The Levene’s test was significant (0.0), suggesting that the assumption of equal variances had been violated, which often happens with large sample sizes such as was compiled in this study. If the group sizes had been nearly equal, the test could have been ignored, but the group sizes for education level and school time with caregiver differed. As a result, an alternate test (a generalized linear model that generated a Chi Square value, which does not assume equal variances) checked the ordinary ANOVA results.

The following tests were conducted using the generalized linear model procedure. This approach is more flexible than ANOVA because it can estimate the main effects and interactions without assuming equal variances. Further, this approach uses a fundamentally different test statistic (generalized linear model), so *F* tests are not part of this output. The results of the chi-square test are presented in Table 3.

Table 3

*Generalized Linear Model for Criterion Referenced Competency Test Math by School Time With Caregiver and Education Level*

| Source  | Wald chi square | <i>Df</i> | Sig. |
|---|-----------------|-----------|------|
| School time with caregiver                    | 1.60            | 4         | .81  |
| Education level                               | 23.00           | 3         | .00  |
| School time with caregiver by education level | 19.00           | 11        | .06  |

The analysis indicated that the test for education level was significant (0.0) (sig. less than .05). These results indicated there were significant differences among the *less than high school*, *high school/GED*, *college degree*, and *graduate degree* groups with regard to CRCT math scores. The probability that these results were obtained by chance is less than 5.0%. This test showed statistical evidence that means that Null Hypothesis 1 can be rejected. The data supported the notion that there are differences between the CRCT math scores of students among those whose primary caregiver falls into different educational groupings.

Because the main effect of education level was significant, post hoc tests were used to further determine which means specifically were statistically different from each other. There are many post-hoc tests available to clarify the nature of a significant *F* test (for example, Bonferroni, Tukey, Sheffe). The tests used in this analysis were Tukey tests, chosen because they allowed retention of the Type I error level set to the chosen alpha level of .05.

Table 2 shows the results of the comparison of math scores among the caregiver education level groups. Primary caregivers who had a college or graduate degree tended to have students with higher math CRCT scores. Further, students whose caregivers possessed a graduate degree had significantly higher scores when compared to individuals with a high school education or a lower college degree. Table 4 shows that students whose primary caregiver had a college or graduate degree had CRCT scores that were significantly different from those with whose primary caregiver had less than a high school level of education on CRCT math the mean differences between *High school*, *College* and *Graduate* educated parents were 47, 28, and 17 respectively.

Table 4

*Individual Comparisons for Criterion Referenced Competency Test Math Among Education Level*

| Education level (I)   | Education level (J)   | Mean difference (I-J) | Sig. |
|-----------------------|-----------------------|-----------------------|------|
| Less than high school | High school/GED       | -19                   | .12  |
|                       | College degree        | -30                   | .01  |
|                       | Graduate degree       | -47                   | .00  |
| High school/GED       | Less than high school | 19                    | .12  |
|                       | College degree        | -11                   | .09  |
|                       | Graduate degree       | -28                   | .00  |
| College degree        | Less than high school | 30                    | .01  |
|                       | High school/GED       | 11                    | .09  |
|                       | Graduate degree       | -17                   | .01  |
| Graduate degree       | Less than high school | 47                    | .00  |
|                       | High school/GED       | 28                    | .00  |
|                       | College degree        | 17                    | .01  |

A large number of participants ( $N = 465$ ) were a part of this study, allowing for a power of .84 to be obtained, and there were only two mild outliers who were eliminated. In conclusion, the two outliers were mild and were not included in the data set considered in the determination to reject Null Hypothesis 1.

### **Null Hypothesis 2**

Null Hypothesis 2 stated, *There is no statistically significant difference among time spent with the primary caregiver on schoolwork groups and Georgia Middle School students' Criterion Referenced Competency Test math scores.* Table 2 shows that there were differences between the means of some of the time spent on schoolwork groupings.

Specifically, the biggest differences among groups' CRCT mathematics scores occurred at the *31- to 60-minute* interval, between the *less than high school* and *Graduate degree* groups (75% points). There were also large differences among means of the CRCT math scores at the *121 minutes and up* time interval. However, this does not prove a statistically significant difference. Further statistical analysis (Linear generalized model that generated a Chi Square value) determined the statistical significance of the difference implied by Table 2.

The results of the generalized linear model procedure are displayed in Table 3. The Chi Square value was analyzed to determine the significance of the difference between the time spent on schoolwork groups similar to what was done for the education level data that was analyzed for Research Question 1. As a result, *F* tests are not part of this output.

Table 3 illustrates that the test for *school time with caregiver* was non-significant (.81). These results revealed that there were no significant differences among the *None (child works without my help)*, *1–30 minutes*, *31–60 minutes*, *61–120 minutes*, and *121 minutes and up* groups. In fact, there was a probability of 8.1% (Chi Square value shows significance results of .81) that the differences observed occurred by chance. The number of participants ( $N = 465$ ) allowed a more than sufficient power of .84 and there were only two outliers. Because the overall test for *school time with caregiver* was non-significant, no post-hoc tests were reported on that variable. The researcher therefore concluded that Null Hypothesis 2 was supported, based on the data obtained. The data showed that any differences that may be detected within the *caregiver time spent with child* groups were not statistically significant; therefore, the Null hypothesis was supported by the data.

### **Null Hypothesis 3**

Null Hypothesis 3 stated, *There is no statistically significant interaction between the primary caregiver education level and time spent with the primary caregiver with regard to Criterion Referenced Competency Test math scores.* The generalized linear model that rendered Chi square values determined the significance of any interaction between the *primary caregiver education level* and *time spent with the caregiver* with regard to the CRCT scores, just as it had for Null Hypotheses 1 and 2. The significance of the interaction between *primary caregiver education level* and *time spent with caregiver* approached significance (.06) as Table 3 illustrates. These findings indicated that there was a 6.0% chance that the results obtained were by chance. A significance of .05, or a 5% probability that the observed effect is a result of chance, is the widely accepted cutoff for significance and the interaction significance was above the cutoff (.06 or 6.0%).

To further depict the interaction between *primary caregiver education level* and *time spent with caregiver* interaction, display plots (see Figures 1 and 2) and the corresponding simple effects tests (see Tables 4 and 5) explain these interactions. The large number of participants ( $N = 265$ ) allowed a more than sufficient power of .84, and there were only two outliers, and as a result, it was concluded that Null Hypothesis 3 is correct based on the analysis of the data collected. There was not a statistically significant interaction between *parent education level* and *time spent with students on school-related work* and the child's CRCT scores; the interaction significance, at .06 or 6.0%, exceeded the cutoff for significance.

Figure 1 is an interaction display plot for *education level* by *school time with caregiver* interaction. This figure displays how much the different caregiver education levels and time spent with the caregiver groups interacted and varied. There are relatively large differences among education level groups at 31–60 and 121+ minutes.

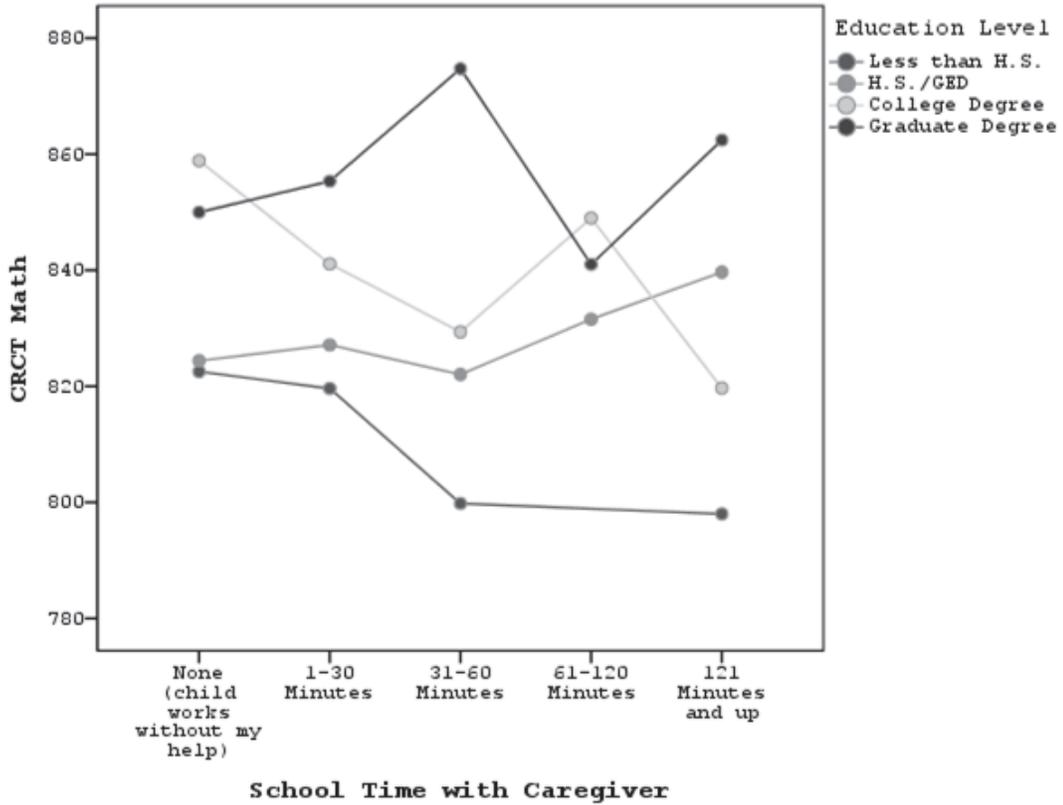


Figure 1. Education level by school time with caregiver interaction.

Figure 2 is an interaction display plot for *school time with caregiver* by *education level*. Many of the differences between means were small. Overall, scores from the *Graduate degree* group were higher than the *Less than high school* group but this was for all time spent with caregiver groups.

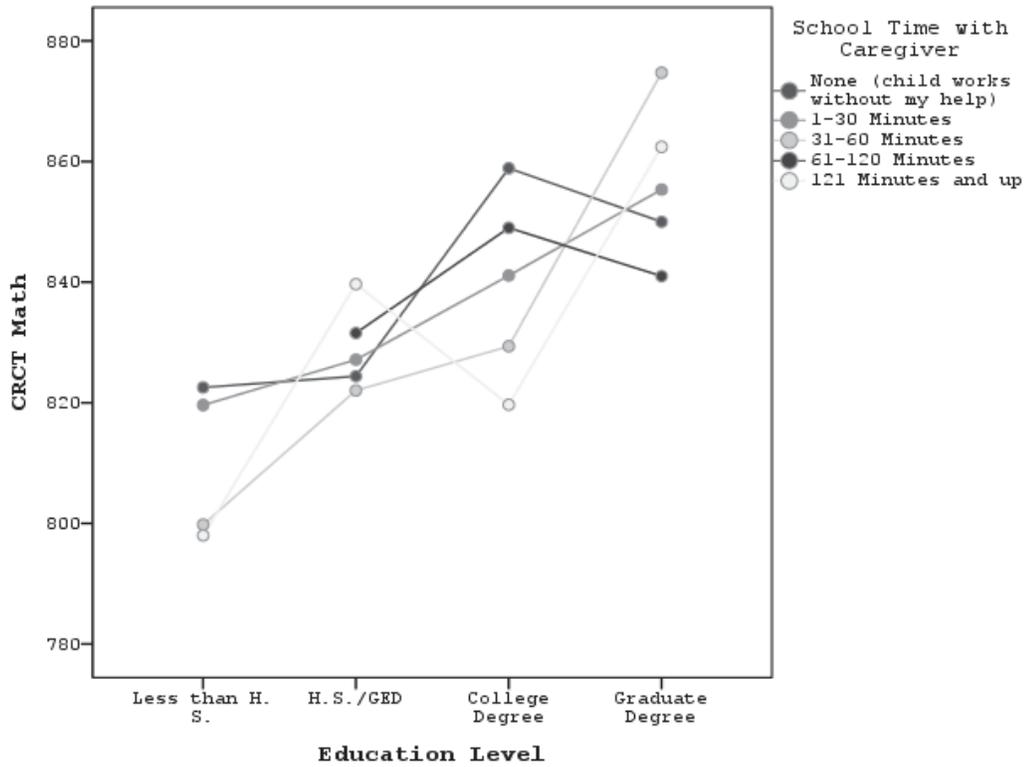


Figure 2. School time with caregiver by education level.

Table 5 shows formal tests between education level groups at each school time with caregiver interval. The groupings that had the highest number of significant simple effect results (showed significant enough statistical results to warrant further investigation) were the school times with caregiver groupings *none* and *31-60 minutes*; each had three groupings that showed significant simple effect groups.

Table 5

*Significant Simple Effects Tests for Education Level Among School Time With Caregiver Groups*

| School time with caregiver group | Education level group  |
|----------------------------------|--|
| None                             | <i>Less than high school and College degree<br/>Less than high school and Graduate degree<br/>High school/GED and College degree</i> |
| 1–30 minutes                     | <i>Less than high school and Graduate degree<br/>High school/GED and Graduate degree</i>   |
| 31–60 minutes                    | <i>Less than high school and Graduate degree<br/>High school/GED and Graduate degree<br/>College degree and Graduate degree</i>      |
| 61–120                           | None – No educational level groups   |
| 121 minutes and up               | <i>College degree and Graduate degree</i>  |

Table 6 compares each of the education level groups individually. They are grouped by the school time with caregiver groups. The largest mean difference groups were in the 31-60 minute grouping and the less than High School group versus the Graduate degree group (Mean Difference = 75).

Table 6

*Individual Comparisons for Education Level Among School Time With Caregiver Groups*

| School time with caregiver         | Education level (I)   | Education level (J) | Mean difference (I-J) | Significance . |
|------------------------------------|-----------------------|---------------------|-----------------------|----------------|
| None (child works without my help) | Less than high school | High school/GED     | -1.9                  | .84            |
|                                    |                       | College degree      | -36                   | .00            |
|                                    |                       | Graduate degree     | -27                   | .04            |

Table 6 (continued)

| School time<br>with caregiver | Education level<br>(I)   | Education level<br>(J)   | Mean difference<br>(I-J) | Significance<br>. |
|-------------------------------|--------------------------|--------------------------|--------------------------|-------------------|
|                               | High school/GED          | Less than high<br>school | 1.9                      | .84               |
|                               | High school/GED          | College degree           | -34                      | .00               |
|                               | High school/GED          | Graduate degree          | -26                      | .04               |
|                               | College degree           | Less than high<br>school | 36                       | .00               |
|                               | College degree           | High school/GED          | 34                       | .00               |
|                               | College degree           | Graduate degree          | 8.9                      | .47               |
|                               | Graduate degree          | Less than high<br>school | 27                       | .04               |
|                               | Graduate degree          | High school/GED          | 26                       | .04               |
|                               | Less than high<br>school | College degree           | -8.9                     | .47               |
|                               | Less than high<br>school | High school/GED          | -7.5                     | .54               |
| 1–30 minutes                  | Less than high<br>school | College degree           | -21                      | .08               |
|                               | Less than high<br>school | Graduate degree          | -36                      | .00               |
|                               | High school/GED          | Less than high<br>school | 7.5                      | .54               |
|                               | High school/GED          | College degree           | -14                      | .06               |
|                               | High school/GED          | Graduate degree          | -28                      | .00               |
|                               | College degree           | Less than high<br>school | 21                       | .08               |
|                               | College degree           | High school/GED          | 14                       | .05               |
|                               | College degree           | Graduate degree          | -14                      | .06               |
|                               | Graduate degree          | Less than high<br>school | 36                       | .00               |
|                               | Graduate degree          | High school/GED          | 28                       | .00               |
|                               | Less than high<br>school | College degree           | 14                       | .06               |
|                               | Less than high<br>school | High school/GED          | -22                      | .25               |

Table 6 (continued)

| School time with caregiver | Education level (I)   | Education level (J)   | Mean difference (I-J)             | Significance . |
|----------------------------|-----------------------|-----------------------|-----------------------------------|----------------|
| 31–60 minutes              | Less than high school | College degree        | -30                               | .11            |
|                            |                       | Graduate degree       | -75                               | .00            |
|                            |                       | Less than high school | 22                                | .25            |
|                            | High school/GED       | College degree        | -7.3                              | .45            |
|                            |                       | Graduate degree       | -53                               | .00            |
|                            | College degree        | Less than high school | 30                                | .12            |
|                            | College degree        | High school/GED       | 7.3                               | .45            |
|                            |                       | Graduate degree       | -45                               | .00            |
|                            | Graduate degree       | Less than high school | 75                                | .00            |
|                            | Graduate degree       | High school/GED       | 53                                | .00            |
|                            |                       | Less than high school | College degree<br>High school/GED | 45             |
|                            | 61–120 minutes        | Less than high school | College degree                    |                |
| Graduate degree            |                       |                       |                                   |                |
| Less than high school      |                       |                       |                                   |                |
| High school/GED            |                       | College degree        | -17                               | .33            |
|                            |                       | Graduate degree       | -9.4                              | .64            |
| College degree             |                       | Less than high school |                                   |                |
| College degree             |                       | High school/GED       | 17                                | .33            |
|                            |                       | Graduate degree       | 8.0                               | .68            |
| Graduate degree            |                       | Less than high school |                                   |                |
| Graduate degree            |                       | High school/GED       | 9.4                               | .64            |
|                            |                       | Less than high school | College degree<br>High school/GED | -8.0<br>-43    |

Table 6 (continued)

| School time with caregiver | Education level (I)   | Education level (J)   | Mean difference (I-J) | Significance . |
|----------------------------|-----------------------|-----------------------|-----------------------|----------------|
| 121 minutes and up         | Less than high school | College degree        | -22                   | .60            |
|                            |                       | Graduate degree       | -64                   | .13            |
|                            | High school/GED       | Less than high school | 42                    | .33            |
|                            |                       | College degree        | 20                    | .39            |
|                            | High school/GED       | Graduate degree       | -23                   | .30            |
|                            |                       | College degree        | 22                    | .60            |
|                            | College degree        | High school/GED       | -20                   | .34            |
|                            |                       | Graduate degree       | -43                   | .03            |
|                            | Graduate degree       | Less than high school | 64                    | .13            |
|                            |                       | High school/GED       | 23                    | .30            |
|                            | Graduate degree       | College degree        | 43                    | .03            |

Table 7 shows the results of the formal tests among school time with caregiver groups at each education level. It displays which test actually shows a statistically significant result. The only educational level that had groups that showed a statistically significant result was the college degree group. The college degree group showed significant effects with all three of the time spent with caregiver groups.

Table 7

*Significant Simple Effects Tests for School Time With Caregiver Among Education Level Groups*

| Education level group | School time with caregiver group   |
|-----------------------|------------------------------------|
| Less than high school | <i>None</i>                        |
| High school/GED       | <i>None</i>                        |
| College degree        | <i>None and 1–30 minutes</i>       |
|                       | <i>None and 31–60 minutes</i>      |
|                       | <i>None and 121 minutes and up</i> |
| Graduate degree       | <i>None</i>                        |

Table 8 shows individual mean comparison amongst the time with caregiver spent on school activities groupings. The individual caregiver times groups are organized based on the caregiver education level groupings.

Table 8

*Individual Comparisons Between School Time With Caregiver Among Education Level Groups*

| Education level       | School time with caregiver (I)     | School time with caregiver (J) | Mean difference (I-J) | Significance. |
|-----------------------|------------------------------------|--------------------------------|-----------------------|---------------|
| Less than high school | None (child works without my help) | 1–30 minutes                   | 2.9                   | .83           |
|                       |                                    | 31–60 minutes                  | 23                    | .24           |
|                       |                                    | 61–120 minutes                 |                       |               |
|                       |                                    | 121 minutes and up             | 24                    | .54           |

Table 8 (continued)

| Education level | School time with caregiver (I)     | School time with caregiver (J)     | Mean difference (I-J) | Significance. |
|-----------------|------------------------------------|------------------------------------|-----------------------|---------------|
|                 | 1-30 minutes                       | None (child works without my help) | -2.9                  | .83           |
|                 |                                    | 31-60 minutes                      | 20                    | .34           |
|                 |                                    | 61-120 minutes                     |                       |               |
|                 |                                    | 121 minutes and up                 | 22                    | .60           |
|                 | 31-60 minutes                      | None (child works without my help) | -23                   | .24           |
|                 |                                    | 1-30 minutes                       | -20                   | .34           |
|                 |                                    | 61-120 minutes                     | 0.0                   | 0.0           |
|                 |                                    | 121 minutes and up                 | 1.8                   | .97           |
|                 | 61-120 minutes                     | None (child works without my help) | 0.0                   | 0.0           |
|                 | 61-120 minutes                     | 1-30 minutes                       | 0.0                   | 0.0           |
|                 |                                    | 31-60 minutes                      | 0.0                   | 0.0           |
|                 |                                    | 121 minutes and up                 | 0.0                   | 0.0           |
|                 | 121 minutes and up                 | None (child works without my help) | -25                   | .54           |
|                 | 121 minutes and up                 | 1-30 minutes                       | -22                   | .60           |
|                 |                                    | 31-60 minutes                      | -1.8                  | .97           |
|                 |                                    | 61-120 minutes                     | 0.0                   | 0.0           |
|                 | None (child works without my help) | 1-30 minutes                       | -2.7                  | .71           |
| High school/GED | None (child works without my help) | 31-60 minutes                      | 2.4                   | .80           |
|                 |                                    | 61-120 minutes                     | -7.2                  | .62           |
|                 |                                    | 121 minutes and up                 | -15                   | .37           |
|                 | 1-30 minutes                       | None (child works without my help) | 2.7                   | .71           |
|                 |                                    | 31-60 minutes                      | 5.1                   | .58           |
|                 | 1-30 minutes                       | 61-120 minutes                     | -4.4                  | .76           |
|                 |                                    | 121 minutes and up                 | -13                   | .46           |
|                 | 31-60 minutes                      | None (child works without my help) | -2.4                  | .80           |

Table 8 (continued)

| Education level | School time with caregiver (I)     | School time with caregiver (J)     | Mean difference (I-J) | Significance. |
|-----------------|------------------------------------|------------------------------------|-----------------------|---------------|
|                 |                                    | 1–30 minutes                       | -5.1                  | .58           |
|                 | 31–60 minutes                      | 61–120 minutes                     | -9.5                  | .53           |
|                 | 61–120 minutes                     | 121 minutes and up                 | -18                   | .32           |
|                 |                                    | None (child works without my help) | 7.2                   | .62           |
|                 | 61–120 minutes                     | 1–30 minutes                       | 4.4                   | .76           |
|                 |                                    | 31–60 minutes                      | 9.5                   | .53           |
|                 |                                    | 121 minutes and up                 | -8.1                  | .70           |
|                 | 121 minutes and up                 | None (child works without my help) | 15                    | .37           |
|                 | 121 minutes and up                 | 1–30 minutes                       | 13                    | .46           |
|                 |                                    | 31–60 minutes                      | 18                    | .33           |
|                 |                                    | 61–120 minutes                     | 8.1                   | .70           |
|                 | None (child works without my help) | 1–30 minutes                       | 18                    | .02           |
| College degree  | None (child works without my help) | 31–60 minutes                      | 30                    | .00           |
|                 |                                    | 61–120 minutes                     | 9.9                   | .45           |
|                 |                                    | 121 minutes and up                 | 39                    | .01           |
|                 | 1–30 minutes                       | None (child works without my help) | -18                   | .02           |
|                 |                                    | 31–60 minutes                      | 18                    | .13           |
|                 | 1–30 minutes                       | 61–120 minutes                     | -7.9                  | .54           |
|                 |                                    | 121 minutes and up                 | 21                    | .13           |
|                 | 31–60 minutes                      | None (child works without my help) | -30                   | .00           |
|                 | 31–60 minutes                      | 1–30 minutes                       | -12                   | .13           |
|                 |                                    | 61–120 minutes                     | -20                   | .14           |
|                 | 61–120 minutes                     | 121 minutes and up                 | 9.7                   | .50           |
|                 |                                    | None (child works without my help) | -9.9                  | .45           |

Table 8 (continued)

| Education level    | School time with caregiver (I)     | School time with caregiver (J)     | Mean difference (I-J) | Significance. |     |
|--------------------|------------------------------------|------------------------------------|-----------------------|---------------|-----|
|                    | 61–120 minutes                     | 1–30 minutes                       | 7.9                   | .54           |     |
|                    |                                    | 31–60 minutes                      | 20                    | .14           |     |
|                    |                                    | 121 minutes and up                 | 30                    | .10           |     |
|                    | 121 minutes and up                 | None (child works without my help) |                       | -39           | .01 |
|                    |                                    |                                    |                       |               |     |
|                    |                                    |                                    |                       |               |     |
|                    | 121 minutes and up                 | 1–30 minutes                       | -21                   | .13           |     |
|                    |                                    | 31–60 minutes                      | -9.7                  | .50           |     |
|                    |                                    | 61–120 minutes                     | -30                   | .10           |     |
|                    | None (child works without my help) | 1–30 minutes                       |                       | -5.3          | .67 |
|                    |                                    |                                    |                       |               |     |
|                    |                                    |                                    |                       |               |     |
| Graduate degree    | None (child works without my help) | 31–60 minutes                      | -25                   | .13           |     |
|                    |                                    | 61–120 minutes                     | 9.0                   | .63           |     |
|                    |                                    | 121 minutes and up                 | -12                   | .50           |     |
|                    | 1–30 minutes                       | None (child works without my help) |                       | 5.3           | .67 |
|                    |                                    |                                    |                       |               |     |
|                    |                                    |                                    |                       |               |     |
|                    | 1–30 minutes                       | 31–60 minutes                      | -19.0                 | .15           |     |
|                    |                                    | 61–120 minutes                     | 14.0                  | .37           |     |
|                    |                                    | 121 minutes and up                 | -7.1                  | .66           |     |
|                    | 31–60 minutes                      | None (child works without my help) |                       | 25.0          | .13 |
|                    |                                    |                                    |                       |               |     |
|                    |                                    |                                    |                       |               |     |
| 31–60 minutes      | 1–30 minutes                       | 19                                 | .15                   |               |     |
|                    | 61–120 minutes                     | 34                                 | .08                   |               |     |
|                    | 121 minutes and up                 | 12                                 | .52                   |               |     |
| 61–120 minutes     | None (child works without my help) |                                    | -9.0                  | .63           |     |
|                    |                                    |                                    |                       |               |     |
|                    |                                    |                                    | -14                   | .37           |     |
|                    |                                    |                                    | -34                   | .08           |     |
| 121 minutes and up | None (child works without my help) |                                    | -21                   | .31           |     |
|                    |                                    |                                    |                       |               |     |
|                    |                                    |                                    | 12                    | .50           |     |
|                    |                                    |                                    |                       |               |     |
| 121 minutes and up | None (child works without my help) |                                    | 12                    | .50           |     |
|                    |                                    |                                    |                       |               |     |
|                    |                                    |                                    |                       |               |     |
| 121 minutes and up | 1–30 minutes                       | 7.1                                | .66                   |               |     |
|                    | 31–60 minutes                      | -12                                | .52                   |               |     |
|                    | 61–120 minutes                     | 21                                 | .31                   |               |     |

## Summary

Chapter Four provided a discussion of the results of the study. The first null hypothesis, which stated that there would not be significant differences among education level groups on CRCT math scores, was rejected. The data showed statistically significant differences in CRCT math scores in relation to primary caregiver education level.

Primary caregivers who had a college or graduate degree tended to have children with higher math CRCT scores. Further, students whose caregivers possessed a graduate degree had significantly higher scores when compared to individuals with a high school education or a lower college degree.

The second null hypothesis, that there would not be significant differences among school time with caregiver groups, was supported by this data, and therefore failed to be rejected. The data did not show any statistically significant differences in the time spent with caregiver on school related assignments groups.

The third null hypothesis, which stated that there would not be a significant interaction between education level and school time with caregiver, was also supported by this data (although the significance value approached significance). The data analysis did not reveal a statistically significant interaction between caregiver education level and time spent with caregiver on school related activities; therefore, the third null hypothesis fails to be rejected. It is important to note that while any return rate over 30% is an acceptable survey return rate, it is not what would be considered a robust return rate for the surveys from which this data was derived. A robust rate would be 75% or more. The return rate for this study was 37%. Therefore, the return rate of 37% must be counted as a

limitation of the results of this research. A more detailed summary and a discussion of the findings and limitations are presented in Chapter Five.

## CHAPTER FIVE: SUMMARY AND DISCUSSION

The following is a summary of the research study presented in the previous chapters, as well as the results of the study. The chapter includes a brief summary of the purpose of the study, the problem, the methodology, and the results. Along with the discourse about the results, the theoretical framework, as well as the relationship of this study's findings to prior research implications will be examined. A discussion of limitations, applications, recommendations, and topics for future research conclude the chapter.

### Purpose of the Study

The purpose of this causal comparative study was to determine if there were differences in middle school students' standardized test scores in math according to their primary caregiver's educational level and the amount of time the primary caregiver spent with the student working on school activities. Because a statistically significant relationship was found, further examination was conducted to determine if there was a significant cumulative effect between the two factors examined (education level and time spent with caregiver) with regard to math scores on the Criterion Referenced Competency Test (CRCT) given in Georgia.

The specific research questions and null hypotheses that guided this research are as follows:

1. Is there a statistically significant difference among the primary caregiver educational level groups (*Less than high school, High school/GED/some college/technical, 2-year degree/technical/bachelor's, Some*

*graduate/graduate degree*) and Georgia Middle School students' CRCT math scores?

**H<sub>01</sub>:** There is no statistically significant difference between primary caregiver educational level groups and Georgia Middle School students' Criterion Referenced Competency Test math scores.

2. Is there a statistically significant difference among time spent with the primary caregiver on schoolwork groupings (none, 1–30 minutes daily 31–60 minutes daily, 61–120 minutes daily 121 minutes or more) and Georgia Middle School children's CRCT math scores?

**H<sub>02</sub>:** There is no statistically significant difference among time spent with the primary caregiver on schoolwork groups and Georgia Middle School students' Criterion Referenced Competency Test math scores.

3. Is there statistically significant interaction between the primary caregiver education level and time spent with the primary caregiver with regard to CRCT math scores?

**H<sub>03</sub>:** There is no statistically significant interaction between the primary caregiver education level and time spent with the primary caregiver with regard to Criterion Referenced Competency Test math scores.

Schools are being held accountable for student achievement more than ever before. Federal mandates such as the No Child Left Behind Act of 2001 and the Race to the Top initiative of 2010 are designed to force schools to work to improve student achievement (Dunn & Allen, 2009; U.S. Department of Education, n.d.). In order to meet the new requirements, educators must examine the factors that may have an effect on

student achievement. Previous literature suggested that one such factor is the education level of the primary caregiver in the household (Bakker et al., 2007; Brown & Iyengar, 2008). Another recurring factor thought to effect achievement is the amount of time spent with the primary caregiver on school-related activities (Desimone, 1999; Griffith, 1996; Jacobs & Harvey, 2005). While these factors have been researched at the high school and elementary levels, they have not been specifically explored at the middle school level. This study sought to advance the literature on both of these factors as well as look at the possible interaction of the two factors to determine their cumulative effect on middle school student achievement.

### **Restatement of the Problem**

It was not known whether there is a statistically significant relationship between primary caregiver education level and middle school student math achievement on the CRCT. Previous researcher had further not established whether there is a statistically significant relationship between time spent with the caregiver on schoolwork and student math achievement on the CRCT. If it is established that either or both of these two factors (caregiver education level and time spent with caregiver) are statistically significant in regard to math achievement, additional examination will establish whether these two factors garner a cumulative effect on CRCT math scores.

### **Summary of the Findings**

The first null hypothesis, that there would not be significant differences among education level groups on CRCT math, was not supported by this data. The data revealed statistically significant differences in CRCT math scores in relation to primary caregiver education level, indicating that primary caregivers who had a college or graduate degree

tended to have students with higher math CRCT scores than students whose parents had different educational attainment. Further, students whose caregivers possessed a graduate degree had significantly higher scores when compared to individuals with a high school education or a lower college degree. The first null hypothesis therefore was rejected.

The second null hypothesis, that there would not be significant differences among school time with caregiver groups, was supported by this data, and therefore failed to be rejected. There were no statistically significant differences among school time with caregiver groupings.

The third null hypothesis, that there would not be a significant interaction between education level and school time with caregiver, was also supported by this data, and although the significance value approached significance, as it was not under the established significance level ( $p < .05$ ), this null hypothesis also failed to be rejected.

### **Relationship of the Current Study to Prior Research**

Student academic achievement was the ammunition behind one of the most drastic educational acts to date, No Child Left Behind (NCLB). The aim of NCLB was to hold schools accountable and to insure that all school-aged children in the United States reach a level deemed as proficient in reading, language arts, and mathematics by the year 2014 (Dunn & Allen, 2009; U.S. Department of Education, n.d.). In order to reach the goal of 100% proficiency by 2014, schools must administer tests developed by an outside entity on a yearly basis, such as the CRCT, which is administered in Georgia (Chappuis et al., 2009). Information and data from these tests is used to guide school-wide curriculae, personnel, and other important decisions that will help the school ensure that students improve their achievement on the required tests.

In order for a school to be deemed as making sufficient progress toward the 2014 goal of 100% proficiency, they must make adequate yearly progress (AYP). AYP is determined by the percentage of students in each of the school's subgroups (socioeconomic, racial, special education, and others) who reach proficiency-level scores on the test administered by the state on an annual basis (Dunn & Allen, 2009; U.S. Department of Education, n.d.). Those schools that meet the AYP standard can continue business as usual. The schools that do not meet AYP face penalties and are held accountable (Dunn & Allen, 2009; U.S. Department of Education, n.d.). All schools that accept federal educational funding are subject to the stipulations under the federal NCLB Act of 2001, and all of those schools must comply with NCLB or run the risk of losing their federal funding.

In 2010, President Obama introduced the Race to the Top incentive program. This program also aimed to improve student achievement, as measured by state-mandated testing. Both NCLB and Race to the Top are powerful incentives for schools to examine data as well as to investigate the factors thought to affect student achievement; these conditions establish the importance of a study such as this as well as its results.

Findings from this study suggested that the education level of the primary caregiver is a significant factor in relation to student achievement of Georgia Middle School students on the mathematics section of the CRCT. This conclusion aligned with prior research (Brown & Iyengar, 2008; Matthews & Farmer, 2008; Ozturk & Singh, 2006). Prior research stated that reading readiness, mathematic skills, teachers' perceptions of parents, parental involvement, and many other factors that affect student achievement are affected by parental education level (Brown & Iyengar, 2008; Matthews

& Farmer, 2008; Ozturk & Singh, 2006). The difference between most prior research and this study is that most of the literature that examined student math achievement in relation to parental education level focused on high school aged students. Factors such as higher level class enrollment, higher level class readiness, and student achievement among high school students were the usual focus, while this study focused specifically on middle school students and their achievement levels.

Another conclusion that can be determined by the data from this study was that time spent with the caregiver completing school-related activities was not found to be a significant factor in student achievement in math as measured by the CRCT. This conclusion seems to go against what some previous research on parental involvement found. Previous studies suggested the importance of parental involvement in influencing student achievement (Harris & Goodall, 2008; Hill & Tyson, 2009; Jacobs & Harvey, 2005).

One thing that must be considered however is how each of the previous studies operationally defined *parental involvement*. This review of literature revealed that most studies did not define parental involvement as time helping with homework. Rather, parental involvement is defined in many studies as parental influence on educational attitudes, transference of educational aspirations, and visibility at the child's school (Ahmed et al., 2008; Jacobs & Harvey, 2005; Okpala et al., 2001). A potential difficulty exists in comparing the results of this study with studies which do not have the same operational definition of parental involvement.

Another factor that must be discussed is the age group of the students who were a part of this study. There is much research which indicated that what is extremely

important to adolescents is the ability to strike a balance between independence and a perception of support (Ahmed et al., 2008; Roseth et al., 2008; Stolz et al., 2004). This finding was taken into consideration, and the researcher theorized that middle school seems to be the time when students start to try to become more independent in general, and this transition may carry over to working on their homework and studies. Just because a parent does not help with schoolwork on a regular basis, does not mean the parent is not involved in the schooling of the student.

The last conclusion drawn from the data is that there was not a significant interaction between parental education level and time spent with the caregiver on school-related activities, meaning that neither of these factors depends on the other. The amount of time parents spend with their child helping with schoolwork does not depend on the parents' education level. In addition, the education level does not dictate how long the parent works with their children on schoolwork. It should be noted, however, that the interaction between these two factors very closely approached a statistically significant level (.058). With a larger sample (>465), one which was more representative of the total population, the results may have been statistically significant, which would have been more aligned with previous research. Previous research showed that there appeared to be a relationship between parental education level and the time spent with students with regard to their education (Kremen et al., 2005; Myberg & Rosen, 2009; Rowe et al., 1999).

## **Implications**

The results of this study indicated that caregiver education level appears to have an effect on the achievement of middle students on the mathematics section of the CRCT. Additionally, the results indicated that time spent on schoolwork with the caregiver cannot be deemed a major factor in determining student results on the math section of the CRCT. Lastly, it could be not concluded that caregiver time spent with a student on schoolwork is determined by caregiver education level.

The results of this study indicate that although having students produce data that can be monitored by way of standardized testing and holding schools accountable are steps in the right direction, more needs to be done. Individual studies such as this one show additional nuances in the data that can be applied to schools to aid them in targeting at-risk students. This study found a significant relationship between parental education level and student achievement on the math section of the CRCT. Armed with information such as this, schools can begin the work of helping their students do better on standardized tests, instead of applying research-based solutions that may not apply to their individual population. Measures such as the screening of families for information (e.g., education level of parents, parental involvement) as they register their children for school may help in identifying potentially at risk students.

These results also show that even though there may be research that can lead to conclusions about students and what factors affect their achievement, each school has its own individual factors that influence their population. Districts need to take the time to get to know their population through educational studies such as this one. By encouraging

and or funding studies that examine the factors that affect schools in the district, schools can work more effectively increase student achievement.

### **Limitations**

The limitations of the study were as follows:

1. The study did not have a 100% response rate, the return rate was 37% so the data may be skewed based on who responded to the survey.
2. The data groupings that the participants were broken into were not evenly distributed, a limitation which often occurs in studies which include large data sets.
3. The online version of the survey was unavailable in Portuguese and Spanish, which are languages spoken by substantive populations at the school in which the study took place. The Spanish- and Portuguese-speaking students at the school make up 18% of the population.
4. Students at one diverse middle school in Georgia were the focus of the study; therefore, it cannot be determined whether the observed results are translatable to other grade levels, schools, and/or states.
5. The CRCT is a test given only in Georgia; making student achievement more difficult to generalize. Student achievement in Georgia Middle School is almost always related to CRCT scores. In other states, student achievement would not be tied to CRCT scores since the CRCT is a test given in GA only.

The assumptions of the researcher were that the participants of the survey gave honest and valid information and that the surveys returned via the student/parent participants yielded a truly representative sample of the school population. This

assumption may have caused a skewing of the data if the conjectures turn out to be false. The researcher made an effort to avoid as many of these limitations as possible. For example, students who speak different languages were encouraged to assist their non-English speaking caregivers to complete the surveys properly and to call the researcher for translation assistance if needed, which was provided via the International Welcome Center (IWC) county translators. Although contact with the IWC was encouraged, no participants contacted that organization in relation to this study. As a result, it is likely that non-English speaking parents may have been underrepresented.

The researcher also included was a means for participants to agree to be contacted if there was missing or unclear information on their survey. This feature was meant to help boost the usable survey numbers although no parents who participated in the study asked to be contacted. This may affect how applicable the proposed study will be to other schools and school systems.

### **Applications and Recommendations**

NCLB and Race to the Top were designed to improve student achievement. The thinking was that if schools were held accountable and data tied to student achievement is public knowledge, then student achievement will improve. Making sure that student achievement improves, especially in math, is paramount in the minds of all who are aware of U.S. student achievement compared to other developed nations. However, more than just demanding higher test scores will be required to help students improve. Districts must take the next step in starting to examine factors outside of school that may have an effect on student learning and achievement. Millions of dollars are poured into schools to help with facilities, teacher and administrator training, and more. Entire school programs

have been revamped and scores of teachers fired, all in efforts to improve student achievement. What districts need to do now is to look at what other factors may be hindering student performance. Although there are many students who are successful despite factors that have been shown to affect student achievement that does not mean such factors should be ignored. Although student achievement is a complicated issue caregiver education levels were found to be a factor with regard to student achievement in this study and that should not be ignored.

**Recommendation 1:** Discovery, and monitoring of at-risk students should begin in elementary school and be mandatory as long as the child is in school. It is much more difficult to help a student if something that can be deemed as a significant factor affecting their education is not discovered until the child is 11 to 13 years old. Perhaps, individualized education plans (IEPs) such as those produced for special education students could be produced and maintained to help ensure progress of students deemed to be at risk.

According to the data obtained in this study, students whose parents only have a high school education or below are more likely to have lower achievement scores in math. Armed with this information, as well as other research-based factors, it would be beneficial to test/monitor these students at least by first or second grade to determine if any gaps in mathematics knowledge exist. Testing and monitoring of this type could eliminate the unnecessary use of resources and extra assistance for students who are able to achieve despite their caregivers' education level and other factors linked to student lower achievement.

**Recommendation 2:** Individual studies in schools and districts need to be conducted to assess which students are at risk. Parental education level needs to be a factor (among others) which helps determine a student's at risk status. If every school gathered information about the primary caregiver's education level during the registration process, that information could be monitored along with other factors known to affect student achievement, and the data could be used by researchers to help students.

At this time, however, information on caregivers is not a part of the registration process for most schools. The fact that caregiver education levels are not known means that it would be difficult to enact educational enhancement programs for students who could be categorized as at-risk based on factors known to effect student achievement, parental educational level being one such factor. To rectify this issue, individual studies, which replicate this study, need to be conducted at middle schools in the Georgia area to determine if caregiver education level is a statistically significant factor in the achievement of other schools' students as well.

**Recommendation 3:** Students need to be offered additional programs based on their at-risk status much earlier than the middle school level, perhaps as soon as they are tested and determined to have educational gaps. After-school programs, tutoring, and intensive classes need to be developed with these students in mind. The programs developed by the district need to be closely monitored, as does the progress of the students who are a part of them. Close monitoring of the progress of the students will allow the program to be revised on a continual basis to ensure it meets the needs of its participants and that the students improve. These recommendations will allow schools

and districts to be more proactive instead of reactive in helping students improve and achieve in math and all subjects in general.

### **Suggestions for Future Research**

Further research should be conducted in the area of student achievement in mathematics, especially at the middle school level. The results of this study indicated that there is a connection between caregiver education level and mathematics achievement on the CRCT; however, more study might indicate additional relationships. The following are recommendations for additional investigation at the middle school level:

1. A study that examines CRCT mathematics achievement as it relates to socioeconomic status.
2. A study that examines CRCT mathematics achievement as it relates to hours worked by primary caregiver(s) per week.
3. A study that examines CRCT mathematics achievement as it relates to race and/or ethnicity.
4. A study similar to this one but on a larger scale and/or including data from additional schools in Georgia.
5. A qualitative study that aims to determine how caregiver education level effects student achievement at the middle school level.

A district-wide study similar to this one, which was conducted in one middle school, would be a great way for a district to gain pertinent information about its population; another option would be a similar study that includes a nationally-administered test. There are still plenty of niches to explore with regard to the subject of

middle school math achievement, especially if having U.S. students catch up and or surpass their international counterparts is the goal.

### **Conclusion**

The purpose of this study was to examine two factors, primary caregiver education level and time spent with the primary caregiver, to determine whether there was a statistically significant relationship between these two factors and the mathematics achievement of middle school students on state-mandated testing.

The first null hypothesis that there would not be significant differences among education level groups on CRCT math was not supported by this data. The data showed statistically significant differences in CRCT math scores in relation to primary caregiver education level. The second null hypothesis that there would not be significant differences among school time with caregiver groups was supported by this data. There were no statistically significant differences among school time with caregiver groupings. The third null hypothesis that there would not be a significant interaction between education level and school time with caregiver was supported by this data (although the significance value approached significance).

The results of this study suggested that having student data that can be monitored via standardized testing and holding schools accountable are steps in the right direction; however, schools and districts cannot stop there. Studies such as this one show additional nuances in data that can be applied to schools to aid them in assisting at-risk students. This study revealed a significant relationship between parental education level and student achievement on the math section of the CRCT. Schools can use information such as this to help students improve their achievement scores on standardized tests. The goal

should be for schools to apply research-based solutions that are applicable to their individual population.

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## APPENDIX A. IRB APPLICATION

Ref. # \_\_\_\_\_

### APPLICATION TO USE HUMAN RESEARCH SUBJECTS

#### Liberty University

#### Committee On The Use of Human Research Subjects

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1. Project Title: A Study of the Relationship Between Caregiver Education Level, Time Spent on School Activities, and Mathematics Achievement
2. Full Review  Expedited Review
3. Funding Source (State N/A if not applicable): N/A
4. Principal Investigator: Ebony Allen, Student  
Distance Learning/Education  
732-207-6874  
[ecallen2@liberty.edu](mailto:ecallen2@liberty.edu)  
1902 Trees of Kennesaw Pkwy  
Kennesaw, GA 30152
5. Faculty Sponsor (if student is PI), also list co-investigators below Faculty Sponsor, and key personnel:  
  
Lisa Reason, Committee Chair/ Professor  
Education Department  
lreason@liberty.edu  
Liberty University,  
1971 University Blvd  
Lynchburg, VA 24502  
419-724-3391
6. Non-key personnel: N/A
7. Consultants: Dr. Rudolph Richichi  
804-814-7019  
drrichichi2@statisticians.net  
Statistical Analysis and Measurement Associates  
P.O. Box 224  
Lenexa, Virginia 23089

Dr. Donald Leake, Associate Professor  
Education Dept.  
Liberty University  
1971 University Blvd  
Lynchburg, VA 24502  
434-592-4307

8. The principal investigator agrees to carry out the proposed project as stated in the application and to promptly report to the Human Subjects Committee any proposed changes and/or unanticipated problems involving risks to subjects or others participating in approved project in accordance with the Liberty Way and the [Confidentiality Statement](#). The principal investigator has access to copies of [45 CFR 46](#) and the [Belmont Report](#). The principal investigator agrees to inform the Human Subjects Committee and complete all necessary reports should the principal investigator terminate University association. Additionally s/he agrees to maintain records and keep informed consent documents for three years after completion of the project even if the principal investigator terminates association with the University.

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Principal Investigator Signature

Date

---

Faculty Sponsor (If applicable)

Date

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**Submit the original request to: Liberty University Institutional Review Board, CN Suite 1582, 1971 University Blvd., Lynchburg, VA 24502. Submit also via email to [irb@liberty.edu](mailto:irb@liberty.edu)**

## APPLICATION TO USE HUMAN RESEARCH SUBJECTS

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10. This project will be conducted at the following location(s): (please indicate city & state)
- Liberty University Campus
- Other (Specify): Georgia
- 

11. This project will involve the following subject types: (check-mark types to be studied)
- Normal Volunteers (Age 18-65)
- Subjects Incapable Of Giving Consent
- In Patients
- Prisoners Or Institutionalized Individuals
- Out Patients
- Minors (Under Age 18)
- Patient Controls
- Over Age 65
- Fetuses
- University Students (PSYC Dept. subject pool\_\_\_\_)
- Cognitively Disabled
- Other Potentially Elevated Risk Populations\_\_\_\_\_
- Physically Disabled
- Pregnant Women

12. Do you intend to use LU students, staff or faculty as participants in your study? If you do not intend to use LU participants in your study, please check "no" and proceed directly to item 13.

YES  NO

If so, please list the department and/classes you hope to enlist and the number of participants you would like to enroll.

---

In order to process your request to use LU subjects, we must ensure that you have contacted the appropriate department and gained permission to collect data from them.

Signature of Department Chair:

---

Department Chair Signature(s)

Date

13. Estimated number of subjects to be enrolled in this protocol: 450

14. Does this project call for: (check-mark all that apply to this study):

- Use of Voice, Video, Digital, or Image Recordings?  
 Subject Compensation? Patients \$\_\_\_\_\_ Volunteers \$\_\_\_\_\_  
Participant Payment Disclosure Form

- Advertising For Subjects?  
 More Than Minimal Risk?  
 More Than Minimal Psychological Stress?  
 Alcohol Consumption?  
 Confidential Material (questionnaires, photos, etc.)?  
 Waiver of Informed Consent?  
 Extra Costs To The Subjects (tests, hospitalization, etc.)?  
 VO2 Max Exercise?  
 The Exclusion of Pregnant Women?  
 The Use of Blood? Total Amount of Blood \_\_\_\_\_  
Over Time Period (days) \_\_\_\_\_  
 The Use of rDNA or Biohazardous materials?  
 The Use of Human Tissue or Cell Lines?  
 The Use of Other Fluids that Could Mask the Presence of Blood (Including  
Urine and Feces)?  
 The Use of Protected Health Information (Obtained from Healthcare  
Practitioners or Institutions)?

15. This project involves the use of an **Investigational New Drug (IND)** or an **Approved Drug For An Unapproved Use**.  
 YES  NO  
Drug name, IND number and company: \_\_\_\_\_

16. This project involves the use of an **Investigational Medical Device** or an **Approved Medical Device For An Unapproved Use**.  
 YES  NO  
Device name, IDE number and company: \_\_\_\_\_

17. The project involves the use of **Radiation or Radioisotopes**:  
 YES  NO

18. Does investigator or key personnel have a potential conflict of interest in this study?  
 YES  NO



## **APPENDIX B. EXPEDITED/FULL REVIEW APPLICATION NARRATIVE**

### **A. PROPOSED RESEARCH RATIONALE (Why are you doing this study? [Excluding degree requirement])**

The researcher has decided to complete the aforementioned study because of the gap in quantitative research examining student achievement on middle school state-mandated tests in relation to primary caregiver education level and time spent with caregiver on school related activities. There is a multitude of research that concludes there is a link between primary caregiver education and student achievement at the college and high school level, and in relation to elementary reading readiness (Bakker et al., 2007; Brown & Iyendar, 2008; Hill et.al, 2004; Jacobs & David, 2005; Ozurk & Singh, 2008; Walker, Petrill, & Plomin, 2005). However, recent research that specifically examines primary caregiver education and how it relates to mathematics achievement on state-mandated testing for middle school students has not been conducted. There is also a large body of evidence that supports the notion of parental involvement (time spent on school-related activities) and its positive effect on student achievement (Bakker et al.; Cone, Delawyer, & Wolfe, 1985; Desimone, 2004; Hill et.al.; Jacobs & David; Ozurk et al., 2005). Once again, however, the researcher has been unable to find recent research that compares both caregiver education level and parental involvement (time spent) in the middle school setting.

In the current educational climate (post-NCLB of 2001 and the Race to the Top incentive program of 2010), which is very data and test driven, the proposed research could prove invaluable to schools looking to develop programs that may be able to assist at-risk students. If a relationship is not found, then the proposed research can be used to

justify helping researchers and schools focus on other factors that may have a greater effect on student achievement on state mandated tests.

**B. SPECIFIC PROCEDURES TO BE FOLLOWED**

- 1) Prior to data collection, the proposed research must be submitted to the Institutional Review Board (IRB) of Liberty University and Georgia County Schools (pseudonym) for review and approval. Once approval from both IRB offices is granted, the researcher is free to begin the initial data collection.
- 2) A listing of current homeroom rosters will be gathered from the administrative team of Georgia middle school (pseudonym).
- 3) The Homeroom rosters will be placed in alphabetical order by the homeroom teachers name and the students will be systematically randomly selected.
- 4) Starting with the first student in the first homeroom teacher's class, every other student will be selected for participation and then given a number that will represent that student when the coding of data begins.
- 5) Labels with the selected students names and homeroom teacher will be printed and placed on manila envelopes. Enclosed in the envelope will be the attached survey, an informed consent form, directions on how to return the survey, and a sealable return envelope.
- 6) The week before survey distribution the researcher will discuss the pending survey distribution with the teachers and solicit their support. The researcher will also discuss the procedures for survey distribution and collection. Lastly the researcher will emphasize the sensitivity of the information and solicit the

teachers assistance in protecting student confidentiality. Teachers will be reminded that student information should be handled with the same care as other school related sensitive information and that surveys must be collected in envelopes sealed by the parent or student.

- 7) The first day of survey distribution the researcher will make an announcement during morning announcements that explains the survey process and reminds teachers how to insure the confidentiality of the student's information. The surveys will be distributed to the selected students and incentives to return the surveys will be discussed.
- 8) Survey Collection will begin the next day and continue for two weeks. The sealed and completed surveys may be placed by the homeroom teachers in the lock box that will be located in the mailroom (only the researcher will have the key). The mailroom is a controlled entry room in the school with camera surveillance. The Completed surveys will be checked and emptied twice daily by the researcher. The completed and sealed surveys may also be hand delivered by the participants to the researcher in her room. The surveys collected during the day will be kept in a locked file cabinet to which only the researcher has the key. Originally selected students may obtain additional surveys if they are misplaced.
- 9) As the surveys are collected they examined to determine their completeness and usability. The usable and complete surveys will be coded using the codes detailed in Chapter III of the research proposal. The code book will be kept in a separate location (home office of researcher) than the participants and the collected surveys.

- 10) Student CRCT information will be gathered from the district “academic portal” and matched to the appropriate survey.
- 11) Once the information is coded, factorial analysis will be run and SPSS will be applied to the data to determine the presence or absence of a statistical relationship between the independent variables individually (parental education level, time spent) and the dependent variable (CRCT math scores). Factorial analysis will also be used to determine whether the two independent variables (parental education level and time spent) have a cumulative effect on the dependent variable (CRCT math scores).
- 12) Data analysis and a detailed write up of the findings and implications will follow.

### C. SUBJECTS

#### **Who do you want to include in your study? Please describe in nonscientific language**

A selectively random group of a maximum of 650 GMS students in 6<sup>th</sup> through 8<sup>th</sup> grade as well as their primary caregivers will be surveyed. The homeroom rosters of all GMS teachers will be collected and alphabetized by homeroom teacher. Every other student on the homeroom rosters starting with the first student in the first homeroom teacher’s class will be included.

#### **The inclusion criteria for the subject populations including gender, age ranges, ethnic background, health status and any other applicable information.**

Any student that fits the selection criteria (every other student on a GMS teacher’s homeroom roster may be included without regard for gender, age etc.

#### **Provide a rationale for targeting those populations.**

1. The inclusion of subjects will be based on their attendance at GMS. The primary caregiver of any of the students randomly selected may participate in the survey.
2. A selectively random group of a maximum of 650 GMS students and primary caregivers will be surveyed. The homeroom rosters of all GMS teachers will be collected and alphabetized by homeroom teacher. Every other student on the homeroom rosters starting with the first student in the first homeroom teacher’s class will be included.

**Provide the maximum number of subjects you seek approval to enroll from all of the subject populations you intend to use and justify the sample size.**

A selectively random group of a maximum of 650 GMS students and primary caregivers is the maximum number of participants to be included in the survey. The total number of usable surveys as concluded by completing a power analysis (statistical analysis) is 450. In order to obtain this number it is necessary to distribute the surveys to a greater number of individuals than the number indicated by the power analysis. The distribution of extra surveys will allow for a greater chance of the researcher to be returned. It was advised by Dr. Richichi (statistical consultant) that surveying half the school population, (650 individuals) should achieve the desired number of (450) of usable surveys.

#### **D. RECRUITMENT OF SUBJECTS AND OBTAINING INFORMED CONSENT**

**Describe your recruitment process in a straightforward, step-by-step manner. The IRB needs to know all the steps you will take to recruit subjects in order to ensure subjects are properly informed and are participating in a voluntary manner. An incomplete description will cause a delay in the approval of your protocol application.**

- 1) Staff will be briefed on the upcoming survey by the researcher during the Tuesday faculty and planning session the week before the planned survey distribution date. Details about confidentiality, the voluntary nature of the study etc. will all be discussed. The staff will also be allowed time to ask questions of the researcher regarding the process.
- 2) Prospective survey participants will be made aware of the upcoming survey via closed circuit, televised morning announcements (GTV). The announcement about the upcoming survey will be made by the researcher the after the staff is briefed, a week before the survey is distributed. It will be made very clear that participation in the completion of the survey is completely voluntary. This will be stated verbally as well as made clear on the informed consent form that will be sent to the possible participants. Homeroom teachers distributing the surveys will also be urged to make sure the students know that it is voluntary that they participate in the survey.

- 3) Students who are selected via the homeroom rosters will be given a survey by their homeroom teacher. Students will be selected for receipt of the survey by a selectively random process. Every other student on the homeroom rosters (alphabetized by homeroom teacher's names) will be selected for receipt of the survey.
- 4) The morning of the surveys are distributed the researcher will appear on GTV to reiterate the voluntary nature of the survey and discuss directions for the receipt and return of the surveys distributed.

#### **E. PROCEDURES FOR PAYMENT OF SUBJECTS**

**Describe any compensation that subjects will receive. Please note that Liberty University Business Office policies might affect how you can compensate subjects. Please contact your department's business office to ensure your compensation procedures are allowable by these policies.**

- 1) Students who return the surveys will be entered in a drawing to win a used MP3 player (used once by the researcher).
- 2) The homeroom with the highest percentage of returned surveys per grade level (6<sup>th</sup>, 7<sup>th</sup> & 8<sup>th</sup>) will receive a donut breakfast provided by the researcher.
- 3) Lastly the homeroom teacher with the highest return rate will receive a \$10 gift card to Starbucks.

#### **F. CONFIDENTIALITY**

- Describe what steps you will take to maintain the confidentiality of subjects.
- Describe how research records, data, specimens, etc. will be stored and for how long.
- Describe if the research records, data, specimens, etc. will be destroyed at a certain time. Additionally, address if they may be used for future research purposes.

1. Starting with the first student in the first homeroom teacher's class, every other student will be selected for participation and then given a number that will represent that student when the coding of data begins. The number that represents the student will aid in keeping names from being recognized if the data is viewed by someone other than the researcher inadvertently.
2. The week before survey distribution, the researcher will discuss the pending survey distribution with the teachers and solicit their support. The researcher will also discuss the procedures for survey distribution and collection. Lastly the researcher will emphasize the sensitivity of the information and solicit the teachers assistance in protecting student confidentiality. Teachers will be reminded that student information should be handled with the same care as other school related sensitive information and that surveys must be collected in envelopes sealed by the parent or student.
3. The first day of survey distribution the researcher will make an announcement during morning announcements that explains the survey process and reminds teachers how to insure the confidentiality of the student's information.
4. Survey Collection will begin the next day and continue for two weeks. The sealed and completed surveys may be placed by the homeroom teachers in the lock box that will be located in the mailroom (only the researcher will have the key). The mailroom is a controlled entry room in the school with camera surveillance. The Completed surveys will be checked and emptied twice daily by the researcher. The completed and sealed surveys may also be hand delivered by the participants to the researcher in her room. The surveys

collected during the day will be kept in a locked file cabinet to which only the researcher has the key, and taken to the researchers home office daily.

Originally selected students may obtain additional surveys if they are misplaced.

5. As the surveys are collected they examined to determine their completeness and usability. The usable and complete surveys will be coded using the codes detailed in Chapter III of the research proposal. The code book will be kept in a separate location (home office of researcher) than the participants and the collected surveys.
6. As data analysis begins, all information will be inputted into the researchers personal laptop that is password protected.
7. All surveys and the associated paperwork will be destroyed once the researcher completes her defense in a satisfactory manner, however some data may be used in later studies. This fact will be disclosed to study participants.

## **G. POTENTIAL RISKS TO SUBJECTS**

**Describe the risks to participants and steps that will be taken to minimize those risks. Risks can be physical, psychological, economic, social, legal, etc.**

The biggest risk to participants is that the information that they disclose on the survey will be disclosed to an individual other than the researcher. Depending on who obtains that information it could be used to make judgments about the parent and or their children. This could cause psychological and emotional harm to the participant(s).

There are a number of steps being taken by the researcher to ensure the security of the information disclosed by participants in the study and they are as follows.

1. Participants will be furnished with a sealable envelope to return their surveys and will be instructed to make sure that the envelope is sealed when they return it to the researcher and or their homeroom teacher.
2. Teachers will be instructed not to accept surveys that are not sealed in the return envelopes provided. If a student loses their return envelope, they will be instructed to go to the researcher's class room to return their survey directly.
3. Teachers will be instructed to treat surveys as they do all other confidential materials that they come in contact with. Not to leave any envelopes on their desk or anywhere that they might be viewed etc. The Principal will speak about the importance of keeping the information contained in the survey confidential.
4. As soon as surveys are verified and screened for usability the information will be coded in the personal laptop of the researcher. The computer that will contain the data is password protected, only the researcher knows the password to the laptop to be used.
5. Once the information from the surveys is coded then the original surveys will be destroyed via paper shredder.
6. The code book to be used for the data collected via the surveys will be kept in the home office of the researcher, away from the survey collection site.
7. The collected surveys will be collected in a lock box, of which only the researcher will have the key. The lock box will be chained to a non-removable table in the copy room which is a controlled entry room (only staff have access to this room).

The mailroom also has camera surveillance on the only entry and exits from the room.

8. Surveys will be collected by the researcher twice daily, once in the early morning hours and once later in the afternoon. This will lessen the chances of the box becoming full. The surveys collected from the lock box during the day will be placed in a locked file cabinet until the end of the school day (only the researcher will have the key to the cabinet).
9. All surveys collected will be taken home at the end of each school day.

**Describe provisions for ensuring necessary medical or professional intervention in the event of adverse effects to participants or additional resources for participants.**

If there are any issues that arise as a result of the survey, participants will be advised to speak directly to the researcher who will alert the appropriate school official (school counselor, principal etc.).

**H. BENEFITS TO BE GAINED BY THE INDIVIDUAL AND/OR SOCIETY**

**Describe the possible direct benefits to the subjects. If there are no direct benefits, please state this fact.**

There will be no direct benefits for the 8<sup>th</sup> grade participants as they will graduate before the results can be analyzed and discussed with the administration of GMS. The 6<sup>th</sup> and 7<sup>th</sup> grade participants will be able to benefit from programs that may be developed by the researcher and the principal as a result of the research. The researcher and the principal

have discussed using the research results as an impetus to set up programs for students that may be deemed as high risk for failure on the mathematics section of the CRCT.

**Describe the possible benefits to society. In other words, how will doing this project be a positive contribution and for whom?**

The results of the proposed research will add to the current body of knowledge regarding student mathematics achievement at the middle school level. The proposed research can be used as an impetus to establish programs that can help identify at risk students and give them the support necessary to help them have higher mathematics achievement scores. Depending on the results, the research can also be used to disprove the effects that educators may believe that parents education/ time spent can have on students. Armed with this new information schools can then refocus their resources in a manner that is more beneficial to students.

**I. INVESTIGATOR'S EVALUATION OF THE RISK-BENEFIT RATIO**  
**Here you explain why you believe the study is still worth doing even with any identified risks.**

The risk to the participants are that what can be considered sensitive information may be disclosed to their teachers and classmates regarding their parents background and home activities. Although the researcher understands that these risks are real and will take extensive measures to make sure that accidental disclosure of information does not occur, they are also not outside of the realm of information that is disclosed to teachers and administrators on a willing and or regular basis. The major difference is simply the scale of very focused information. The researcher brings this fact up to point out that disclosing

the type of information to be gathered in the study is not out of the norm for parents of school aged children and the gathering of this information in a more focused and concentrated fashion could potentially help all those involved. Although there is risk for emotional and or psychological harm the researcher believes that that the risk is minimal because teachers are disclosed this type of information all the time and are trained and expected not to prejudge and or treat students differently as a result. The potential benefits of this study could be; the establishment of programs to help students at risk of failing high stakes test, helping districts maintain the funding they so desperately needs to service their students and or the reallocating funds to areas and or programs that will better serve student needs. It is the opinion of the researcher that the listed possible benefits outweigh the small risk carried by the study participants.

**J. WRITTEN INFORMED CONSENT FORM** (*Please attach to the Application Narrative. See Informed Consent IRB materials for assistance in developing an appropriate form. See K below if considering waiving signed consent or informed consent*)

**L. SUPPORTING DOCUMENTS** (*to be attached to the Application Narrative*)

**Letter from the principal of the proposed site of research, permission e-mail from NCCS to use their survey, as well as a copy of the proposed survey were as electronic documents as well as hardcopies to the indicated address.**

**M. COPIES:**

**For investigators requesting Expedited Review or Full Review, email the application along with all supporting materials to the IRB (irb@liberty.edu). Submit one hard copy with all supporting documents as well to the Liberty University Institutional Review Board, Campus North Suite 1582, 1971 University Blvd., Lynchburg, VA 24502.**

## APPENDIX C. CONSENT FORM

A Study of the Relationship Between Caregiver Education Level, Time Spent on School Activities, and Mathematics Achievement.

Ebony Allen  
Liberty University  
Education Department

You are invited to be a part of a research study that looks at how parent education level may or may not affect student math scores. The study will also look at how time spent with the parent on school work may affect student math scores. You were randomly chosen to be a possible participant in the study. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being led by: Ms. Ebony Allen, Education Department, Liberty University]

### **Background Information**

The purpose of this study is: To see how and if parent education level affects student math scores. The study will also try to decide if time spent with the parent on school work affects math scores.

### **Procedures:**

If you agree to be in this study, we would ask you to do the following things:

- 1) Fill out and sign the attached survey form as well as this consent form.
- 2) Have your child sign where asked.
- 2) Allow the researcher (a Cobb county teacher) to review your child's math CRCT scores as they are listed in county records.

### **Risks and Benefits of being in the Study**

The study has two main risks. First, while returning the survey, your child may lose or misplace it. As a result, a person other than the researcher may view your responses. The second risk would be if your child returns the survey without sealing the return envelope. This may allow the homeroom teacher or other person to view your responses to the survey

The chances of these risks are very small as long as your child returns the survey as instructed.

The main benefit of taking part in the study are; that Cobb county and ECMS may be able to use the results of this study to set up programs for students who may be at higher risk for failing the Math section of the CRCT.

**Possible Payment:**

All participants will be entered in a drawing for an MP3 player. The drawing will take place two weeks after survey collection has ended. Also, students who are in the homeroom that has the most returned surveys will receive a free donut breakfast. There will be one winning homeroom for each grade level.

**Confidentiality:**

The records of this study will be kept private. Any report we might publish will not include anything that will make it possible to identify any person. Research records will be stored securely. Only the researcher will be able to view the records.

All surveys will be stored in a secure location away from ECMS. Only the researcher will be able to view the surveys once returned to her in the sealed envelope provided. Any documents used by the researcher will be inputted into a secure computer program. At that time, all surveys will be shredded.

**Voluntary Nature of the Study:**

Taking part in this study is voluntary. Your decision to participate or not will not affect your current or future ties with Liberty University, ECMS or Cobb County schools. If you decide to participate, you are free to not answer any question. You also may change your mind at any time about participating.

**Contacts and Questions:**

The researcher leading this study is: Ebony Allen. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at ECMS, 770-578-2740 ext. 432, ebony.allen@cobbk12.org. (*Advisor- Lisa Reason, Education Department, Liberty University, 419-724-3391*)

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), **you are encouraged** to contact the Institutional Review Board, Dr. Fernando Garzon, Chair, 1971 University Blvd, Suite 2400, Lynchburg, VA 24502 or email at fgarzon@liberty.edu.

*You will be given a copy of this information to keep for your records.*

**Statement of Consent:**

I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Signature of parent or guardian: \_\_\_\_\_

Date: \_\_\_\_\_

*(If minors are involved)*

Signature of Investigator: \_\_\_\_\_

Date: \_\_\_\_\_

## APPENDIX D. PARENT EXPERIENCE SURVEY

**Parent Experience Survey** – To be filled out by the primary caregiver (individual that worked most with the child(ren) on school related activities in the previous school year (last year).

**We are interested in gathering information from our parents that will aid in a research project. The information gathered by this survey will be used to help our school understand our parents and community better. This survey will aid the school in better serving the community and making sure that all students are successful.**

**Your information will be kept strictly confidential. Your identity and the identity of your children will be kept anonymous. However in order for us to obtain correct data your child's full name must be listed in the space provided. Please place your completed survey in the envelope provided, seal it and have your child return it to his or her homeroom teacher.**

**Your participation is voluntary, but will be greatly appreciated. By returning this survey and signing your name below you give permission for the researcher to pull academic information from you child's records. This information will be kept completely confidential and anonymous.**

**Full Name of your child (Please print)**

\_\_\_\_\_

**Grade**

**Your Signature**

\_\_\_\_\_

**Please circle the one answer that best describes you.**

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**1) About how many hours during the average day do you spend with your oldest middle school child doing school activities? (homework, projects, paperwork etc.)**

**A- None (child works without my help)  
day**

**B- 1-30 minutes each  
day**

**C- 31-60 minutes each day  
day**

**D- 61-120 minutes each  
day**

**E- 121 minutes or more (more than 2 hours)**

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**2) About how many hours during the average week do you spend working for income?**

**A- None (Not working at this time)**

**B- 1-20 hours per week**

**C- 20-39 hours per week**

**D- 40-50 hours per week**

**E- 50 + hours per week**

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**3) Please indicate the highest level of education that you have completed**

**A- Less than**

**B- High school/GED**

**C- 2-yr Degree**

**D- Some Graduate School**

**H. S.**

**Some College**

**Technical Degree**

**Graduate Degree**

**Some Technical**

**Bachelors Degree**

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**4) What is your racial or ethnic identification (Select only one)**

**A- American Indian or Other Native American**

**B- Asian, Asian American, or Pacific Islander**

**C- Black or African American**

**D- White (Non-Hispanic)**

**E- Mexican or Mexican American**

**F- Puerto Rican**

**G- Other Hispanic or Latino**

**H- Multiracial**

**I- Other**

**J- I prefer to not respond**

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**\*If you give permission for the researcher to contact you if there are questions about your responses to any of the above, please indicate a telephone number in which you can be reached here on the line below.**

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**Thank you for your participation. Please seal your survey in the envelope provided and have your child return it to their home room teacher.**