THE EFFECTS OF MATH TUTORING SESSIONS FOR PARENTS ON EIGHTH GRADE STUDENTS' MATHEMATICS ACHIEVEMENT AND ANXIETY

by

Susan McFather Scott

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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ABSTRACT

Educators across the United States have searched for avenues to improve students' mathematics achievement since the publication of *A Nation at Risk* (National Commission on Excellence in Education, 1983) which reported that American students were behind students in other countries academically. Recent legislation, No Child Left Behind (2001), continues to address the need for improvement in mathematics among K-12 students. A possible intervention in middle school is to incorporate parental involvement. Numerous researchers (Colombo, 2006; Desimone, 1999; Epstein, 2008; Flynn, 2006; Henderson & Berla, 1994; Sheldon & Epstein, 2005; Wherry, 2006) have demonstrated the positive outcomes of parental involvement on children's education. This construct was investigated by analyzing the effects of math workshops for parents of eighth grade students on student math achievement and anxiety levels. Two theories form the foundation for the study: (a) Epstein's (1987) Theory of Overlapping Spheres which describes the behavioral practices of parental involvement and (b) Hoover-Dempsey and Sandler's (1995, 1997) Model of Parental Involvement, which is based on psychosocial constructs that affect the relationship between parental involvement and students' successes. A Nonequivalent Control-Group design and a Static-Group Comparison Design were used in the study with a sample of 105 eighth grade math students and their parents. Analysis of covariance (ANCOVA) was conducted for hypothesis one and a Two-Sample t-test was employed for hypothesis two. These statistical measures revealed no significant difference between eighth grade students' math achievement and math anxiety levels for students whose parents attended math workshops, and those students whose parents did not attend math workshops.

Dedication

This dissertation is dedicated to my family. Robert Scott, my husband and best friend, thank you for supporting me throughout this leap of faith. Without you taking on so many roles, I would not have been able to reach my goal. Moreover, because of your continual love and support, I was motivated to press forward; hence, I was able to achieve my dream. Your constant commitment to and belief in me provided a valuable security I needed. Just one of the many ways you demonstrated your love and support for me was our 20 hour round trip to Liberty University. My beautiful daughter, Carmen Haley Scott, you are the most precious daughter in the world; thank you for your patience and never ending love throughout my dissertation journey. There were times I could see the hurt in your eyes when I was working on my dissertation. Please know I would rather be reading, playing, and talking with you. Carmen, you are my heart. You were able to grasp at such a young age the importance of what mama was doing. Your specialness was highlighted each time we traveled together to Liberty University. I never will forget the time you told me, "Mama, I want to be with you every step of the way." Your comforting companionship enriched my trips to school. These moments were highly valuable, and I will never forget them. I pray that the example of commitment to the highest academic standards I have demonstrated to you will manifest in your life as you are already a very highly intelligent and hardworking young lady.

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At this point, I would like to offer a tribute to my parents Carl and Ann McFather, and my 12 siblings. Although my parents have gone on to be with the Lord, I trust that Mama and Daddy know what their youngest daughter has accomplished. Mama and Daddy, you set the stage in the first 9 years of my life and instilled in me the importance of academic excellence. I wish you could be here so you can celebrate with me in my accomplishment. I want you to know that the seed you planted in me has flourished, and I will continue to live out the legacy you established. I also express thanks to all of my brothers and sisters for your love and support. You all are so special to me and I am grateful to each and every one of you for holding on to the special bond of love that our parents instilled in us. I thank all of my siblings for their prayers, phone calls, and many talks with me. I could always sense our extraordinary bond and see it when we were together and communicating with one another. I also could feel the sincere love and concern when each one of you checked on me throughout this endeavor.

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support, and patience while I completed my doctoral degree. I love you dearly and cherish every moment which we have shared and anticipate the future years as we grow spiritually as a family.

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List of Abbreviations

Alpha level (α)

Analysis of Covariance (ANCOVA)

Criterion Referenced Competency Test (CRCT)

Georgia Department of Education (GaDOE)

Individualized Education Program (IEP)

Kuder-Richardson Formula (KR-20)

Math Anxiety Questionnaire Modified (MAQ-Modified)

National Coalition for Parental Involvement in Education (NCPIE)

National Commission on Excellence in Education (NCEE)

No Child Left Behind (NCLB)

Online Assessment Site (OAS)

Probability value (*p*-value)

Statistical Package for Social Science (SPSS)

CHAPTER ONE: INTRODUCTION

Over three decades ago, the authors of *A Nation at Risk* (National Commission on Excellence in Education [NCEE], 1983) reported that the educational system in the United States was headed in the wrong direction, and student academic achievement was behind that of other countries. Limits in mathematical skill were among the signs of this nation being at risk, and it was found that only one-third of 17 year old youth could solve multi-step problems (Lemke et al., 2004). Furthermore, international comparisons showed that the performance level of students in the U.S. was below the international average for mathematics literacy and problem solving (Lemke et al.). The message, conveyed by the authors of *A Nation at Risk*, was that the nation was in dire need of reform. This report concerned school leaders, parents, and ultimately, national leaders. As a result, the enactment of legislation became a preferred means to improve education in the U.S.

The Augustus F. Hawkins and Robert T. Strafford Elementary and Secondary School Improvement Amendments of 1988 included sections on accountability as well as sections on education, as recommended in the *A Nation at Risk* report (NCEE, 1983, as cited in Vinovskis, 2009). The Hawkins-Strafford Act went into effect in October 1988. This Act reaffirmed the role of the federal government to assist the states in regard to educational issues; also, it provided extensive funds for disadvantaged children. During the administration of President George H. W. Bush, education legislation was enacted by the members of Congress (e.g., the Educational Excellence Act of 1989). The 1989 Act was revised and the revisions were debated, and in February of 1990, the amended version was passed by the members of the Senate; however, it was ignored by the members of the House. Other legislation, such as the Equity and Excellence

in Education Implementation Act was debated, but it was never passed. Because of the growing concern about the educational dilemma in the U.S., more legislation (e.g., America 2000 and The Neighborhood Schools Improvement Act of 1993) emerged; however, these Acts were never enacted. During the Clinton administration, similar legislation was initiated and as during the Bush administration, was amended and debated. Some were enacted, such as Goals 2000, which passed in March 1994, and the Reauthorization of the Elementary and Secondary Education Act (ESEA), which was passed in October 1994.

National leaders expressed great concern about the state of education in the U.S., and their concerns were demonstrated in an abundance of legislation during the two decades which followed the report of *A Nation at Risk* (NCEE, 1983). However, school students across the nation continued to struggle in many subject areas. This perception of continuing mediocrity in education led to the enactment of the No Child Left Behind Act (NCLB; 2001).

Public Law 107-110, better known as the NCLB of 2001, was signed into effect by George W. Bush in 2002, and the intention of the Act was to guide educators in a reform of the U.S. system. This reform was driven by an emphasis on standards based education, which involved the use of achievement test scores as a means to demonstrate that the standards were being met (Jorgenson & Hoffmann, 2003). The law set high goals for many stakeholders including school leaders, teachers, and parents, to ensure that U.S. students achieve at high levels. The achievement of the high goals was to be demonstrated via students' ability to meet or exceed achievement levels set by members of the state legislatures and incorporated into mandated achievement tests.

One of the concerns of the NCLB (2001) was improvement of student achievement in mathematics. Although student achievement in mathematics has been held as a priority since

NCLB implementation in 2002, mathematics achievement continues to lag (Wise, 2008) and even decline. According to staff of the U.S. Department of Education (2008), the mathematics achievement of K-12 students continues to decrease, and there is a strong decline during the middle school years, in particular, when students engage in Algebra.

Another key facet of NCLB (2001) was that parents be involved in their child's education. Furthermore, it was specified in the Act that educators and parents should engage in two-way communication. Over the past several decades, numerous researchers (Colombo, 2006; Epstein, 2008; Flynn, 2006; Henderson & Berla, 1994; Sheldon & Epstein, 2005; Wherry, 2006) have conducted studies about the effects of parents being involved in their students' education. Many of the researchers have reported positive effects. However, parent involvement remains infrequent in many students' lives, especially in middle and high school (Deplanty, Coulter-Kern, & Duchane, 2007; Epstein & Van Voorhis, 2001; Sanders, 2008). The purpose of this research project was to investigate this important concern, the effects of parental involvement on their children, specifically during the middle school years.

In order to investigate the effects of parental involvement, two theories were used: (a) Epstein's (1987) Theory of Overlapping Spheres, which includes behavioral practices; and (b) a model of parental involvement developed by Hoover-Dempsey and Sandler (1995, 1997) which is based on psychosocial constructs. In both of these theories, the authors described concepts which operate as dynamic influences of the conditions under investigation in the study.

Students are the main focus of Epstein's (1987) Theory of Overlapping Spheres, and she conceptualized two models as components of her theory. In one of the models, there is an emphasis on partnerships between home and school to enhance students' achievement and success in educational endeavors. Epstein recommended school staff and students' parents form

partnerships in an effort to reinforce learning through behavioral modification. As the individuals who are within the two spheres of school and family continue to spend time together, the spheres will overlap. As the degree of the overlap of the spheres increases, the positive affect on the child is increased. The two spheres overlap via communication and collaboration. Possible practices in these arenas include: (a) communication between teacher and parents, (b) parents volunteering, (c) parents' attendance at school events, and (d) parents' participation in educational activities at home when they help their child with homework (Chen & Gregory, 2010; Epstein, Sanders, Simon, Salinas, Jansorn, & Van Voorhis, 2002).

The second construct, Hoover-Dempsey and Sandler's (1995, 1997) theory of parental involvement, is based on psychosocial constructs that affect the relationship between parental involvement and students' successes. Hoover-Dempsey and Sandler sought to address: (a) why parents become involved in their child's education; (b) how parents choose certain types of involvement to engage in; and (c) how parental participation has positive effects on students' educational endeavors (Chen & Gregory 2010; Hoover-Dempsey & Sandler; Hoover-Dempsey, Walker, Sandler, Whetsel, Green, Wilkins & Closson, 2005). Hoover-Dempsey and Sandler's theory of parental involvement is based on the belief that parents' motivation to become involved in their child's education is rooted in their personal beliefs about their shared responsibility in helping to educate their child and their sense of self-efficacy when they help their child to be successful in school (Hoover-Dempsey et al.). The parents' personal beliefs about helping their child and their sense of self-efficacy are effected by several factors including educators' practices in respect to parental involvement. This pattern creates an interactive spiral that seems to have the potential to strongly impact and support or challenge and even dampen parental involvement.

It was important to conduct this research project, because the findings may add to the knowledge base in regard to the effects of parental involvement on students' achievements through a focus on a particular type of parental involvement (i.e., learning at home), in one subject (i.e., math), and one subject in a specific grade level (i.e., eighth grade). The quasi-experimental study and associated math tutoring sessions for parents were conducted in an effort to understand how providing parents with the necessary tools to be able to help their child at home with math might impact student achievement and math anxiety. Because of the nature of the study, substantial information of benefit to eighth grade educators was acquired. The findings from this study will provide middle school math teachers with a model to employ for the initiation of parent involvement. The researcher will provide educators with a model to establish workshops and access to the information that was taught to parents in the parent math tutoring sessions. The findings will also provide information about math anxiety and the achievement outcomes of the eighth grade math students in this study.

Problem Statement

Parents are a dominant stakeholder in the U.S. educational system. However, many parents do not fulfill their responsibility to take part in their child's education. Although parents are sometimes involved with their child's schooling, there is a lack of parents who are engaged as partners with teachers in the education of their child as the child progresses through school (Deplanty et al., 2007).

This lack of parental involvement contributes to a substantial problem in regard to parents being able to help their child learn during the middle school years. As students enter middle school, the subject matter becomes more complicated and difficult for some parents to understand; therefore, it can be a challenge for them to help their child with homework.

Sometimes, parents simply do not know how to communicate in the language of the discipline with their child (Bal & Goc, 1999; Griffin & Galassi, 2010). When parents lack adequate knowledge of skills in particular subjects, this can interfere with their ability to assist their child with learning, and there is potential for confusion and even losses in student achievement. Certainly, these parental barriers exist when parents try to help their child with math homework, as the math content requires abstract thinking skills in the discipline in order for a second party to be of assistance (Balli, Demo, & Wedman, 1998; Hyde, Else-Quest, Alibali, Knuth, & Romberg, 2006).

In contrast, Overstreet, Devine, Bevans, and Efreom (2005) found that, when parents who struggled with mathematical concepts, were provided with the opportunity to learn the mathematics skills their children were taught at school, they were more willing to assist their child at home. Moreover, Epstein and Van Voorhis (2001) and Hoover-Dempsey et al. (2005) noted that, when teachers initiated parental participation by invitation and provided activities for parents to help their child with learning at home, most parents were more willing and able to help their child with homework. Furthermore, Epstein and Van Voorhis emphasized that teacher initiation of parent participation and teacher initiation of communication are key factors for parents to become and stay involved in their child's education.

More attention should be given to the subject of mathematics to improve students' comprehension and application (Sheldon, Epstein, & Galindo, 2010). Although students in the U.S. are taught to learn and explore mathematics from kindergarten on, by middle school, many students struggle to learn mathematics concepts. As a result, many U.S. students fall short in mathematics in comparison to students in other countries. A possible solution is that parents and educators need to work together in an effort to increase students' understanding of math concepts

and to improve math scores among students in the United States (Sheldon & Epstein, 2005). To address this issue, teachers must initiate partnerships and implement a range of activities with parents in order to assist students to learn math (Sheldon et al., 2010). Since parents may lack understanding of the applicable math concepts, because the subject curriculum matter becomes more complex in middle school, the challenge is an even greater hurdle to accomplish. Although a great obstacle, a need for understanding mathematics exists for both students and their parents; the necessity for parents to get involved in their child's mathematics education also remains critical (Bal & Goc, 1999). Once parents are provided with the tools to learn the concepts, they may be more willing and able to help their child in math (Overstreet et al., 2005).

Parental involvement is important, and evidence of its positive impact on student achievement is present in much of the literature. In these research studies, positive relationships have been found between parent and family involvement in schools and children's: (a) academic achievement, (b) attendance, (c) attitude, and (d) continued education (Colombo, 2006; Epstein, 2008; Flynn, 2006; Henderson & Berla, 1994; Sheldon & Epstein, 2005; Wherry, 2006). According to staff of the MetLife Foundation (2008), there is a positive correlation between the level of family involvement and student achievement; the more extensive the family participation, the greater the impact it has on student achievement. Additionally, in a Harvard Research Project directed by Jeynes (2005), the meta-analysis found that parental involvement has a positive association with higher student achievement. Clark (2007), Jacobs and William (2007), and Michaels, Dittus, and Epstein (2007) reported in their studies that parents' participation in their children's education positively affected the children's achievement. Moreover Melhuish, Sylva, Sammons, Siraj-Blatchford and Taggart (2001) found that parental involvement is linked to: (a) higher academic achievement, (b) greater cognitive ability, (c)

greater problem-solving skills, (d) more school enjoyment, (e) higher school attendance, and (f) fewer behavioral issues at school.

Based on the literature, it is evident that parents should be involved in their child's education, and when they become involved, there are positive results. However, how to involve parents is a dilemma that still exists for many educators, especially in mathematics (Sheldon et al., 2010.)

While there is much literature in which the authors demonstrated the positive effects of parental and family involvement on students' academic success; there has been modest research in regard to teacher's initiation of this involvement (Balli et al., 1998; Wedman, 1998). Strategies for teachers to consider are inviting parents into their classrooms and providing them with tutorials when needed. These activities might enable parents to respond in a positive manner. This study addressed, in part, the use of tutorials as a way to enhance parental involvement.

Purpose of the Study

The focus of this study was on the provision of tutoring sessions for parents, so that they could help their child learn the concepts of mathematics and be able to complete their mathematics homework. Moreover, participation in the math tutoring sessions may encourage the development of two-way communication between parents and teachers, which the authors of the NCLB (2001) identified as a form of communication that should be utilized. The workshops are intended to have a domino effect; once parents receive training, they should be able in turn, to help their child to learn math at home.

Parental involvement is classified into various types of activity (Epstein, 2005) which includes: (a) volunteering, (b) communicating, (c) decision making, (d) collaboration, (e)

parenting, and (f) learning at home. The element "learning at home" was chosen for this study because, according to Acock and Demo (1994) and Harris and Goodall (2008), the learning at home type of parental involvement is acknowledged as the most direct face-to-face form of parent participation. Additionally, parents are able to nurture their child through their demonstration of affection and support while they engage in homework activities with their child and can also help address the child's subject anxiety. According to Bempechat (2004), homework is present in a child's academic world over time, and one purpose is to help motivate achievement. As a pedagogical practice, homework plays a critical, long-term role in the development of children's achievement motivation. "Homework provides children with time and experiences to develop positive beliefs about achievement, as well as strategies for coping with mistakes, difficulties, and setbacks" (p. 189). Furthermore, Bempechat noted that, when parents encourage and help their child to do homework, it motivates the child to want to achieve.

The purpose of this study was to determine, whether the provision of mathematics tutoring session for the parents of eighth grade middle school, mathematics students increases their mathematics achievement and lessens their mathematics anxiety levels.

Research Questions

Two research questions guided this quantitative study.

RQ1. Is there a difference in mathematics achievement between eighth grade math students whose parents participate in the math tutoring sessions and eighth grade math students whose parents do not participate in the math tutoring sessions?

RQ2. Is there a difference in mathematics anxiety levels of eighth grade math students whose parents participate in the math tutoring sessions and eighth grade math students whose parents do not participate in the math tutoring sessions?

Hypotheses

The following null hypotheses were tested.

H1: There will be no significant difference in students' scores on the Number Sense and Equation Posttest (Scott, 2012) between students whose parents received tutoring sessions and students whose parents did not receive tutoring sessions.

H2: There will be no significant difference in students' scores on the Math Anxiety Questionnaire-Modified (Wigfield & Meece, 1988) posttest between students whose parents received tutoring sessions and students whose parents do not receive tutoring sessions.

Identification of Variables

The experimental treatment in this study was 1.5 hour tutoring sessions for eighth grade math students' parents, which was related to the students': (a) math coursework, (b) number sense, and (c) operations. The workshops were conducted by an outside math professional who does not teach eighth grade math in the school, in order to control for bias. The workshops were provided on a weekly basis for six consecutive weeks. The Experimental Group, those who received the treatment, were 87 parents of eighth grade math students who attended a middle school in southwest Georgia. The Control Group, those parents who did not receive tutoring, were the 88 parents of eighth grade math students who attended the same middle school in southwest Georgia.

The dependent variables in the study were students' posttest math scores and posttest math anxiety scores. These scores were obtained from the students' results on the Number Sense and Equations posttest (Scott, 2012) and the Math Anxiety Questionnaire-Modified (Wigfield & Meece, 1988) posttest.

Significance of the Study

Parental involvement is important, and it has been recognized historically that when parents are involved in their child's educational endeavors, it is more likely that the child will experience positive educational results (Chen & Gregory, 2010; Fan, 2001; Sheldon & Epstein, 2002). The provision of parent and family involvement has shown increases in children's: (a) academic achievement, (b) attendance, (c) attitude, and (d) pursuit of continuing education (Colombo, 2006; Epstein, 2008; Flynn, 2006; Henderson & Berla, 1994; Sheldon & Epstein, 2005; Wherry, 2006). Furthermore, the authors of the NCLB (2001) emphasized the importance of parental involvement as a strategy to guide adolescents through school and to academic success (Deplanty et al., 2007). According to Wherry (2003), parents are a child's first and most influential teacher, and children will model their parents' behavior. Because parents have such a dynamic influence, both Epstein and Van Voorhis (2001) and Griffin and Galassi (2010) maintained that educators should collaborate with parents as they are powerful resources in the education of children.

Although previous researchers (Colombo, 2006; Epstein, 2008; Flynn, 2006; Henderson & Berla, 1994; Sheldon & Epstein, 2005; Wherry, 2006) have demonstrated that parental involvement has shown positive results in student achievement, it should be noted that various studies (Atkinson & Forehand, 1979; Desimone, 1999; Epstein & Van Voorhis, 2001; Fan &Chen, 200; Hill & Craft, 2003; Steinberg, Lamborn, Dornbusch, & Darling, 1992; Seginer, 1983) have provided a variety of definitions of parental involvement. These definitions have ranged from parental beliefs, expectations, and attitudes to more active parent participation such as help with homework, volunteering, and communication (Hong & Ho, 2005). Furthermore, there seems to be a gap in the literature in regard to middle school mathematics achievement and

specific types of parental involvements. Much of the literature about parental involvement in the middle school years has been focused on parents' values related to involvement as opposed to statistical outcomes in regard to parental involvement within specific curricular subjects. In addition, the gap may be due to the multidimensionality of parental involvement (Hong, Yoo, You, & Wu, 2010).

To increase parents' involvement, specifically in respect to their child's learning and application of mathematical concepts, it seems advisable to utilize parental involvement strategies and encourage parents to develop a partnership with their child's teacher. Ultimately, a child's education is largely impacted by the child's home endeavors. According to Harris and Goodall (2008), parental engagement in children's learning in the home makes the greatest difference to student achievement (Harris & Goodall). Because of the vital importance of parental involvement, the researcher proposed to conduct this study to determine whether the provision of workshops for parents would increase math achievement and lessen math anxiety levels in eighth grade math students as a result of their parents' parental involvement in their child's learning at home.

Definition of Core Terms

Analysis of covariance (ANCOVA): "A procedure for determining whether the difference between the mean scores of two or more groups on one or more dependent variables is statistically significant, after controlling for initial differences between the groups on one or more extraneous variables" (Gall, Gall, & Borg, 2010, p. 632). This statistical procedure is employed to evaluate the difference between mean scores by adjusting mean posttest scores for initial differences between the groups on the pretest.

Control Group: A group of participants who do not receive the treatment. In this current study, the Control Group consisted of students from families of parents who did not receive tutoring sessions.

Covariate: "A covariate is an independent variable whose influence on the dependent variable is controlled by analysis of covariance" (Gall et al., p. 157). To elaborate, a covariate is a variable, which is related to the dependent variable, and it is incorporated in the experiment to adjust the results for differences that exist among the subjects prior to the experiment. In this study, the covariates will be the pretests.

Experimental Group: In the current study, the Experimental Group consisted of students from families of parents who received tutoring. Each tutoring session consisted of 1.5 hours per week for six consecutive weeks.

Individualized Education Program (IEP): A legal document that specifies a student's special education program. An IEP includes the child's disability, the services that will be employed for the student, the child's yearly goals, and any accommodations that will be provided to assist the child in learning.

Kurtosis: "Kurtosis is a measure of whether the data are peaked or flat relative to a normal distribution" (NIST/SEMATECH, 2012, section 1.3.5.11). Data sets with high kurtosis have a distinct peak near the mean, whereas data sets with low kurtosis tend to have a flat top near the mean rather than a distinct peak.

Learning at home: This is when parents are involved with their child's learning outside the classroom in practices like: (a) interactive homework; (b) helping with homework; (c) nurturing the child through collaborative ventures; (d) discussions that pertain to homework; and (e) real life or future student plans like college, technical school, the

military, or careers (Epstein, 2005; Harris & Goodall, 2008). In the current study, learning at home will be defined as parents, who are involved with their child's math learning outside the classroom through processes such as interactive homework, helping with homework, nurturing the child through collaborative math ventures, and math discussions.

Mathematics Achievement: For the purpose of this study, mathematics achievement is defined as the score on the Number Sense and Equation (Scott, 2012) posttest.

Mathematics Anxiety: The "feelings of tension and anxiety that interfere with the manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary life and academic situations" (Richardson & Suinn, 1972, p. 551). The components of mathematics anxiety will be measured via the Math Anxiety Questionnaire-Modified (MAQ-Modified, Wigfield & Meece, 1988). The MAQ-Modified is an anxiety scale that consists of 11 items (i.e., questions), which measures mathematics anxiety in two components: (a) a negative affective reactions component and (b) a cognitive component (Wigfield & Meece, 1988).

Probability value (p-value): *p* value is the probability that a particular result will occur by chance if the null hypothesis is true (Howell, 2011).

Skewness: "Skewness is a measure of symmetry, or more precisely, the lack of symmetry. A distribution, or data set, is symmetric if it looks the same to the left and right of the center point" (NIST/SEMATECH, 2012, section 1.3.5.11).

Statistical Package for Social Science (SPSS): A software application for performing statistical calculations.

T-test: A t-test is a statistical procedure for comparing the means of two samples or treatments.

Chapter Summary

An overview of legislation impacting the U.S. educational system over the last three decades was provided in this chapter. This overview began with the report of *A Nation at Risk* (NCEE, 1983) and progressed into the era of the NCLB (2001). Among the key concerns in the U.S. educational system is students' performance in the area of mathematics. The researcher identified substantial points emphasized in the NCLB (2001) in regard to improvement of the U.S. educational system. Among the important points noted in NCLB was the inclusion of parental involvement in students' education. The positive effects of parental involvement in children's educational endeavors were noted. The purpose of the study, the theories which guided the study, and the need to carry out the study were addressed. The research questions, hypotheses, and definitions of core terms were presented as well. In Chapter Two, the researcher will provide an in depth review of the literature.

CHAPTER TWO: REVIEW OF THE LITERATURE

Over the last few decades, much research has been conducted on the topic of parental involvement in schools and how it affects students' academic performance. This topic has been given national attention and has effected and changed national legislation. The members of the National Parent Teacher Association (PTA; 2000) have given enormous attention to the issue of parents' engagement in their child's education, as this engagement has shown to have positive effects. The PTA members believe so strongly in parents being an integral part of the child's education, that they worked closely with the members of Congress to make parental involvement a national priority. This was reflected in the amendment of policies on parental participation in the Elementary and Secondary Education Act (ESEA), and this Act was signed into law in 2002 as Public Law 107-110, better known as the No Child Left Behind Act (NCLB; 2001).

Although in recent years, legislation has been and still is in place to encourage and support parental involvement in schools, many educators, especially at the middle and high school level still perceive lack of parental involvement as an issue (Epstein, 2005; Pate & Andrews, 2006; U.S. Department of Education [DOE], 2007). The education of students should be a shared experience or partnership as suggested by Epstein (1987) in her Overlapping of Spheres Theory. Many educators feel that lack of parental involvement is the reason that: (a) students' grades decline, (b) homework is not completed, (c) students have a negative attitude toward school attendance, and (d) students have very little motivation to learn. Provided in this chapter, the review of literature, is an overview of how researchers have conceptualized parental involvement and academic achievement. Readers will learn about specific biblical principles related to parents and their children. Additionally, readers will learn about two theories and a

model, which supports parental involvement. Other topics, which will be addressed, are: (a) the types of parental involvement, (b) how parental involvement affects students' academic achievement, (c) why parents choose not to be involved, and (d) how educators can encourage parents' involvement in their children's academic careers.

Academic Achievement and Parental Involvement Conceptualized

Since this dissertation is about the effects of parental involvement on students' academic achievement, it is essential to provide the reader with an understanding of both academic achievement and parental involvement. Following is an overview of how researchers have conceptualized academic achievement and parental involvement, and these terms have been defined for the purpose of this dissertation.

Academic Achievement

Academic achievement can be measured and observed. However, for the purpose of this study, it will be defined narrowly and with a limited number of indicators. Fan and Chen (2001) reported that measures of academic achievement can be indicated by test scores and grade percent average (GPA). Cordry and Wilson (2004) extended the Fan and Chen definition of academic achievement when they added graduation from school as academic achievement. Also, they identified other factors as indicators of academic achievement, such as: (a) completion of homework, (b) a positive attitude toward school, (c) placement in advanced classes, and (d) appropriate behavior in school. The measure of academic achievement employed in this study was student outcomes on national mandated standards by means of the Number Sense and Equation Posttest (Scott, 2012).

Who Is a Parent?

It is essential to define who a *parent* is to fully understand what is meant by parental involvement. As defined in the NCLB (2001) the term, parent, refers to a natural parent, a legal guardian, or other individual who acts in *loco parentis*. This means a parent is not limited to one who is a biological parent, but could be an individual such as a grandparent or any person who is legally responsible for the child's well-being. To illustrate the reality that not all children grow up with a direct relationship to a biological parent, one need to go no further than the researcher's personal childhood experience, which has had a strong influence on her beliefs in regard to the definition of a parent. This researcher lost both parents at the age of nine years old. This tragic incident changed the researcher's life forever. The researcher was raised by an older brother along with 12 biological siblings, which was certainly a nontraditional experience. This experience serves as evidence that some children are reared in environments by individuals other than their biological parents. However, the researcher was fortunate that an older brother stepped in and took on the role of parent and became involved in every aspect of raising her, including being involved in her education. The researcher's biological parents were her first teachers, in that, they nurtured her spiritually and emotionally, which has made a lasting impact on her life. However, her older brother became her leader because he assumed the parental role and continued the legacy of her biological parents. Along with the researcher's personal childhood experience, her teaching experiences have made her aware of the various types of parents, by whom students are being raised including: (a) biological parent(s), (b) foster parents, (c) grandparents, or (d) siblings. Persons filling the role of guardian for students who occupied any of these statuses were included as parents in the study.

Parental Involvement

The term, parental involvement, which is referred to in the NCLB (2001), is most commonly seen as parents participating in two-way communication with teachers in regard to student academics and other school activities. According to Pate and Andrews (2006), parental involvement is defined as: (a) to know about and know how to be involved in schoolwork, (b) to understand the relationship between parenting skills and student academic success, and (c) commitment to consistent communication with educators about student progress. Greene and Tichenor (2003) supported and extended the parental involvement definition of Pate and Andrews (2006); they observed that parents are engaged in their child's educational process when they: (a) develop their parenting skills, (b) pursue and encourage positive communication skills between home and school, (c) volunteer, (d) provide learning opportunities at home, (e) contribute to decisions that affect schooling, and (f) collaborate with the community in support of the school.

Significance of Parental Involvement

The success of students, when parents are involved, has been repeatedly demonstrated; thus, parental involvement in their child's education is recognized nationally as well as at each school as a best practice. This is the case because parents are the most important people in a child's life, and their influence on their child will markedly enhance good behavior and academic performance (Canter, 2001). Canter cited and reported the results from the *Instructor* magazine poll of 1989 and the Phi Delta Kappa/Gallup Poll of teachers in 1966; in both polls, it was found that educators were very much in favor of support from parents. Although legislators and educators support parental involvement, the development of effective participation remains a mystery in many schools. With the passage of NCLB (2001), the staff of Title I schools must

meet the minimal requirements for parental involvement, which were mandated to continue the receipt of federal funding. Many school staffs do just the minimum and do not pursue partnerships with families in order to provide evidence of parents' involvement in their child's homework and the presence of parents in schools on a daily basis.

Although parental partnerships and evidence of parental involvement is lacking, especially as children progress through school, Epstein (1995) maintained that this phenomenon could be reversed. Furthermore, parents desire to gain information from educators that will enable them to help their child. Moreover, Epstein emphasized that it is the goal of nearly all educators and school leaders to help parents to become involved in their child's education, but some may be fearful, and they may lack the expertise and collaboration skills to do so. Finally, nearly all students want their parents' help and are willing to help bridge the communication gap between school and parents. Bempechat (2004) emphasized that children need to be aware that their instructors and parents believe in their ability to gain knowledge and master new skills. Once children know that both parents and teachers are actively involved in their education, it is more likely that the children's success will increase.

Epstein (2001) reported that optimal parent participation is not easily accomplished. Zill and Nord (1994) reported that there is a natural decline in parental involvement as students advance throughout their years of school. To prevent this decline, parents, school staff, and community members must be willing to work together to curtail the barriers that hinder successful parent involvement (Epstein). First, teachers must be aware of the many benefits entailed in parental involvement. The education of students should be a shared responsibility between teachers and parents, because parents place their child in the school to ensure their child's academic success (Epstein, 2005). Further, Epstein emphasized that teachers are able to

give parents relevant information about what their children learn as well as provide the tools the parents can use to help their children. In return, the parents provide teachers with valuable information about the children that the teacher would not know otherwise; thus, a bridge is established between home and school, which increases the coordinated efforts of both parents and teachers toward a common goal.

Ultimately, parents play a vital part in a child's life. School staff and parents must establish bonds in order to aid in children's school successes. When these actions transpire, a shared understanding develops about what the child will learn and the skills that need to be developed. When teachers broaden their perception of educating students through the building of cohesive relationships with parents, a partnership is formed.

Biblical Perspective and Researcher's Viewpoint

The researcher's understanding of the Bible is the basis for her beliefs about children and parental involvement. God's word expresses that children are a blessing.

> Psalm 127:3-5 states, Behold, children are a heritage from the LORD, the fruit of the womb a reward. Like arrows in the hand of a warrior are the children of one's youth. Blessed is the man who fills his quiver with them! He shall not be put to shame when he speaks with his enemies in the gate.

Moreover, the Bible states that each child is wonderfully made. In Psalm 139:13-16, it is stated,

> For you formed my inward parts; you knitted me together in my mother's womb. I praise you, for I am fearfully and wonderfully made. Wonderful are your works; my soul knows it very well. My frame was not hidden from you, when I was being made in secret, intricately woven in the depths of the earth. Your eyes saw my unformed

substance; in your book were written, every one of them, the days that were formed for me, when as yet there was none of them.

Along with passages where it is expressed that children are special and a blessing, God's word expresses how parents are to be involved in their children's life. The father is to rule over his family, including the children and to take care of them. In I Timothy 3: 4, it is stated, "He must manage his own household well, with all dignity keeping his children submissive." The Bible further reveres parents as children's leaders. In Ephesians 6:1-3, it is stated,

> Children, obey your parents in the Lord, for this is right. Honor your father and mother (this is the first commandment with a promise), that it may go well with you and that you may live long in the land.

These scriptures emphasize that parental involvement has been acknowledged as a major factor of a child's success since the family unit was created, and parents are responsible for the training their child receives (Schultz, 2002). This emphasis extends back to the early chapters of the Bible (Genesis 18:19), "For I have chosen him, that he may command his children and his household after him to keep the way of the LORD by doing righteousness and justice, so that the LORD may bring to Abraham what he has promised him."

The Bible also presents several references about children and the responsibility of parents to their children (Deuteronomy 6: 6-7; Proverbs 13:24; Proverbs 23:13; Ephesians 6:4). These scriptures clearly portray that parents are responsible for their child and his/her upbringing and instruction.

Schultz (2002) maintained that the home is really all that is necessary to train and educate a child, but allows that many parents delegate their children to others (i.e., schools) to help in the education process. Although children attend school, parents must realize that they share their

child with the school in the educational process (Epstein, 2005). It is essential that schools should be perceived by parents as being educational institutions, whose purpose is to assist parents' with their responsibility for the education and rearing their child. Furthermore, parents should not expect school staff and teachers to take the place of parents' primary responsibility to educate their child (Ephesians 6: 1-4; 1Timothy 3:4-5).

Because this researcher is a Christian educator, God's word plays an integral role in her theoretical viewpoint and educational philosophy. The researcher's personal teaching philosophy has a significant influence on her beliefs regarding parental involvement issues, which in return drives this research study. The following is an excerpt of the researcher's teaching philosophy which expresses a vivid backdrop of the theoretical framework of this study.

> Train up a child in the way he should go: and when he is old, he will not depart from it (Proverbs 22:6 KJV). It is the parents' responsibility to train their child, and as a teacher, I assist parents in educating their children. Furthermore, I assume the role of *in loco parentis* in the classroom. As a teacher, I will also follow in my Savior's footsteps through following his word. According to Psalms 32:8 (NIV), "I will instruct you and teach you in the way you should go; I will counsel you and watch over you." I firmly believe that it takes both, parents and the teacher, to motivate, stimulate, instruct, model, discipline, encourage, and lead students. Because of this, I am a proponent of parental involvement. Believing that parents are the foremost individuals in a child's life and that their influence on their child will significantly enhance good behavior and academic performance (Canter, 2001), I think that educators should take the initiative to form partnerships with students' parents. Furthermore, I believe educating students should be a shared responsibility between teachers and parents, because parents share the child with

the school staff to ensure their child's future success (Epstein, 2005). When children hear the same message and language of the standards at home as they hear at school, students may acquire an enhanced opportunity of being successful in their educational endeavors.

Along with a biblical perspective of and the researcher's viewpoint regarding the importance of parental involvement in their child's education, this study is also driven by researched based studies. Much of the research about the impacts of parental involvement makes a connection between family and schools.

Theoretical Framework

The following theories, the Theory of Overlapping Spheres (Epstein, 1987) and the Model of Parental Involvement (Hoover-Dempsey & Sandler, 1995, 1997), are employed in the study. Application of these theories may provide a basis for school staff to overcome the challenge of incorporating learning at home programs that align with a holistic view of the learning experience. Learning outside of school is not limited to the completion of school assignments. Epstein (1995) redefined homework as not only the completion of homework assignments by oneself, but also as working on subject related activities with others such as: (a) a parent, (b) a friend, (c) another family member, or (d) an individual within the community. The tutoring sessions for parents in this study are intended to provide them with the necessary tools to assist their child in learning at home. As a result of parents' participation in the tutoring sessions at school, they will have the opportunity to learn the language of the discipline of mathematics. Furthermore, they may increase their ability to adequately explain homework concepts in a manner that assists their child. Endeavors of this sort fulfill the goal of the Theory of Overlapping Spheres; that is, parents and school personnel spend time together and the content of communication about a topic becomes the same in both spheres. When parents learn

the vocabulary and the language of the discipline (i.e., mathematics) taught at school during the tutoring sessions, they will be able to apply it at home with their child. Furthermore, because the tutoring sessions provide parents with the necessary tools to assist their child with learning at home, parents will be more influential. Parents will be taught and will then be able to utilize the mechanisms of: (a) encouragement, (b) modeling, (c) reinforcement, and (d) instruction. These mechanisms correspond strongly with the third level of Hoover-Dempsey and Sandler's model of parental involvement, which is Mechanisms through which Parent Involvement Influences Child/Student Outcomes.

The fourth level of Hoover-Dempsey and Sandler's (1995, 1997) model of parental involvement, which is Tempering/Mediating Variables, corresponds to Epstein's (1987) Theory of Overlapping Spheres. Both theories are concerned with the engagement of the appropriate influential mechanisms, which reflect the child's age. These mechanisms are impacted by the family's belief system and the school philosophy. As the individuals within both spheres (i.e., family and school) spend time together, potentially, both spheres will align with the same beliefs and expectations and will positively impact the child, who is the focal point of both theories.

Theory of Overlapping Spheres

Epstein's (1987) Theory of Overlapping Spheres is one of the models of parental involvement, which was chosen to support this study and is reflected in the design of the study as the ideal for parental involvement. To fully comprehend Epstein's theory of overlapping spheres, one must grasp the idea of Bronfenbrenner's (1979) theory and understand what took place in educational reform prior to Bronfenbrenner's theory. This is important because Epstein used Bronfenbrenner's theory as the basis upon which she created her own theoretical model (Keyes, 2000). During the 1970s, the period which preceded Bronfenbrenner's theory, parental

involvement was beginning to emerge as an element of school reform. This was during the effective schools movement, in which parental involvement was perceived as a component that would assist in the improvement of students' success in school (Epstein, 1996; Spring, 2008).

Bronfenbrenner's (1979) Ecological Model emerged during the time when educational theory was becoming prevalent and was being utilized to accommodate the changing societal needs and goals. Bronfenbrenner's Ecological Model impacted educational theory through his emphasis on the impact of the interconnectedness of students' school and home environments. Bronfenbrenner's model, referred to as the Theory of Overlapping Context, directs attention to the mutual accommodation of the child's home and the larger environments in which the home is a part (Keyes, 2000).

Bronfenbrenner's (1979) theory can be visualized as the layers of an onion. The model consists of four layers which are the: (a) microsystem, (b) mesosystem, (c) exosystem, and (d) macrosystem. The microsystem is the innermost layer, which is the child's immediate setting (i.e., home) of the developing person, and the outermost layer is the macrosystem level, which refers to the values, laws, and customs of the culture that influence all inner layers. The different layers of the system continuously interact and influence one another, and these layers never operate in isolation. Each layer has an effect on a child's development, and changes in any one layer will ripple throughout the other layers. Therefore, the ecological structure demonstrates that there is connectedness between the layers of the system (Keyes, 2000). When this theory surfaced in the educational realm, school leaders viewed the home life of a child as a major influence on a child's success in school. This elicited further research efforts, which examined how students' experiences in and outside of school affect one another in regard to their academic

endeavors. Therefore, researchers began to focus on how various environments influence students' success (Epstein, 1996; Keyes).

Epstein's (1987) models of the Theory of Overlapping Spheres were developed in the 1980s, and her six types of parental involvement followed. Epstein's models of the theory of overlapping spheres are similar to Bronfenbrenner's (1979) ecological theory. Both Epstein's theories and Bronfenbrenner's theory describe environments that interact with one another to influence the child. Furthermore, the focus of Epstein's theory supports a similar conclusion as Bronfenbrenner's, in that, communication between the domains could help students achieve success (Epstein, 1996; Keyes, 2000).

Epstein's (1987) Theory of Overlapping Spheres has two models: (a) one articulates the influence of the home, school, and community with the child as the center of attention; and (b) the other articulates the influence of the home and school with the child as the focus (Epstein, 2002). All three spheres are important. However, family and schools seem to have greater influence on the child in his or her education (Epstein). The education of students should be a shared experience or partnership as suggested by the overlapping spheres in the theory. When educators reach out to parents or vice versa, teacher/parent partnerships may form. This is the ultimate basis of Epstein's overlapping spheres of influence theory.

Deslandes (2001) examined two of the three spheres. The overlapping spheres model represents two *institutions,* which are the student's family and school, since these are the two places where students spend most of their time. In the overlapping spheres of influence model, partnership is encouraged through parental involvement. The emphasis is on viewing parental involvement as an option for parents or schools, since it is an essential ingredient to the academic success of students. However, these realms of activity are affected by three forces: (a) the

child's age, (b) family beliefs, and (c) the philosophy of the particular school. It is noted that there is more overlap during the early years of a child's schooling and that drift tends to occur as the child ages, unless parental involvement is encouraged from individuals within the school or initiated by family members (Epstein, 1995). The three forces can either enhance or diminish the child's education depending on how they affect the spheres.

The objective of Epstein's (1987) Theory of Overlapping Spheres is that the spheres should overlap as the teacher, parent, and child spend time together. When this happens, the family and school staff can come closer to utilizing the same communication patterns, because the amount of time they spend together increases the contextual and content overlap of the spheres. Thus, the language patterns become similar in both settings. Then, through continuous practice of patterns, characteristics in both spheres become similar, and genuine partnerships are established between the family and school. This partnership creates a framework for the home and school to act as one unit in which shared activities transpire to achieve a common goal. When school staff understand Epstein's theory of the overlapping spheres and activate it, there is potential for a dynamic joint venture to be formed which can produce lasting effects throughout the child's schooling (Epstein, 2002; Deslandes, 2001).

Hoover-Dempsey and Sandler Model of Parental Involvement

The second theoretical framework that drives the study is the Hoover-Dempsey and Sandler's (1995, 1997) model of parental involvement. The model is based on psychosocial constructs that affect the relationship between parental involvement and students' successes (Walker, Wilkins, Dallaire, Sandler, & Hoover-Dempsey, 2005).

Hoover-Dempsey and Sandler's (1995, 1997) theory addresses: (a) why parents become involved in their child's education, (b) how parents choose certain types of involvement in which

to engage, and (c) how parent participation has positive effects on students' educational endeavors (Chen & Gregory 2010; Hoover-Dempsey & Sandler, 1995; Hoover-Dempsey et al., 2005). Moreover, the model was intended to describe the process of parental involvement in order to attain the ultimate goal, positive student outcomes (Walker et al., 2005).

Hoover-Dempsey and Sandler's (1995, 1997) model of parental involvement is a theoretical map constructed of five levels, and each level is built on a previous level of knowledge. Each stage of the map outlines options for the construction of new knowledge, and these options surface as a result of particular avenues of knowledge taken at the previous level. Each phase influences the prior one; the model culminates in the fifth level, known as student outcomes. Student outcomes, as envisioned by Hoover-Dempsey and Sandler, are best described as student's achievement, skills, and sense of self-worth about school successes (Griffin & Gallassi, 2010; Walker et al., 2005).

Level 1 of Hoover-Dempsey and Sandler's (1995, 1997) model of parental involvement is focused on the motivational constructs, which influence a parent's decision to become involved. These include: (a) parents' beliefs about parental roles, (b) parents' understanding of efficacy as they try to help their child to be successful in school, (c) parents' perceptions of general and specific invitations by the school, and (d) parents' perceptions of specific child invitations (Hoover-Dempsey & Sandler, 1997; Walker et al., 2005).

In Level 2 of Hoover-Dempsey and Sandler's (1995, 1997) model of parental involvement, as reported by Walker et al. (2005), the focus is on the circumstantial issues that affect parent involvement, and occurs once parents make the commitment to become involved. Some of these issues are the amount of time and energy it will take to help their child, as well as the parents' skills and knowledge about the particular subject matter.

In Level 3 of Hoover-Dempsey and Sandler's (1995, 1997) model of parental involvement, as reported in Walker et al. (2005), the mechanisms through which parent involvement influences the child are addressed. These include: (a) encouragement, (b) modeling, (c) reinforcement, and (d) instruction. Another concern is the students' perceptions of the mechanisms employed by parents. This issue is the background for the movement toward the next level of Hoover-Dempsey and Sandler's theoretical map of parental involvement (Griffin & Gallassi, 2010; Walker et al.).

In Level 4 of Hoover-Dempsey and Sandler's (1995, 1997) model of parental involvement, it is theorized that the mechanisms, which parents employ with their child, must be appropriate for the child's developmental age in order to yield positive results in the subsequent level (Walker et al., 2005). Also, in this stage, the researchers emphasized that it was important that the parental mechanisms fit or align with school expectations. This level is labeled as a Tempering and Mediating period. The way parents assist their child and the way students perceive and respond to their parents' assistance is a work in progress during this stage. How the parents' and students' interactions coalesce with each other will be manifested in the final stage. This mediating experience is thought to elicit students' intrinsic motivation to: (a) learn, (b) enhance self-regulatory strategies, and (c) heighten their self-efficacy (Griffin & Gallassi, 2010; Walker et al.).

Level 5 of Hoover-Dempsey and Sandler's (1995, 1997) model of parental involvement, as reported in Walker et al. (2005), represents the climax, student outcomes, which are measures of student achievement such as skills and knowledge. Also, measures of students' efficacy for doing well in school are considered an element of student outcomes (Griffin & Gallassi, 2010; Walker et al.).

Recently, there has been much emphasis in the educational research done and legislation proposed regarding education in the U.S. on the importance of parents being involved as a partner in their child's education. This is a central point in both theories (Epstein, 1987; Hoover-Dempsey & Sandler, 1995, 1997), and it contributed greatly to this researcher's decision to base this current study on both theories.

According to Hidalgo, Siu, and Epstein (2004), over three decades ago, educational researchers began to contest the theories of social organizations, in which it was held that organizations worked best when they operated separate and independent of others. However, since that time, there has been an increase in the number of studies (Atkinson & Forehand, 1979; Barth, 1979; Desimone, 1999; Henderson & Berla, 1994; Seginer, 1983; Sewell & Hauser, 1980; Sheldon & Epstein, 2005; Steinberg, Lamborn, Dornbusch, & Darling, 1992; Wherry, 2006), which pertain to parental and family involvement in educational organizations (i.e., schools) and students' academic affairs. This increase is an effect of the accountability movement in the schools. This movement began after the members of the National Commission on Excellence in Education (NCEE; 1983) published the report, *A Nation at Risk.* Based on this report, innovative plans were made ways to reform the U.S. schools.

Around the time of the publication of *A Nation at Risk* (NCEE, 1983), there were continued efforts to develop educational theory about the effectiveness of the link between the school and home. This emphasis, on the importance of parental involvement in schools and the recognition that the education of students is a shared responsibility between parents and educators, was critical to the reformation of schools (Epstein, 1996). One of the ways to reform schools was to include the student's home life in the child's educational setting (i.e., school) by means of invitations and various forms of communications (Masumoto & Brown-Welty, 2009).

As schools underwent reformation, Epstein noted that it was evident that "neither schools nor families alone could do the job of educating and socializing children and preparing them for life" (p. 210), since the education of students should be a shared responsibility between parents and the school. This concept is the underlying theme of Epstein's Theory of Overlapping Spheres. Furthermore, Epstein's theoretical models mirror the logic of Covello (Banks, 2004) who emphasized that students were shaped by their experiences within and outside of school, as well as the environments in which they live and not merely by the influences of their educators.

Masumoto (2009) reported that several school reforms came about because of the need for accountability, that is, the Goals 2000, Educate America Act. Eventually, school reform "culminated at the national level by the implementation of the No Child Left Behind Act of 2001" (p. 2). Under each of these reforms, the members of Congress offered funding to states to enable districts and schools to establish programs that partnered with parents and families (Epstein, 1996). In the NCLB Act of 2001, the necessity of parents, families, and school staff working together to produce successful academic students was accentuated (Michael, Dittus, & Epstein, 2007).

Fan and Chen (2001) noted that the continuous research on school and parent involvement is compiled as parental involvement and is multidimensional and complex, and to approach it as simple would be misinformed. Furthermore, it is advisable to examine the effects of parental involvement, based on a holistic approach that incorporates the behavioral and psychosocial dimensions of parent participation (Chen & Gregory, 2010). Behavioral dimensions are present in Epstein's (2002) typology of parental involvement and are visualized in her Theory of Overlapping Spheres. In addition, psychosocial dimensions are represented in

Hoover-Dempsey and Sandler's (1995, 1997) model of parental involvement (Chen & Gregory, 2010; Fan & Chen).

Types of Parental Involvement

Often, parents are involved with their child's schooling in regard to field trips with their child or to help in fund raisers, but it is more complex when there is a need to help their child learn. Many times, parents simply do not know how to help. To assist with the challenges of parental involvement, one may consider the use of the Epstein, Sanders, Simon, Salinas, Jansorn, and Van Voorhis (2002) parenting strategies. According to Epstein et al. "a framework of six major types of involvement has evolved from many studies and many years of work" (p. 12) in regard to parental involvement; these six typologies are known as Epstein's six types of parental involvement. Along with the six typologies of parental involvement, strategies for each type have been developed. Epstein's types of parental involvement include parenting, communicating, volunteering, learning at home, decision making, and collaboration (Epstein, 2005; Epstein et al.). According to Sheldon, Epstein, and Galindo (2010), the use of

> "strong partnership programs with activities including the six types of involvement which focus on specific academic and nonacademic goals have helped schools reduce student behavior problems, improve student attendance, improve test scores, and increase students' report card grades and standardized achievement test scores" (p. 30).

As reported by Henderson and Mapp (2002), many researchers have utilized the Epstein et al. (2002) six types of parent involvement or Epstein's (1987) Theory of Overlapping Spheres as a theoretical framework. In the publication, *A New Wave of Evidence* (Henderson & Mapp), the findings from 51 studies were evaluated; these studies included: (a) descriptive case studies, (b) correlational studies, (c) pre-experimental studies, (d) quasi-experimental studies, and (e)

experimental studies. The focus of these studies was on family or parental involvement and its effects on students' academic achievement and success. The overarching theme of the report was that "families and parents have a major influence on their children's achievement in school and through life" (p. 7). The participants in the studies ranged from early childhood through high school aged students, as well as students and family members from numerous regions of the U.S. and diverse populations.

The types of parental involvement and an overview of each are presented in Table 1 (Epstein 2005; Epstein et al., 2002). Hammack, Foote, Garretson, and Thompson (2012) maintained that the Epstein et al. (2002) six types of parental involvement are avenues or ways by which parents can connect with school staff in support of their children's education. This connection is a major concern of the members of the National Parent Teacher Association (National PTA; 1997). The PTA, along with the cooperation of professional members of the National Coalition for Parental Involvement in Education (NCPIE) utilized Epstein's model of the six types of parenting as a guide to develop its standards, the National Standards for Parent/Family Involvement Programs. The focus of these Standards is on what school staff should do to encourage parents and families to be involved in their children's learning experiences. "The National Standards for Parent/Family Involvement Programs were created to be used in conjunction with other national standards and reform initiatives in support of children's learning and success" (National PTA, p. 1). During the years which followed the creation of the National Standards for Parent/Family Involvement Programs, the members of the National PTA (2000) continued emphasis on the need for school staff to involve parents and families in their child's academic endeavors. Therefore, the National Standards for

Parent/Family Involvement Programs, which were developed in 1997, became the standards, which school staffs currently use in order to encourage family involvement.

Table 1

Types of Parental Involvement

Type 1	Parenting	Basic obligations of family, such providing for the health and nutrition of the child and setting home conditions to support learning. For example, state learning expectations, limit television, and set times for study.
Type 2	Communicating	Basic obligation for the parents and school staff to communicate with each other, whether through notices, memos, report cards, conferences, or school functions to find out about academic performance and child's progress in school.
Type 3	Volunteering	Parent involvement at school, such as volunteering and attendance at school events.
Type 4	Learning at Home	Parent involvement at home, such as provision of activities like music, dance classes, interactive homework or discussion of future plans for college.
Type 5	Decision Making	Parents involved in school decision making, like PTA, parent councils, or parent workshops.
Type 6	Collaboration	Parents' active collaboration with community organization to increase family and student access to resources like scouts, sports, and museums.

(Epstein 2005; Epstein et al., 2002)

Provision of the National Standards for Parent/Family Involvement (1997) programs can bring a heightened awareness of the approaches that school staff can use to promote parental involvement. However, Epstein et al. (2002) and Henderson and Mapp (2002) developed an initiative that combined the efforts of parents, schools, and communities to work together as partners to support students' successes.

These insights regarding parent, school, and community partnerships brought about a revision in the National Standards for Parent/Family Involvement Programs (National PTA, 1997). The National PTA (2008) members had shifted their emphasis toward parent, school, and community partnerships that enhance students' achievements and accomplishments, rather than emphasis only on what school staff could do to promote parental involvement. Therefore, the members of the PTA revised and renamed its standards, the National Standards for Family-School Partnerships. An implementation guide was designed for the revised standards for schools to use as a tool to assist in the development of partnerships with parents (National PTA, 2009). With guidance and support from school leaders, along with the education of parents about Epstein's types of involvement, parents may increase their involvement levels, which may yield positive relationships between school personnel and parents. As reported by Hammack et al. (2012), regarding schools where Epstein's parenting model has been implemented the model has been "useful in promoting parent friendly practices" (p. 105).

According to Epstein et al. (2002), Epstein's types of parental participation set a pattern for effective involvement, whether the parent is involved at home, in school, or in the community, which are the three communal areas involved in shaping children's success (Epstein 2005; Epstein et al.; Zill & Nord, 1994). When this involvement framework is incorporated in schools, it assists educators in their development of comprehensive plans of school-family-community partnerships (The Parent Educator, 2004). Each type of involvement has particular challenges that must be met in order to involve all families. Some of the challenges may be to: (a) provide workshops, (b) ensure that parents receive information about their child's learning, (c) provide interactive homework that will involve family members, and (d) discover ways to

collaborate with parents. In order to meet these challenges, various practices can be utilized by schools with families and community to enhance student achievement.

Practices, Challenges, and Redefinition of Terms for Parenting Types

For each of the types of parental involvement, Epstein et al. (2002) provided examples of practices or activities, challenges, and redefinitions of the vocabulary of traditional partnerships. These practices, challenges, and redefinitions are useful for school staff and educators in order to enhance parent participation throughout students' entire schooling.

Parenting. Sample practices for the support of the parenting type of activity include, but are not limited to, workshops, website pages, and home visits to provide information on parenting that supports the development of the child and the child's success in school at each grade level (Epstein et al., 2002). A major challenge for school staff is to provide information to all families, not just to the few parents who attend school activities on a regular basis. An example of a redefinition of a term developed by Epstein is the understanding of workshop. Epstein uses this word to refer to making information available in several formats such as via the internet or audio cassette disc in order for all families to have access, rather than just being able to hear the information at the school building in one meeting (Epstein et al.).

Communication. Sample practices of communication between the school and home, as envisioned by Epstein et al. (2002), include: (a) yearly conferences with every parent, (b) interpreters to assist families whenever needed, (c) student work sent home on a regular basis, (d) report card pickup, (e) school newsletters, (f) annual surveys, and (g) the provision of clear information about all programs. A major challenge for school staff is to ensure that the communication is clear and understandable in all of the printed materials to be viewed by parents. Another challenge is to obtain ideas from parents or family members to improve

communication. Epstein's redefinition of terms in this arena is communication about school programs and student progress, in particular, two-way avenues of communication. Epstein believes that there are multiple avenues, rather than just a single avenue between home and school. These should include connections from home to school and community to school rather than the basic school to home style of communication (Epstein et al.).

Volunteering. Epstein et al. (2002) recommended a new definition of the term, volunteer, as an individual who supports the school and student success in any way and at any time or place, rather than just a person who comes to the school during regular school hours. Sample practices for parents' volunteerism which could help teachers, students, or administrators at school and in all areas include: (a) chaperone a field trip, (b) participate in a booster club, or (c) tutor students in class or after school. Epstein believes school staff should conduct an annual survey to identify parents who are interested in volunteering. Furthermore, it is her view that school staff should provide a family room or center for volunteers to feel comfortable and welcome and that class parents should be provided with contact information such as a telephone tree. The involvement of volunteers brings challenges for schools, such as the need to: (a) recruit from all of the populations they serve, (b) provide equitable service to and from the volunteers, (c) be warm and welcoming, (d) reach all the needy parties with volunteer services, and (e) ensure that all volunteers feel useful to and appreciated by the school. In addition, it is a challenge for staff to: (a) be flexible with time, (b) create training for parents, and (c) allow parents to volunteer for areas in which they have talent or interest.

Learning at home. Epstein (1995) emphasized that *help* at home means how family members "encourage, listen, guide, and discuss" (p. 705) assignments with their students. Some examples of the learning at home type of parental involvement are, provide: (a) information

about skills for each subject at each grade level; (b) information on how parents can help their child improve; (c) interactive homework activities that allow students to work with their parents or another family member; (d) weekly planners of assignments for students or students and parents; and (e) assistance to establish academic goals. The challenges related to incorporating learning at home programs are to design and employ a schedule for interactive homework and involve families in decisions related to the curriculum (Epstein et al., 2002). Epstein (1995) redefined homework as not only individual completion of assignments, but also the completion of activities with others, whether it is the child's parent, sibling, friend, or someone in the community.

Decision making. Epstein (1995) redefined decision making as a collaborative process that entails working together to reach shared goals, rather than decisions being made by one individual. The decision making type of parental involvement is demonstrated in the following practices: (a) parent/teacher organizations; (b) councils; and (c) committees such as curriculum, personnel, or leadership committees. In addition, decision making may be executed via networks. Epstein defined the parent leader as a liaison, who shares information and obtains ideas from families and community members, rather than a parent who only attends school related meetings (Epstein et al., 2002). Some of the challenges that school staff have with the decision making type of parental involvement is to ensure that parent participation includes parents from the various races, ethnicities, and socioeconomic status (SES) groups that make up the school population.

Collaboration with community. Epstein (1995) redefined community when she emphasized that community refers to any local setting, entity, or group, whether formal or informal, which supports the learning of students in the school. Furthermore, Epstein

emphasized that community is not labeled by high or low SES status, but by all people and organizations available to support students and families and who make up the school (Epstein et al., 2002). The collaboration with community type of parental involvement includes practices such as the dissemination of information to families about community programs: (a) community health, (b) recreational events, (c) social support groups, (d) counseling, (e) summer programs, (f) recycling projects, and (g) tutoring programs. Another example would be to encourage alumni to participate in school programs for the students. The challenge for school staff in the collaboration with community type of involvement is to: (a) be able to compromise on where to hold various collaborative events, (b) provide the news to families concerning community programs, and (c) ensure that families can participate in the available services.

How Parental Involvement Affects Students

There is an overwhelming amount of research (Colombo, 2006; Epstein, 2008; Flynn, 2006; Henderson & Berla, 1994; Sheldon & Epstein, 2005; Wherry, 2006) in which the researchers were able to demonstrate an important correlation between parent and family involvement in schools and children's: (a) academic achievement, (b) attendance, (c) attitude, and (d) continued education. According to staff of the MetLife Foundation (2008), there was a positive correlation between the level of family involvement and student achievement; the more far reaching the family participation, the greater the impact it had on student achievement. Additionally, the meta-analysis in a Harvard Research Project directed by Jeynes (2005) found that parental involvement has a positive association with higher student achievement. In addition, there are several studies (Clark, 2007; Jacobs & William, 2007; Michael et al., 2007), in which the findings were similar to those from the Harvard Research Project and the MetLife Foundation. These researchers found that parents' participation in their children's education

positively affected the children's achievement. Also, Melhuish, Sylva, Sammons, Siraj-Blatchford, and Taggart (2001) found that parental involvement has been associated with: (a) higher academic achievement, (b) greater cognitive ability, (c) greater problem solving skills, (d) more school enjoyment, (e) higher school attendance, and (f) fewer behavioral issues at school.

Numerous researchers (Epstein, 1995; Henderson & Mapp, 2002; Hough, 2004; Jackson & Davis, 2000) have emphasized that parental involvement in their child's formal education is a collaborative endeavor between families and schools, and it can result in children being successful both academically and in life. A form of collaboration is when parents and educators communicate with each other. This was described in the NCLB (2008) as two-way communication, a form of communication that was strongly recommended. Two-way communication is important, and it has been identified as an area, where both teachers and parents want more from each other, in order to educate the student for whom both the parents and teacher share responsibility (Balli, Demo, & Wedman, 1998).

Other researchers (Epstein, 2005; Epstein et. al., 2002; Simmon-Morton & Crump, 2003) maintained that parents must remain involved in the lives of their children after elementary school, because modern life is so complex, and students need their parents' support. However, too many parents are not actively involved in their child's education after elementary school.

Reasons Parents Are Not Involved in Their Child's Education

Epstein's (2001) findings demonstrated a strong connection between the school climate and the extent to which parents and families are involved in their children's educations. Henderson and Mapp (2002) emphasized that parents as well as families may not become involved if they do not feel that the school milieu (i.e., the social and educational tone of a school), is one that is welcoming and presents a sense of respect, trust, and desire for parents to

be there. Beyond the school climate and environment, there are several causes that limit parental involvement in their child's education. According to Bal and Goc (1999), some causes may include: (a) parents do not have training or academic skills, (b) both parents have to work, (c) a large number of non-English speaking family members or families who cannot communicate effectively in the language of the school setting, and (d) teachers who are resistant. Bal and Goc elaborated that, as children progress into middle school and on to high school, the subject matter becomes more difficult and challenging for parents, and many do not remember or may not have ever truly learned how to do the work their children are being asked to complete. Their previous failures may also add to their frustration, and they simply choose not to help their child. Because parents may have inadequate skills in many subject areas, they tend to avoid school matters.

When both parents have to work in hourly wage positions, outside a 9-5 schedule, or face economic hardships which require multiple jobs, they may have to choose between work and attendance at school events (Bal & Goc, 1999). The need to work can prevent parents from having the time to volunteer at the school, as well as help their child do his or her homework at home.

Bal and Goc (1999) emphasized that non-English speaking families face cultural barriers in addition to language barriers, which may cause parents to distance themselves from communication with their child's teacher and lead to feelings of inadequacy. Colombo (2004) and Graham-Clay (2005) agreed with Bal and Goc, that the addition of cultural difficulties creates a challenge not only for the non-English speaking parents, but also for teachers and potentially impairs parent teacher communication; in turn, this limits the development of a partnership. Also, they noted that teachers may be hesitant to welcome parents into their classrooms. Since some teachers contact parents only about a student's inappropriate behavior

and poor grades, parent participation is likely to be restricted. If these negative circumstances cause problems between the teacher and the parent, there can be a domino effect that spills over to the child. When this happens, a bond is very hard to form, and it leaves the child in a bad situation. Given that these obstacles exist, and that parents have a dynamic effect on their child, educators and school staff must overcome these barriers by establishing avenues that will encourage parents to be involved so their students can become academically successful.

How to Get Parents Involved

Collaboration between parents and school is an integral part of students' academic success, and this collaboration must be valued by school staff, in order to simultaneously build and thus fortify partnerships. To strengthen the parent connection, Buttery and Anderson (1997) reported that teachers and school staff can improve parent involvement if they: (a) project a positive, welcoming attitude toward parents; (b) institute clear and effective communication; (c) listen to parents when they voice their concerns; (d) promote the development of parent networks; and (e) recognize and appreciate different degrees of parent participation. Other researchers (Callahan, Radanmacher, & Hillreth, 1998; Olympia & Sheridan, 2004; Zarate, 2007) have suggested that school staff should offer workshops (e.g., provide ideas, activities, tutoring sessions) in which parents can learn how to be effective homework mentors and help their children with school work at home. In these workshops, teachers should be available to actually teach parents the standards or concepts of a subject area, which their child will learn in the upcoming weeks. Moreover, there should be a place set aside on the campus of the school exclusively for the purpose of parents, who can use this facility for: (a) networking, (b) parent meetings, (c) parent-led committees, and (d) organizations in order to create a positive environment for parents.

In order to encourage parents to be fully engaged in their child's education, Epstein (2002) advised that the six types of parent involvement should be used to establish a partnership with students' families. Based on the information provided earlier about these types, it would seem especially important for middle school staff to employ the communication patterns set forth in Epstein's parent involvement typologies and strategies. When school staff provides activities, information, and workshops for families that address each of the six types of involvement, it opens a window of opportunity for parents to become drawn in to the school environment and to participate in the school-led learning of their child at home.

To ensure high levels of parental involvement, school staff should take the initiative, rather than wait for parental involvement to develop on its own. When school staff, teachers, and students initiate parental involvement through general and specific invitations, it is more likely that high levels of parental involvement will develop (Gonzalez-Dehass & Willems, 2003; Hoover-Dempsey & Sandler, 1997). As noted previously, in the first level of the Hoover-Dempsey and Sandler model of parental involvement, the authors emphasized that invitations were among the most effective motivational constructs which influence a parent to make the decision to become involve (Hoover-Dempsey & Sandler; Walker et al., 2005).

Under the NCLB (2001), school staffs are responsible for the incorporation of parent involvement; however, numerous researchers (Buttery & Anderson, 1997; Callahan, Radanmacher, & Hillreth, 1998; Epstein, 1995, Epstein et al., 2002; Staples & Diliberto, 2010) have maintained that teachers are the essential constituent, within the school sphere, and are responsible for the initiation of dynamic partnerships. Educators must perceive parental involvement as a major element in the development of these partnerships. The logical extension of Epstein's (1987, 1995, 1996, 2001, 2005) work would be for teachers to reach out to parents

to inform them about their child's positive behaviors and academic achievements. In the literature, Buttery and Anderson (1997) Sheridan (2004) and Zarate (2007) emphasized that parents should be allowed to meet or attend special events during non-traditional school hours. Furthermore, teachers should extend themselves to encourage parents to be engaged with their child, not only at home, but also in the school through volunteering in and outside of the classroom or just visiting the school. For example, home visits could be made by trained educators, who are of similar cultural backgrounds to the parents, so parents will not feel alienated. Staples and Diliberto (2010) stated that, "Home visits bridge the gap between home and school by breaking down barriers with parents such as limited time for school visits and feeling unwelcomed" (p. 61). During home visits, educators could obtain means to use non-traditional ways to contact parents, such as ask parents for: (a) alternative phone numbers like cell phone numbers, (b) telephone numbers of relatives, or even (c) email addresses. Teachers could provide the same kind of information to the parents in order to have more means of communicating with them.

In regard to communication with parents, it was suggested that teachers set the tone and cordially invite parents to pledge their time to volunteer in their classroom. The authors of Project Appleseed (2009) stated, "the key to successful parental involvement is parent pledges" (p. 2). These pledges are promises that parents will volunteer a certain number of hours at their child's school throughout the school year. Epstein (1995) emphasized the need for teachers to let parents know they are valued and appreciated for the time they give to ensure their child's and other children's success in school. Henderson and Mapp (2002) believed parents should be treated respectfully and be given the opportunity to express their expertise in regard to their child's: (a) behavior, (b) health, (c) academic progress, and (d) activities with the teacher.

School staff and faculty should demonstrate their belief that parental involvement is important by the provision of multiple occasions for parents to become involved. These opportunities could be provided at various times to fit time schedules of parents (Staples & Diliberto, 2010).

The more teachers reach out and forge a relationship with parents, the more parents will feel welcome as they participate in school, which is an action that has a far-reaching effect on the child's academic success (Callahan et al., 1998; Graham-Clay, 2005; Henderson & Mapp, 2002; Olympia & Sheridan, 2004; Zarate, 2007).

Implications

Although a child can be trained and educated in the home, parents delegate oversight of their children to others (i.e., school staff and faculty) to help in the education process (Schultz, 2002). Therefore, the old African quote, which states that it takes a village to raise a child, could be amended to; it takes a village to educate a child. "There is no doubt that if the educational village - home, school, and community [the three spheres] are involved and supportive, students benefit" (Canter, 2001, p. 6). Parents choose to send their child to school to obtain an education. However, it is essential that parents realize that they have a responsibility to assist in the education of their child throughout the child's entire school years. It is also necessary that schools do their part to foster parental involvement.

Schools want parent involvement, but what seems to be a mystery is how schools can develop effective parent participation. Although legislative mandates have been put in place under the No Child Left Behind (2001), only minimal parent involvement exists in many middle and high schools. In the literature, Bal and Goc (1999, Graham-Clay (2005), and Henderson and Mapp (2002), state many reasons have been identified for the lack of parent involvement, but the

emphasis is on the effects of communication barriers. Lack of parental involvement seems to be due largely to the deficiency of communication between parents and teachers.

The concept that the education of children is a shared responsibility of the school, family, and community is present in Epstein's (1987) Theory of Overlapping Spheres. Furthermore, researchers (Epstein, 2005; Pate & Andrews, 2006) have referred to the stressors, which can be present, when lack of parental involvement exists in schools, for example: (a) students' grades may decline, (b) students' homework might not be completed, (c) students may develop a negative attitude about school attendance, and (d) there may be a decline in students' motivation to learn. Although parents may try to help at home, as lessons become increasingly harder, many parents lack the knowledge to help. Also, there is an implication that implies parents must participate beyond the home (Desimone, 1999; Epstein, 1987; Henderson & Berla, 1994; Seginer, 1983; Sewell & Hauser, 1980; Sheldon & Epstein, 2005; Steinberg, Lamborn, Dornbusch, & Darling, 1992; Wherry, 2006). They must pursue positive communication between home and school, and teachers are obligated to encourage parental participation as well. Although parents may help at home and volunteer at school during their child's earlier years, their presence is not evident at many schools and the help at home lessens after their child leaves elementary school. This seems to be because parents do not know how to help, and teachers do not provide an environment that welcomes parents. Also, parents are not involved as much as they should be because many parents work during school hours.

According to Buttery and Anderson (1997), school staff must provide an open and welcoming atmosphere for parents. This creates an opportunity to effectively communicate with parents and listen to their concerns. In return, teachers need to understand how to utilize parents in their classrooms and appreciate the various ways parents can participate. Parents can be

provided with workshops or tutoring sessions in order to re-teach or refresh parents' math and reading skills and, potentially, improve their effectiveness as tutors at home. The use of math tutoring sessions can be an avenue whereby two-way communication can be established between parents and teachers, which is specified in the NCLB (2001) as the form of communication that should be utilized. Moreover, a place on the school campus can be established for parents to use for: (a) networking, (b) parent meetings, (c) parent-led committees, and (d) organizations to meet. These efforts can be used to create positive environments for parents.

The literature emphasizes the importance of teachers doing their part to foster parental involvement through making more positive contacts with parents instead of negative contacts. The literature stresses that schools make arrangements for parents to meet or attend special events during nontraditional hours. Furthermore, the literature stresses that teachers go beyond the call of duty to get parents engaged, not only at home, but also in the school through volunteering or just visiting the school. For example, home visits can be made so parents will not feel intimidated. It is important to find other non-traditional ways to contact parents. Possible avenues for gaining contact information from parents are to ask parents for alternative phone numbers like cell phone numbers, means of contacting the parent through one of more relatives, or even email addresses; or it is possible for teachers to provide their home and cell phone numbers in order to have more means of communicating with parents. When teachers reach out to parents, parents are more likely to feel welcome to participate in school activities which will have a far reaching effect on children's academic success (Callahan, Radanmacher, & Hildreth, 1998; Mapp & Henderson, 2002; Olympia & Sheridan, 2004; Graham-Clay, 2005; Zarate, 2007).

Strategies must be put in place to improve the relationship between schools and parents that make it possible for teachers to interact with parents and change their perceptions. Middle school and high school students need parental support at school and at home just like elementary school students do. When parents are visible at school and at home in their child's learning, it sends positive messages to the child. Bempechat (2004) emphasized that parents are models that children follow. When children perceive their homework is important to their parents, it will be important to them, also. Moreover, Bempechat emphasized that homework plays a long-term role in students' achievement motivation.

To prevent parental involvement issues, when parents try to help their child learn and apply math concepts, strategies from the Epstein et al., (2002) typologies should be used. Among these strategies are workshops, which can be provided to parents so they can be tutored and trained in helping their child learn. Participation in the tutoring sessions may enable parents to understand the concepts or Standards that their child are required to know. With this information, parents can be better prepared to interact with their child about homework assignments (Balli et al., 1998; Epstein 2005; Epstein et al., 2002). A goal for the workshops is to assist parents so that, in turn, they will be able to help their child in learning.

When parents' change their perceptions and begin to collaborate with teachers, they have potential to make a positive impact no matter what age their child is. Based on the information in the review of literature (Eptein, 1995; Henderson & Mapp, 2002; Sheldon, Epstein, & Galindo, 2010), the changed perceptions and collaboration between teachers and parents has positive effects on students throughout middle school, and it carries over into the high school where student morale and increased graduation rates might be the result of continued parental support. In turn, this may help to support students who are equipped to go to college or prepared

to go into the workforce. The positive effect of parental involvement is an important tool for educators to have, and educators should use it for the advancement of the schools, community and, ultimately, U.S. society (Epstein 2005; Epstein et al., 2002; Simmon-Morton & Crump, 2003). Parents are the appropriate individuals, who can influence students' success in school, and school staff should provide a program in which the emphasis is on parental involvement throughout the child's entire education.

Parents are influential teachers in a child's life, and children model their parents' behavior (Canter, 2001). When children see their parents in the school building, and when the parents take part in their education, a positive message is sent to the children. In addition, this may influence children to have positive attitudes about school. Because parents have this influence, teachers should use them as important resources. Educators must court parents and develop a partnership. Partnerships of this type have been shown to have a positive impact not only in individual classrooms, but also in the community and ultimately the world, since well-educated and socially adjusted students become productive citizens (Wherry, 2003).

Chapter Summary

In this review of literature, the author summarized themes from the literature regarding the topics of parental involvement and academic achievement. She cited Biblical principles applicable to the relationship of children to parents as well as two theories about parental involvement. The Biblical principles and the parental involvement theories were the drivers of this research study. Varying specific aspects of these topics were addressed, including: (a) the types of parental involvement, (b) the effects of parental involvement on students' academic achievement, (c) the barriers to parental involvement, and (d) how educators can promote parental involvement. Chapter Three presents the methodology utilized in this research study.

CHAPTER THREE: METHODOLOGY

The purpose of the current study was to determine the impact of tutoring sessions in mathematics for parents of eighth grade middle school mathematics students on the math achievement of the students. The researcher also investigated the effect of math tutoring sessions for parents of eighth grade middle school math students on eighth grade students' math anxiety levels. The parent tutoring sessions consisted of weekly workshops, which were used to assist parents to understand the concepts and standards that their child was learning in the number sense and equation unit of their math class. In addition, the tutoring sessions for parents were used to train parents to help their child with math. It was hoped that parental participation in the workshops would have a domino effect; once parents received training, they would in turn, be able to help their child to develop and utilize math concepts.

The design, participants, setting, instrumentation, procedures, and analysis are presented in this chapter. In addition, the research questions, which were used to guide this study, are provided.

Research Questions and Methodology

Research Questions

The methodology for the study was two quasi-experimental research designs, and the designs employed were a Nonequivalent Control-Group Design and a Static-Group Comparison Design which were used to answer the following research questions.

RQ1. Is there a difference in mathematics achievement between eighth grade math students whose parents participate in the math tutoring sessions and eighth grade math students whose parents do not participate in the math tutoring sessions?

RQ2. Is there a difference in mathematics anxiety levels of eighth grade math students whose parents participate in the math tutoring sessions and eighth grade math students whose parents do not participate in the math tutoring sessions?

Research Method

Due to the notable importance of parental involvement on student outcomes (Epstein, 2008; Flynn, 2006; Henderson & Berla, 1994), the researcher executed two quasi-experimental designs to determine the impact of the provision of math workshops for parents on eighth grade student math achievement and math anxiety. Quasi-experimental research methods were chosen because random assignment was not possible, since the study was implemented in a middle school setting. Quasi-experimental research is the best design to use when the researcher desires to control and manipulate variables in an experimental method and when randomization of participants to each group is not possible (Gall, Gall, & Borg, 2010). To answer Research Question #1, the extraneous variables of the students' math achievement test scores were controlled for by the application of analysis of covariance (ANCOVA) statistical procedure.

The design employed to answer Research Question #1was a Nonequivalent Control-Group design. This design is often used in educational research and is the closest design to a true experimental design. It is a powerful design with the potential to yield useful knowledge (Gall et al., 2010). This design utilizes a pretest and a posttest, which makes it applicable to a study in which students' math achievement, is tested before the experimental treatment and then measured again following the experimental treatment. This allowed the researcher to observe changes that occurred and to determine if the changes were statistically significant. Also, the researcher chose this design because a control group can be used to rule out changes due to internal validity threats after the employment of the ANCOVA statistical test. Lastly, a major

reason that the researcher chose this design was because a convenience sampling of participants can be used, which is often the reasonable method for use in educational settings due to limits in the researcher's control over participant sorting and assignment within instructional settings.

The design chosen to answer Research Question #2 was a Static-Group Comparison Design. This design was chosen because of the lack of random assignment of the Experimental Group and the Control Group. Additionally, this design was chosen to answer Research Question #2 because a posttest, but no pretest was administered to both groups.

Hypotheses

The null Hypothesis, H1, was utilized to address RQ1, and the null Hypothesis, H2, was used to answer RQ2. The following null hypotheses were tested.

H1: There will be no significant difference in students' scores on the Number Sense and Equation Posttest (Scott, 2012) between students whose parents received tutoring sessions and students whose parents did not receive tutoring sessions.

H2: There will be no significant difference in students' scores on the Math Anxiety Questionnaire-Modified (MAQ-Modified; Wigfield & Meece, 1988) posttest between students whose parents received tutoring sessions and students whose parents do not receive tutoring sessions.

Participants

The researcher conducted the study in a rural middle school, and convenience sampling was utilized. The sample for this study consisted of eighth grade math students at a rural middle school and their parents. The sample included six eighth grade math classes in addition to the parents of the students in those classes. The six eighth grade math classes were taught by two different teachers. The students in two of the eighth grade math classes, Classes A and B, were

gifted and challenged students. The students in three of the eighth grade math classes, Classes C, D, and E, were regular education students. One of the classes, Class F was an inclusion math class, that is, students within this class consisted of both regular education students and students who have an individualized education program (IEP). The Treatment Group consisted of students and their parents for Classes A, C, selected students in class D, and selected students in class F. This sample included one gifted and challenged class, one regular education class along with selected students from another regular education class, and selected students from the inclusion class. The parents of students in the Treatment Group engaged in math tutoring workshops on a weekly basis for six consecutive weeks. The Control Group consisted of Classes B, E, selected students in class D, and selected students in class F. This provided a control group, which included one gifted and challenged class, one regular education class along with selected students from another regular education class, and selected students from the inclusion class, a sort equivalent to that of the treatment group. The parents of students in the Control Group did not participate in math tutoring sessions. This method of selection was chosen to seek equivalency in the treatment and control groups.

Setting

A middle school located in southwest Georgia, which draws students from a rural area including three small cities, was chosen for the study. The county in which the middle school is located has only one public school system, and the school system is comprised of one elementary school, one middle school, and one high school. The middle school in which the sample was drawn serves approximately 520 students. At the time of the study, 60% of the middle school student body was African American, 35% was Caucasian, and 5% was Latino. There were 175 eighth grade students, who attended the middle school, and all eighth grade students took math

each day for 100 minutes throughout the school year. Of the 175 eighth grade students, 105 of those students participated in the study. The remaining 70 students did not participate because the researcher taught those students. The eighth grade math teachers, who taught the 105 student participants, planned together and taught the same standards on a daily basis for their math classes. Each of the math teachers taught three math classes per day.

Choice of Setting

Parental involvement is important as demonstrated in the literature, which shows a significant connection between parent and family involvement in schools and children's academic achievement, attendance, attitude, and continued education (Colombo, 2006; Epstein, 2008; Flynn, 2006; Henderson & Berla, 1994; Sheldon & Epstein, 2005; Wherry, 2006). Because researchers have found a significant connection between parental involvement in schools and children's academic success, this researcher decided to conduct her study in a school setting. In addition, because of the researcher's deep concern for the improvement of math test scores and parental involvement at the middle school level, based on her professional involvement at this level of education, she decided to select a middle school setting to conduct this study.

Instrumentation

The independent variable in the study was parental participation in 1.5 hour math tutoring sessions, which were related to the students' coursework (i.e., number sense and equations). The workshops were conducted by a math professional who did not teach eighth grade math in the school. The workshops occurred on a weekly basis for six consecutive weeks. The Experimental Group, the participants who received the treatment, consisted of 55 parents of eighth grade math students attending a middle school in southwest Georgia. The Control Group,

those parents who did not receive tutoring, consisted of 50 parents of eighth grade math students attending the same rural middle school as the students in the Experimental group.

The dependent variables in the study were students' number sense and equation posttest math scores and students' posttest math anxiety scores. Both the number sense and equation posttest and the math anxiety posttest were administered to all of the students in the Experimental Group and the Control Group.

To answer RQ1, the researcher utilized a combination of questions from the Georgia Department of Education Online Assessment Site (GaDOE OAS, 2011-2012) and the Classzone website (Houghton Mifflin Harcourt Publishing, 1995-2008) to develop a math number sense and equation pretest/posttest. The researcher used the number sense math questions from the GaDOE OAS bank to develop the math pretest posttest, because the test items provided in the site are standardized questions aligned to the Georgia Performance Standards. Several sample test questions in the Georgia OAS bank are either released test items from previous Criterion Referenced Competency Test (CRCT) or test items similar to test questions on the math CRCT. Because the GaDOE provides educators with test items from previous CRCTs, which have high validity and reliability ratings, along with other test items which have been reviewed by educators, the items obtained from this source were utilized in the development of the tests for the study. The goal was for the tests to have high validity and reliability. Also, the researcher used questions from the Classzone website, because the website is used in conjunction with the math textbook (McDougal Littell, 2007), and textbook lessons are aligned to the state Standards. To create a reliable and valid number sense and equation pretest/posttest, the researcher followed the test development pattern described in Gall et al. (2010).

As suggested by Gall et al. (2010), the researcher created a preliminary version of the number sense and equation pretest/posttest that was aligned to the Standards found within the number sense and equation unit by the selection of items from the Georgia OAS bank and the Classzone website. This procedure provided face validity. Next, the number sense and equation pretest /posttest questions were critiqued by a team of math professionals within the school and by a team of math experts outside of the school environment. At the end of this process, the number sense and equation pretest/posttest was revised, and content validity was provided (Ary, Jacobs, Razavieh, & Sorenson, 2006). To find the reliability for the number sense and equation pretest/posttest, this researcher pilot tested these tests with a group of 50 eighth grade math students at the end of the school term, which was completed prior to the study. The Kuder-Richardson Formula (KR-20), a special case of Cronbach's alpha, was utilized to find the reliability of the number sense and equation pretest/posttest. The KR-20 coefficient for the pretest/posttest was 0.879 as calculated and based on scores from the number sense and equation pretest/posttest of the pilot test. The KR-20 is best used to find the reliability of a test when there is a right or wrong answer as in multiple choice questions (Ary, et al.). The results for the prepared test were strong as the closer the reliability coefficient is to 1, the more reliable the test (Gall, et al.).

To measure students' math achievement in the area of number sense and equations, students in the Treatment and the Control Groups completed the same Number Sense and Equation tests prior to the intervention and at the end of the treatment period. Both the pretest and the posttest were administered as paper and pencil tests. The number sense and equation pretest results were used as a covariate in the study. It was essential to use the number sense and equation pretest results as a covariate in investigations of this type, because pretest exposure can

influence the dependent variable, and it must be controlled for (Ary et al., 2010). In addition, it was important to use a covariate because the Treatment Group and the Control Group were not selected by random assignment. The ANCOVA statistical measure was employed, which eliminated concerns of initial significant differences between the Treatment Group and the Control Group. Utilization of the ANCOVA eliminated the main threat to the internal validity of a nonequivalent control group experiment, that is, group differences on the posttest are due to preexisting group differences rather than to the treatment effect (Gall et al., 2010). The results from the number sense and equation posttest were used to determine whether there were any significant differences in the mean test scores of the groups, as a result of the treatment.

To answer RQ2, the MAQ-Modified (Wigfield & Meece, 1988) was utilized. To measure students' math anxiety, all students in the Treatment and the Control Groups took the MAQ-Modified following the treatment period as a posttest. The MAQ-Modified was administered as a paper and pencil test. The MAQ-Modified consists of 11 Likert-type scale questions; the response range is from 1-7, and 1 represents the lowest math anxiety and 7 represents the highest math anxiety. There are two subscales on the MAQ-Modified, the negative affective reactions scale (i.e., 7 items) and cognitive worrying scale (i.e., 4 items). The Cronbach's alpha for each subscale is .86 and .76, respectively. The results from the MAQ-Modified (Wigfield & Meece, 1988) posttest were utilized to compare the math anxiety means of the Experimental and Control Groups in the study.

Variables, such as experimental treatment diffusion, compensatory rivalry by the Control Group, compensatory equalization of treatments, and resentment demoralization of the Control Group, were controlled by treating both the Treatment Group and the Control Group the same (Gall et al., 2010). Both groups of parents received the same notices and memos. The only

modification was that members of the Treatment Group participated in weekly tutoring sessions. Because the participants, who received tutoring, were parents of eighth grade students, the participants from both groups were not in close proximity to each other on a daily basis. Therefore, any rivalry between members of parent groups was unlikely. It was emphasized to the parents, that the content of the tutoring sessions be kept confidential. In the event that parents in the Control Group desired to receive tutoring sessions, they were encouraged to sign up for tutoring workshops that transpired during the following quarter.

External validity threats were minimized as much as possible. Since teachers often give pretests prior to teaching a unit and a benchmark test following units taught, the Number Sense and Equation Math (Scott, 2012) Pretest and Posttest appeared to be a standard procedure. Additionally, since teachers often give surveys at various times during the year about students' feelings or concerns about math, the MAQ-Modified (Wigfield & Meece, 1988) appeared to be a standard procedure as well.

To ensure generalization of the study findings to a target population, the following measures were employed.

1. The description of the participants was clearly described including demographics.
2. The sampling procedure was clearly described.
3. The sampling frame was described.
4. The completion rate was noted.
5. An explicit description of the experimental treatment was provided.
6. The Hawthorne effect was avoided by not giving special attention to participants and not providing information regarding the hypotheses (Gall et al., 2010).

Permission Procedures

Prior to conducting the study, the researcher discussed it with the Building Principal and the Superintendent of the School District in face-to-face meetings. Written permission was obtained from the Principal of the school and included in the researcher's Institutional Review Board (IRB) application. Next, permission to conduct the study was obtained from the members of the Liberty University IRB. Once IRB approval was granted, the researcher met with all teachers and personnel, who were to be involved in the conduct of the study. This ensured that everyone would be on the same page and understood the procedures that were to transpire throughout the study. The researcher sent letters to inform parents of the study; subsequently, consent and assent forms were obtained from the parents and students who participated in the study.

During the intervention period, attendance of the parent participants in the Experimental Group was monitored at each tutoring session to determine the percentage of parents, who attended all tutoring sessions. The parents were encouraged to be present at all tutoring sessions.

The intervention or treatment consisted of tutoring sessions, which parents participated in for six consecutive weeks. The treatment covered the math unit being taught to the eighth grade children of the parent participants, which included number sense and equations. The tutoring of the parents and the instruction of their children took place during the same six week period. The tutoring sessions were held each Monday evening from 6:00 to 7:30 pm. In these sessions, the parents were taught content related to the same Standards which their child learned that week. Parents practiced similar problems and participated in activities, which helped them to learn the Standards at the same time their child was learning them. Also, the parents were taught strategies to assist their child with weekly homework assignments. This procedure was followed so that

the parents had the same opportunities to learn the math and to facilitate their involvement as their child learned the same concepts.

A Nonequivalent Control-Group Design was used in the conduct of the study to answer Research Question #1 and a Static-Group Comparison Design was employed to answer Research Question #2. Therefore one pretest and two posttest instruments were utilized. To measure students' math achievement, a Number Sense and Equation Pretest (Scott, 2012), which was derived from questions in the GaDOE OAS (2011-2012) and the Classzone (Houghton Mifflin Harcourt, 1995-2008) website, was administered to eighth grade math students prior to the treatment of the parent math tutoring sessions. Following the treatment, the math tutoring sessions for parents which coincided with the Number Sense and Equation unit taught to students by their teachers, a Number Sense and Equation posttest and the MAQ-Modified posttest was administered to the eighth grade math students. The Number Sense and Equation posttest was administered the first day following the end of the Number Sense unit, and the MAQ-Modified was administered on the second day in a relaxed atmosphere. The researcher met with the math teachers and provided exact directions prior to student testing. The exact dates to administer and how to administer the pretest and posttest to students and how to administer the tests were discussed in detail during these meetings.

All of the collected student data were kept in a locked filing cabinet. Parent participant data were coded and locked in the same filing cabinet. The code information was stored in a separate locked storage area. The code information is necessary to decipher the data. Also, the data were placed in a computer data file, password protected, and stored on the hard drive of this researcher's school computer.

Data Analysis

After collection and organization of the data, the researcher used the Statistical Package for Social Scientists (SPSS; 2012) software to analyze the data. RQ1 was: Is there a difference in mathematics achievement of eighth grade math students whose parents participate in the math tutoring sessions and eighth grade math students whose parents do not participate in the math tutoring sessions?

To answer RQ1, the following null hypothesis was formed.

H1: There will be no significant difference in students' scores on the Number Sense and Equation Posttest (Scott, 2012) between students whose parents received tutoring sessions and students whose parents did not receive tutoring sessions.

An ANCOVA was used to test H1. This statistical measure was selected in order to control the extraneous variables of the students' pretest scores. In the ANCOVA statistical procedure, the Number Sense Pretest results were utilized as a covariate to determine the statistical differences between posttest results for each group of students. The ANCOVA was employed to determine whether there were any significant differences in math achievement between the students in the Treatment and the Control group. A two-tailed ANCOVA test, with an alpha level $\alpha = .05$, was employed to determine whether there was a significant difference in mean scores. When a two-tailed ANCOVA test is used, if the *p* values for the *F* statistic are less than $\alpha = .05$, and the null hypothesis is rejected. If the *p* values for the *F* statistic are higher than $\alpha = .05$, then the null hypothesis is retained. The results for RQ1 are presented in Chapter Four.

RQ2 was: Is there a difference in mathematics anxiety levels of eighth grade math students, whose parents participate in the math tutoring sessions, and eighth grade math students whose parents do not participate in the math tutoring sessions?

To answer RQ2, the following null hypothesis was formed.

H2: There will be no significant difference in students' scores on the Math Anxiety Questionnaire-Modified (MAQ-Modified; Wigfield & Meece, 1988) posttest between students whose parents received tutoring sessions and students whose parents do not receive tutoring sessions.

A Two-sample t-test was utilized to test H2. This statistical measure was chosen to compare the means of the MAQ-Modified (Wigfield & Meece, 1988) posttest results of the two groups (i.e., Experimental Group and Control Group). Ultimately, the Two-sample t-test was employed to identify potential significant differences in math anxiety between the Treatment and the Control Group. A two-tailed t-test with an alpha level $\alpha = .05$ was employed to determine whether there was a significant difference in mean scores. In the use of a two-tailed t-test, if the *p*-values for the *T* statistic are less than $\alpha = .05$, then the null hypothesis is rejected; if the *p*-values for the *T* statistic are higher than $\alpha = .05$, the null hypothesis is retained. The results for RQ2 are presented in Chapter Four.

A Two-sample t-test was chosen because it is useful when the researcher desires to compare responses from two groups, in this case the Experimental group and the Control group. Another reason it was chosen is that the RQ and hypothesis concern a psychological factor. A pretest would have been inappropriate in this case as it had the potential to introduce bias by informing participants of the hypothesis being pursued (Gall et al., 2010)

Summary

This chapter provided a detailed description of the: (a) design, (b) participants, (c) setting, (d) instrumentation, (e) procedures, and (f) analysis utilized in the study. In addition, the research questions which were used to guide this study were presented.

In Chapter Four, a detailed discussion of the results from the study, which was conducted in a rural middle school in southwest Georgia, is provided.

CHAPTER FOUR: RESULTS FROM THE STUDY

The purpose of this study was to determine the impact of math tutoring sessions on parents and whether the parent tutoring would help their eighth grade middle school students to improve their math achievement. In addition, the researcher investigated whether parents' participation in the math tutoring sessions improved the levels of math anxiety for the eighth grade, middle school math students. The parent tutoring sessions consisted of weekly workshops in which parents were provided lessons and activities regarding the concepts and Standards their child would learn in the number sense and equation unit of their math class. In the tutoring sessions, parents were also presented with ideas and activities to help their child to learn math at home. The overarching concept was that participation in the workshops would provide parents with tools to assist their child with homework. Once parents received training, they would, in return, be able to assist their child at home to develop and utilize math concepts.

This chapter is divided into three sections. The demographic data describing the participants in the study are presented. The two research questions, provided in Chapters One and Three, are addressed and the results from the data analysis are examined to determine the effectiveness of math tutoring sessions for parents of eighth grade middle school students as an intervention to impact their math achievement and math anxiety levels. Lastly, a summary of the findings is presented.

Demographic Data

The study was conducted in a rural middle school, and convenience sampling was utilized. The population for this study was eighth grade math students at a rural middle school and their parents. The sampling frame included six eighth grade math classes of students and the

students' parents. Students from the six eighth grade math classes, along with their parents, were chosen to be either in an experimental or a control group. The six eighth grade math classes were taught by two different teachers. Both the Experimental and the Control Group consisted of gifted, regular education, and special education students as well as their parents. Students' parents in the Experimental Group participated in math tutoring sessions, but students' parents in the Control Group did not participate in math tutoring sessions.

A total of 105 students and their parents participated in this study. For the Experimental Group, there were 55 students and their parents. The Control Group consisted of 50 students and their parents. Of the sample, 53% were female, and 47% were male. There were 57% African American students, 40% Caucasian students, and 3% Latino.

Parents of students in the Experimental Group participated in math tutoring sessions for six consecutive school weeks. The workshops took place on Monday evenings from 6:00 to 7:30. For the purpose of the study, a child's parent(s) was counted as participating whether one or both parents attended the workshop. On most occasions, the mother or female guardian was the parent who attended. There were a few occasions when both parents attended the workshops.

Table 2

Weekly Math Tutoring Sessions for Parents

Week	# Parents' Attendance	Percentage
1	48	87%
2	39	71%
3	31	56%
4	20	42%
5	28	51%
6	25	45%

Note. Total Percentage of Parents' Attendance (n = 352) by Number of Weeks (n = 6) = Average Percentage (59%).

Percentages were calculated on the basis of whether the student had at least one parent in attendance. Table 2 contains the percentages of parents who attended each weekly math workshop and the average attendance for all workshops.

Table 3 shows the descriptive statistics for math achievement by groups (i.e., Experimental and Control Groups). Students in the Experimental Group had a 36.36 increase in mathematics achievement, whereas students in the Control Group had a 33.16 increase in mathematics achievement.

Table 3

Descriptive Statistics for Math Achievement by Groups

Variable	Group	M	SD	N
Math pretest	Experimental	35.60	10.93	55
	Control	36.20	13.66	50
Math posttest	Experimental	71.96	14.03	55
	Control	69.36	14.56	50

Table 4 shows the descriptive statistics for math anxiety by groups (i.e., Experimental and Control Groups).

Table 4

Descriptive Statistics for Math Anxiety by Groups/ Two-Sample T

Variable	Group	M	SD	N
MAQ-Modified posttest	Experimental	3.60	1.25	55
	Control	3.61	1.30	50

Results

Two quasi-experimental designs were conducted to analyze the data of the study. A Nonequivalent Control-Group Design was utilized to evaluate the effectiveness of the math tutoring sessions for parents of eighth grade middle school math students on eighth grade students' math achievement. A Static-Group Design was employed to evaluate the effectiveness of the math tutoring sessions for parents of eighth grade middle school math students on eighth grade students' math anxiety. This pattern allowed both of the research questions to be addressed. The analysis of covariance (ANCOVA) procedure was used to answer the first research question. The ANCOVA was used to determine if there were differences between groups (i.e., Experimental Group and Control Group) for an independent variable (i.e., math parent workshops) in respect to the dependent variable (i.e., math posttest scores), while using the math pretest as the covariate. The statistical procedure of ANCOVA produces an *F* test of significance for the main effect of the independent variable, while accounting for the covariate. It was essential to utilize the math pretest as the covariate in this type of design, because it could have an important association with the dependent variable, and it was essential that it be controlled for in the analysis (Ary, Jacobs, & Sorensen, 2010).

RQ1 was stated as: Is there a difference in mathematics achievement between eighth grade math students, whose parents participate in the math tutoring sessions, and eighth grade math students, whose parents do not participate in the math tutoring sessions?

Achievement was measured with the use of a Number Sense and Equation Math Test (Scott, 2012) developed by the researcher. Prior to the choice of the statistical measure, ANCOVA, certain assumptions must be satisfied, that is, the assumption of normality. Normality of the math pretest scores and the math posttest scores of eighth grade math students

were examined based on the descriptive statistics displayed in Table 5. Normality is assumed, because the scores fell between -2 and 2 of Skew and Kurtosis. As shown in Table 5, both the pretest and posttest scores met the conditions for normality.

Table 5

Descriptive Statistics for Math Tests, Eighth Grade Students

	N	*M*	*SD*	Kurtosis	Skew
Math Pretest	105	35.890	12.250	1.063	.837
Math Posttest	105	70.720	14.275	-.307	-.406

Moreover, the histogram is an effective graphical technique to display the values of both Skew and Kurtosis, which represent the normality or lack of normality of data sets (NIST/ SEMATECH, 2012). Figures 1 and 2 represent normality within the boundaries established by

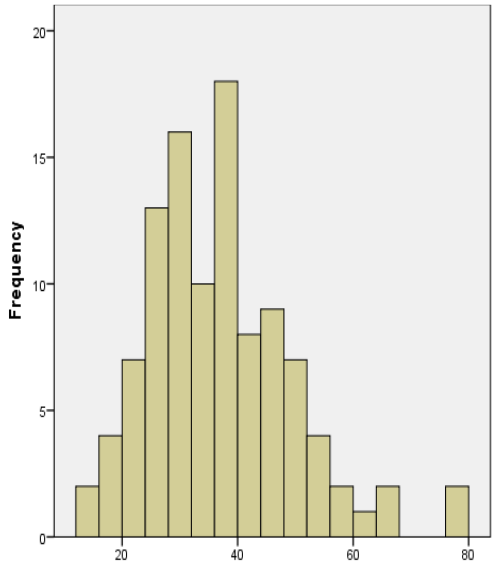

Figure 1. Math pretest.

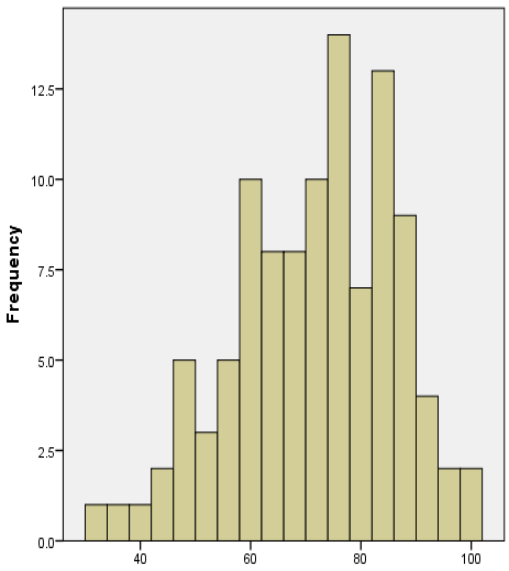

Figure 2. Math posttest.

Skew and Kurtosis. The histograms demonstrate the symmetric and unimodal math pretest and posttest scores of these eighth grade math students.

Before an ANCOVA is conducted, the researcher must verify that the homogeneity-of-regression (i.e., slope) assumption is met. In this assumption, it is presumed that the relationship between the covariate and the dependent variable is the same for all combinations of the independent variable. The test is used to assess the interaction between the covariate and the independent variable in the prediction of the dependent variable. When a significant interaction between the covariate and the independent variable is obtained, the differences between the dependent variable among groups vary as a function of the covariate. Therefore, when the interaction is significant, the assumption is violated. In this case, the results from an ANCOVA are not meaningful, and the relationship between the independent variable and dependent variable (i.e., the main effect) cannot be interpreted, because the interpretation will change whenever the values of the covariate differ. In the event of a significant interaction, the appropriate step would be to not conduct an ANCOVA. Therefore, it is imperative that the homogeneity-of-regression (i.e., slope) assumption is met to continue analysis of the data via ANCOVA. In Table 6, the *p*-value of the Tests of Between-Subjects Effects for homogeneity-of

Table 6

Tests of Between-Subjects Effects, Eighth Grade Math Students

Source	Type III Sum of Squares	*df*	Mean Square	*F*	Sig.
Corrected Model	3830.234	3	1276.745	7.427	.000
Intercept	30332.697	1	30332.697	176.447	.000
Control_Experimental	75.709	1	75.709	.440	.508
Math Pretest	3440.506	1	3440.506	20.014	.000
Control Experimental	17.752	1	17.752	.103	.749
Math Pretest	--------	---	--------	------	------
Error	17362.756	101	171.908	------	------
Total	546388.000	105	---------	------	------
Corrected Total	21193.990	104	---------	------	------

Note. *R* Squared = .181 (Adjusted *R* Squared = .156)

regression was 0.749, which is not statistically significant (e.g., *p* value is greater than .05). The assumption of homogeneity-of regression was not violated, and it was determined that it was appropriate for the researcher to proceed in analysis of the data with the use of the statistical measure, ANCOVA.

In ANCOVA, it is assumed that the variance of the dependent variable is equal across groups formed by the independent variable. The Levene's Test for Equality of Variance was utilized as the criterion to satisfy the assumption. Levene's test is a diagnostic statistic that tests the null hypothesis, in order to determine that the error variance of the dependent variable is homogenous across groups. The researcher's anticipated outcome was to fail to reject the null hypothesis; therefore, the assumption was satisfied. In Table 7, the *p* value of Levene's is 0.647, which is not statistically significant (e.g., *p* value is greater than .05); hence, the researcher failed to reject the null hypothesis. The assumption of equal variance was not violated, and it was deemed that the results from the ANCOVA would be valid.

Table 7

Levene's Test of Equality of Error Variances, Eighth Grade Math Students

F	*df*1	*df*2	Sig.
.212	1	103	.647

Since the criteria for each assumption was satisfied, an ANCOVA analysis was employed to test Research Question 1. The ANCOVA results are presented in Table 8 for the effect of the covariate (i.e., math pretest) between the groups (i.e., Experimental Group and Control Group) of the independent variable (i.e., math parent workshops) on the dependent variable (i.e., math posttest).

Table 8

ANCOVA for Math Achievement of Eighth Grade Students, Dependent Variable, Math Posttest

Source	Type III Sum of Squares	*df*	Mean Square	*F*	Sig.
Corrected Model	3812.483	2	1906.241	11.187	.000
Intercept	30856.006	1	30856.006	181.083	.000
Math Pretest	3634.939	1	3634.939	21.332	.000
Control Experimental	219.111	1	219.111	1.286	.259
Error	17380.508	102	170.397	-----	-----
Total	546388.000	105	---------	-----	-----
Corrected Total	21192.990	104	---------	-----	-----

Note. R Squared = .180 (Adjusted *R* Squared = .164)

The *F* test for the between groups was not significant (e.g., *p* value is greater than .05). There was no significant difference between the Experimental Group (i.e., the eighth grade math students whose parents attended math tutoring sessions) and the Control Group (i.e., the eighth grade math students whose parents who did not attend math tutoring sessions on math achievement). The results from the ANCOVA indicated that the data analysis failed to reject the null hypothesis used to answer RQ1. Therefore, there was no significant difference in students' scores on the Number Sense Post-test between students whose parents received tutoring sessions and students whose parents that did not receive tutoring sessions.

For research question two, a Two-sample t-test was conducted to evaluate the effectiveness of the math tutoring sessions for parents of eighth grade middle school math students on eighth grade students' math anxiety levels.

RQ2 was: Is there a difference in mathematics anxiety levels of eighth grade math students, whose parents participate in the math tutoring sessions, and eighth grade math students, whose parents do not participate in the math tutoring sessions? Math anxiety was measured with

use of the Math Anxiety Questionnaire-Modified (MAQ; Wigfield & Meece, 1988).

Prior to conducting a Two-sample t-test, the assumption of equal variance must be met. It is assumed that the variance of the dependent variable is equal across groups formed by the independent variable. Hence, the data have to be evaluated to determine whether the equal variance assumption is met. The variance of the Control group and the Experimental group should be approximately equal. The Levene's Test for Equality of Variance was employed to examine this assumption. The Levene's test is a diagnostic statistic that tests the null hypothesis, in order to determine that the error variance of the dependent variable is homogenous across groups. The anticipated outcome of the researcher was to fail to reject the null hypothesis; therefore, satisfying the assumption. As shown in Table 9, the *p* value of Levene's was at 0.975; which is not statistically significant (e.g., *p* value is greater than .05); hence, the researcher failed to reject the null hypothesis. The assumption of equal variance was not violated, and it was deemed that the results from the Two-sample t-test would be valid.

Table 9

Levene's Test of Equality of Error

F	df1	df2	Sig.
0.00	1	103	0.975

The *T* test for the between groups was not significant. The Two-sample t-test results shown in Table 10 have a *p* value of 0.957 (e.g., *p* value greater than .05). There was no significant difference between the Experimental Group, eighth grade students whose parents attended math tutoring sessions and the Control Group, eighth grade students whose parents did not attend math tutoring sessions on math anxiety levels. The results of the Two-sample t-test

indicated that the data analysis failed to reject the null hypothesis used to answer RQ2. Therefore, there was no significant difference in students' scores on the MAQ-Modified (Wigfield & Meece, 1988) posttest between students whose parents received tutoring sessions and students whose parents did not receive tutoring sessions.

Table 10

Two- Sample T-test/ MAQ-Modified Posttest

T	df1	Sig.
- 0.05	101	0.957

Summary

The purpose of this study was to analyze the effectiveness of math tutoring sessions for parents of eighth grade middle school math students on the math achievement and math anxiety levels of eighth grade math students. Math achievement was examined with the use of the Equations and Number Sense posttest (Scott, 2012) scores of eighth grade math students assigned to the Experimental Group or to the Control Group. Math anxiety levels were examined with use of the MAQ-Modified (Wigfield & Meece, 1988) posttest scores of eighth grade math students assigned to the Experimental Group or to the Control Group. The Experimental Group consisted of eighth grade math students whose parents attended math tutoring workshops for 1.5 hours for six consecutive weeks during the duration of the Equations and Number Sense unit. The Control Group consisted of eighth grade math students whose parents did not attend the math tutoring workshops. The findings from this study indicated that there was no significant relationship between the math achievement of eighth grade students whose parents attended math workshops and eighth grade students whose parents did not attend

math tutoring workshops. Furthermore, it was found that there was no significant relationship between eighth grade students' math anxiety levels for students whose parents attended math workshops and students whose parents did not attend math tutoring workshops.

This Chapter provided an overview of the demographic data for the sample used in the experiment. The researcher also presented the attendance percentages of parent participants, who were present at each parent tutoring session. The results of the data analysis of the effects of parent workshops on students' math achievement and math anxiety levels and a summary of the findings were discussed. In Chapter Five, a summary of the study and the findings will be presented followed by a discussion of the results. Limitations and implications of the research will be emphasized. Lastly, recommendations for future research will be identified.

CHAPTER FIVE: SUMMARY AND DISCUSSION

The quantitative findings from this research study were presented in Chapter Four. The statistical procedure, analysis of covariance (ANCOVA), was utilized to determine the effects of math parent workshops on the math achievement of eighth grade students. The statistical procedure Two-sample t-test was employed to determine the impact of math parent workshops on math anxiety levels of those same eighth grade math students. It was anticipated that parents' participation in the workshops would be a positive intervention for eighth grade math students in rural Southwest Georgia. In this chapter, the summarized findings from the study are presented and include: (a) an overview, (b) the purpose of the study, and (c) review of the methodology. In addition, the researcher provides: (a) the implications, (b) the limitations, and (c) recommendations for future research studies, in which the topic of parental involvement is present.

Overview

The authors of the report, *A Nation at Risk* (National Commission on Excellence in Education, 1983), brought attention to the fact that the United States educational system was not the dynamic system that it once had been. Following the publication of this report, legislation was enacted as a means to improve education in the U.S. However, a couple of decades passed, and the U.S. educational system continued to lag behind other countries. This brought about an historical era of accountability for students to meet state standards, as mandated in the No Child Left Behind Act (NCLB; 2001). The NCLB was a reform directive, which involved the stakeholders (i.e., school leaders, teachers, and parents). High goals were established to ensure that U.S. students would meet and exceed the highest standards. Low mathematical skills were

among the indicators of the nation being at risk and a subject of concern in NCLB. Therefore, math was addressed in this Act, in order to ensure improvement in the math test scores of U.S. students. Although student achievement in mathematics was a priority in the NCLB Act, mathematics achievement continued to lag (Wise, 2008) and even decline. According to staff of the U.S. Department of Education (2008), the mathematics achievement of K-12 students continues to decrease, and there is a strong decline, which occurs during the middle school years, in particular, while students engage in Algebra.

According to Lee, Grigg, and Dion (2007), one of the ways to examine the effectiveness of current mathematics instruction and student achievement in mathematics, in this era of regular testing, is to conduct assessment of select students in fourth and eighth grades via the National Assessment of Educational Progress (NAEP) under the direction of the U.S. Department of Education. Although the 2009 NAEP report showed progress in student achievement in mathematics, there is still a need for much improvement, since only 26% of eighth grade students tested demonstrated Proficient Understanding of math concepts (U.S. Department of Education, 2010).

Another key aspect of NCLB (2001) was that parents are to be involved in their child's education. The authors of the NCLB encouraged parents to be involved in their child's education by having two-way communications with their child's educator. Over the past several decades, a number of research studies (Atkinson & Forehand, 1979; Barth, 1979;Desimone, 1999; Epstein, 2008; Kelley, 1952; Steinberg, Lamborn, Dornbusch, & Darling, 1992; Seginer, 1983; Sewell & Hauser, 1980) have been conducted on the effects of parents being involved in students' education. In many of these studies, positive effects have been found. Although it was recommended in the NCLB that parents be involved in their child's education, and an

abundance of research studies (Colombo, 2006; Epstein; Flynn, 2006; Henderson & Berla, 1994; Sheldon & Epstein, 2005; Wherry, 2006) have shown that parent involvement in students' education has positive effects, parent involvement remains uncommon in many students'schools, especially in middle and high school (Deplanty, Coulter-Kern, & Duchane, 2007; Epstein & Van Voorhis, 2001; Sanders, 2008). The focus of the current study was to investigate the effects of parental involvement, specifically during the middle school years.

There is much need for improvement in middle grades mathematics education in the U.S. Educators play a substantial role in the improvement of math education as a result of the way they teach their students in the classroom on a daily basis. However, another vital part of the equation is parents, and their presence and support in the education of their student is needed to provide a balanced education for their child.

Purpose

There are several ways that educators could improve mathematics education within their classroom. However, a unique way to improve mathematics education is through implementation of math workshops for parents. Use of this strategy can encourage another dynamic stakeholder to participate in the process of educating students. Through the provision of parent workshops, teachers and parents are able to form a partnership as they communicate and spend time together. The more parents communicate with their child's educator, and vice versa, the more the home and school language in regard to the mathematical Standards becomes comprehensible and familiar. When students hear the same message at home as they do in school, it is theorized that they can attain positive results (Epstein, 2002; Deslandes, 2001). The focus of this study was on parental involvement, based on the provision of tutoring sessions for parents. The goal was to provide them with the tools necessary to assist their child to learn math

concepts and complete math homework. In addition, during the workshops the parents were provided with ideas about how to encourage their child while they were engaged in homework activities. Statistical analysis was performed of outcome data in respect to the effects of math tutoring sessions for parents of eighth grade middle school math students on student eighth grade math achievement and the effects of math tutoring sessions for parents of eighth grade middle school math students on their students' math anxiety levels.

In this study, there were two groups of students and their parents, an Experimental and a Control Group. The parents in the Experimental Group participated in parent tutoring sessions, which consisted of six consecutive school weeks of workshops. The topics of the workshops paralleled the topics the students were being taught in math class, namely, number sense and the equation unit. The parents of the students in the Control Group did not participate in math tutoring workshops, while their students were taught the number sense and equation unit in math class.

Research Questions and Null Hypotheses

The purpose of the quantitative study was to answer the following questions:

RQ1: Is there a difference in mathematics achievement between eighth grade math students whose parents participate in the math tutoring sessions, and eighth grade math students whose parents do not participate in the math tutoring sessions?

H1: There will be no significant difference in students' scores on the Number Sense and Equation (Scott, 2012) posttest between students, whose parents receive tutoring sessions, and students whose parents do not receive tutoring sessions.

RQ2: Is there a difference in the mathematics anxiety levels of eighth grade math students, whose parents participate in the math tutoring sessions, and eighth grade math students whose parents do not participate in the math tutoring sessions?

H1: There will be no significant difference in students' scores on the Math Anxiety Questionnaire-Modified (MAQ-Modified; Wigfield & Meece, 1988) posttest between students whose parents received tutoring sessions, and students whose parents do not receive tutoring sessions.

Review of Methodology

The methodology utilized in this the study was two quasi-experimental research designs. The specific design employed to answer Research Question #1, was a Nonequivalent Control-Group design. This researcher evaluated the pretest and posttest results for two groups of eighth grade math students from a rural Southwest Georgia middle school. During the six week study, the parents of the Experimental group participated in 1.5 hours of math workshops for six consecutive school weeks. The students in both the Experimental Group and the Control Group were taught the same concepts of the number sense and equation unit. Both groups were taught the same content related to the pertinent math Standards via the use of the same PowerPoint presentations and the same activities during their math class. Both groups of students completed a math achievement pretest. The pretest was used to determine any initial differences in math achievement between groups. The math achievement pretest was used as the covariate during the ANCOVA statistical analysis of research question one. Also, both groups completed a math achievement posttest. The math achievement posttest was used to assess whether significant differences in math achievement, based on the effects of the math tutoring workshops for parents.

The specific research design used to answer Research Question #2 was a Static-Group Comparison Design. Research question two was analyzed via a Two-sample t-test. To assist in answering research question #2, students participated in the MAQ-Modified (Wigfield & Meece, 1988) posttest. The Two-sample t-test was conducted to compare the means of the MAQ-Modified (Wigfield & Meece, 1988) posttest results of the groups (i.e., Experimental Group and Control Group). This allowed the researcher to assess whether there was a significant difference in math anxiety levels, based on the effects of the math tutoring workshops for parents.

Participants

The participants of the study were eighth grade mathematics students and their parents from a rural middle school in Southwest Georgia. The middle school, from which the sample was drawn, serves approximately 520 students with the following demographics: (a) 60% African American, (b) 35% Caucasian, and (c) 5% Latino. Participants included 105 eighth grade math students and their parents. Each of the student participants took math each day for 100 minutes throughout the entire school year. The members of the Experimental Group, whose parents participated in math tutoring workshops, consisted of 55 students and their parents. These students were gifted, regular education, and special education students. The members of the Control Group, those students whose parents did not participate in math tutoring workshops, consisted of 50 students and their parents. The Control Group students were similar to the Experimental Group students, in that, the group consisted of gifted, regular education, and special education students. There were two math teachers, who have at least 3 years of teaching experience, who participated in the study. There was an additional participant, who conducted

the math tutoring workshops. This participant was a math professional, who did not teach the participant students.

Procedure

The Control and Experimental Groups were formed by selection of students from six eighth grade math classes. Each student's parents were paired with the student, and the parents were also participants in either the Control Group, parents who did not participate in math tutoring sessions, or the Experimental Group, parents who did participate in math tutoring sessions. Prior to the intervention of math tutoring sessions for parents, a math achievement pretest was administered to student participants in both the Control and Experimental Groups. A six week unit, on number sense and equations, was taught to all students of the six classes involved in the study. The unit was taught during the students' regular math class each day for six consecutive school weeks.

The intervention, math tutoring sessions for parents, was conducted during the same six consecutive school weeks, when the students were engaged in the number sense and equations unit. However, the tutoring sessions for parents were held each Monday evening from 6:00 to 7:30, instead of during the regular school day when their child learned math. Each Monday during the tutoring workshops, parents learned the same Standard-specific content their child learned for the particular week. Also, parents practiced similar problems and participated in activities, which may have encouraged their child in learning the math concepts. At the end of the unit, the Number Sense and Equation (Scott, 2012) posttest and the MAQ-Modified (Wigfield & Meece, 1988) posttest was administered to all participating students and was collected by the participating teachers. All pretests and posttests were graded by the researcher. The data were recorded in the data view spreadsheet of the Statistical Procedures for Social

Scientists (SPSS; 2012) program. Analyses were run, and the results were recorded and summarized.

Summary of Results

The purpose of this quantitative research study was to determine whether math tutoring sessions for parents of eighth grade math students would have an effect on math achievement of eighth grade students, as compared to a similar group of eighth grade math students, whose parents did not participate in math tutoring sessions. To answer RQ1, the analysis of covariance (ANCOVA) procedure was utilized. The ANCOVA produces an *F* test of significance for the main effect of the independent variable, while the covariate is accounted for. In RQ1, the independent variable was the math workshops for parents; the dependent variable was the math achievement posttest score, and the covariate was the math achievement pretest score. The *F* test yielded a non-significant statistic, a *p* value greater than .05. Therefore, there was no significant difference in math achievement between eighth grade math students in the Experimental Group and the eighth grade students in the Control Group. The results failed to reject the null hypothesis formed to assist in answering RQ1. In this study the math tutoring workshops for parents did not have a significant effect on eighth grade math students' math achievement scores.

The second purpose of this quantitative research study was to determine if math tutoring sessions for parents of eighth grade math students would have an effect on the math anxiety levels of eighth grade students, as compared to a similar group of eighth grade math students, whose parents did not participate in math tutoring sessions. To answer RQ2, a Two-sample t-test procedure was utilized. A Two-sample t-test produces a *T* test of significance for comparing the means of the posttest results of the Experimental and Control Groups. In RQ2, the independent variable was the math workshops for parents; the dependent variable was the MAQ-Modified

(Wigfield & Meece, 1988) posttest score. The t-test for the Experimental Group was non-significant (*p* value greater than .05). There was no significant difference in math anxiety levels between eighth grade math students in the Experimental Group and the eighth grade students in the Control Group. Therefore, the findings failed to reject the null hypothesis formed to answer RQ2. The math workshops for parents of eighth grade students did not have a significant effect on eighth grade math students' math anxiety levels.

Discussion

The non-significant findings for this study suggested that parental involvement had no effect on students' academic achievement and math anxiety levels. The findings from this study did not support the findings from previous research studies (Colombo, 2006; Epstein, 2008; Flynn, 2006; Henderson & Berla, 1994; Sheldon & Epstein, 2005; Wherry, 2006). These researchers, as described in the literature review, found that parental involvement had positive effects on students' achievement, attendance, attitude, and continued education. Furthermore, these researchers emphasized the positive aspects of parental involvement on students' academic achievement and other positive features that assist students to excel in school. In a Harvard Research Project, which was directed by Jeynes (2005), it was found in the meta-analysis that parental involvement has a positive association with higher student achievement. Other researchers have reported similar findings; when parents participate in their children's education, it positively effects the children's achievement (Clark, 2007; Jacobs & William, 2007; Michaels, Dittus, & Epstein, 2007). Similarly, Melhuish, Sylva, Sammons, Siraj-Blatchford, and Taggart (2001) found that parental involvement led to: (a) higher academic achievement, (b) greater cognitive ability, (c) improved problem solving skills, (d) more school enjoyment, (e) higher school attendance, and (f) fewer behavioral issues at school.

This study, which was conducted in a local school setting, was the first parental involvement study, known to the researcher, which involved math workshops for parents. Although the parental involvement was lacking and in need of much improvement, in the opinion of the school's leadership team, it may have been unreasonable to expect parents to move from such a low level of involvement to being involved in a six week commitment. Doing so would require overturning what researchers have observed as a normative decrease in involvement. Zill and Nord (1994) maintained that there is a natural decline in parental involvement as students advance throughout their years of school. This observable decline is evident after students leave elementary school. With this expected decline in parental involvement and other unknown factors for the lack of parental involvement in middle school, it could be very difficult to reach and maintain a high level of parent participation. Epstein (2001) described the situation best; optimal parent participation is not easily accomplished.

The findings of the current study revealed non-significant results and suggested that parental involvement has limited effects on students' academic achievement and math anxiety levels. However, because of the positive effects which have been found in many studies (Barth, 1979; Colombo, 2006; Epstein, 2008; Flynn, 2006; Henderson & Berla, 1994; Sheldon & Epstein, 2005; Wherry, 2006), school staff should strive to achieve high levels of parental participation to enhance students' academic lives. The achievement of high levels of parental involvement will require strategic planning that involves all stakeholders.

The researcher offers the following recommendations for the various stakeholders.

1. Administrators are the visionary leaders in the school, who must ensure that parental involvement is evident in schools. When there is lack of parental

participation, administrators must establish a strategic plan to incorporate and support parental involvement in the school.

2. Teachers are key to the initiation and building of relationships with the students' parents. Teachers must realize that they should go beyond the walls of their classroom and make initial contacts through invitations as well as maintaining regular contacts to build relationships with parents.

3. Many researchers (Barth, 1979; Clark, 2007; Colombo, 2006; Epstein, 2008; Flynn, 2006; Henderson & Berla, 1994; Michaels, Dittus, & Epstein, 2007; Sheldon & Epstein, 2005; Wherry, 2006) have demonstrated that parental involvement has positive effects on student achievement and success but, often, parents are not involved, especially at the middle school level. Parents must realize they are important to students' success in school, and best practice findings suggest it is vital for there to be school programs to emphasize and motivate parent involvement throughout their child's entire education.

The school administrator should include, in budget planning, specific funds for parental involvement training. It is the researcher's opinion that such training should be based on Epstein's six workable and easy to understand typologies of parental involvement (Epstein 2005; Epstein et al., 2002). Furthermore, the training should include support in regard to how parents can assist their child in learning each subject. This may include workshops in math as well as other subject matters. These measures should be put to use and should not be a onetime offering. There must be recurrences of these workshops so that, eventually, they become an ordinary part of the school environment.

Parents are integral stakeholders, and parental involvement is an important tool to which educators have access. Educators must take advantage of this tool, which other researchers have shown to be powerful, and use it for the advancement of the schools, community, and ultimately, society (Epstein, 2005; Epstein et al., 2002; Simmon-Morton & Crump, 2003). All stakeholders (i.e., administrators, educators, and parents) must work together cohesively to implement and carry out parental participation endeavors; if a high rate of parental involvement can be achieved, then the lasting positive effects on students' academic achievement and other aspects of their education can be attained.

Limitations to the Study

This study was conducted at a small middle school in southwest Georgia and involved eighth grade Math students and their parents. Because the number of participants was limited to only eighth grade math students and their parents from one school, the results of the study may not generalize to numerous middle schools' population of eighth grade Math students. However, in order to ensure generalization of the study to a similar target population, the following efforts were made. The description of the participants included the demographics, the sampling procedure was clearly described, the sampling frame was described; the completion rate was noted, description of the experimental treatment was discussed, and the Hawthorne Effect was avoided by not giving special attention to the participants and not providing information regarding the hypotheses (Gall et al., 2010).

The lack of randomization or the formation of non-equivalent groups posed a threat of group differences on the posttest scores due to pre-existing differences, as opposed to the difference resulting from the treatment (Gall et al., 2010). To decrease the threat, carefully selected similar populations of participants were assigned to the Control and Experimental

Groups. Additionally, the ANCOVA was utilized to statistically minimize the effects of initial differences between the groups to test null hypothesis #1.

Variables, such as experimental treatment diffusion, compensatory rivalry by the control group, compensatory equalization of treatments, and resentment demoralization of the Control Group, were controlled by treating both the Treatment Group and the Control Group the same (Gall, Gall, & Borg, 2010). Both groups of parents received the same notices and memos. The only difference between the groups was that the parents in the Experimental Group participated in weekly math workshops. Because the parent participants, who received tutoring, did not meet or speak with each other or with parents in the Control Group on a daily basis, the participants from both groups would not have been in close proximity to each other on a daily basis. Therefore, it is unlikely that any rivalry between parent groups existed. It was communicated to the parents in the Experimental Group that the tutoring sessions were to be kept confidential. In the event that any of the parents in the Control Group would like to receive tutoring sessions, they were encouraged to sign up for tutoring workshops that were provided several weeks following the study.

External threats to validity were minimized as much as possible. Since the researcher employed pretests and posttests, pretest and posttest sensitization were possible threats (Gall et al., 2010). Typically, teachers give a pretest prior to teaching a unit and a benchmark posttest following units that are taught, so that use of the Number Sense and Equation Math (Scott, 2012) pretest and posttest appeared to be a standard procedure for the students. Therefore, since students regularly complete pretest and posttest assessments throughout the year, the impact of pretest and posttest sensitization should have been minimal. To eliminate pretest and posttest sensitization to the math anxiety questionnaire, students were informed that the questionnaire

was a way to provide teachers with honest answers in regard to how math affects them in various situations.

Additional threats to the internal validity of this study included maturation and selection threat due to non-equivalent groups (Gall et al., 2010). Although it is not possible to entirely eliminate these threats, the researcher utilized a design with the ability to minimize their impact.

During the six week study, the participants' physical and psychological development may have changed, especially since during the middle school years students' physical development and psychological development undergo many changes. Other changes in the development of the participants may have been intellectual growth via instruction outside of the math classroom. The study was conducted over a six week period, which is not an extraordinary long period of time, with the intention of limiting the extent of developmental changes among participants. Another key aspect included in the design of the study that would decrease the maturation threat was the use of a Control Group, which included math students of the same grade level.

Implications

Mathematics is a subject in the U.S. school curriculum which is held to high standards and it is one of the content areas identified to assure accountability and the success of U.S. students. Unfortunately, as important as mathematics is, many U.S. students struggle to learn mathematics. Initially, these struggles or inadequacies in mathematics were made evident with the publication of *A Nation at Risk* (NCEE, 1983). However, decades after the announcement of *A Nation at Risk*, students in U.S. schools continue to struggle academically. In the U.S. Department of Education (2008) report, the mathematics achievement of K-12 students was still well below that desired. In particular, the mathematical skills of many students decline during the middle school years when they engage in Algebra. Much legislation, such as the NCLB (2001),

along with the most recent adoption of the common core curriculum by nearly all states in the U.S. (Common Core State Standards Initiative, 2012), has been established to improve students' education. These national level efforts were developed to ensure that U.S. students would be held to high standards and have skills comparable to those of their international peers. In the Common Core Standards Initiative, the authors maintained that use of these Standards will ensure that all U.S. students will be prepared with the requisite skills and understanding in order to compete with other students throughout the world. To reach the mathematical goals set forth in NCLB, as well as those of the Common Core Standards, measures must be taken by all stakeholders to ensure that all learners will be successful. In an effort to involve all stakeholders, school leaders and teachers must discover innovative strategies to build relationships with parents, a most valuable group of stakeholders.

Recommendations for Future Research

Although numerous researchers (Atkinson & Forehand, 1979; Colombo, 2006; Desimone, 1999; Epstein, 2008; Flynn, 2006; Henderson & Berla, 1994; Sheldon & Epstein, 2005; Steinberg et al., 1992; Wherry, 2006) have demonstrated the positive effects of parental involvement on students' success in school, there are few studies focused on parental involvement in math at the eighth grade or middle school level. Therefore, there is a need to know more about this topic. Several recommendations for future research in the area of parental involvement in mathematics can be made. A number of the recommendations may be viewed as extensions of this study and may be advantageous to establishing a more robust pool of findings regarding the impact of training parents to assist students.

First, a larger sample size should be used to represent the population of students being studied. The use of a larger sample might have allowed the findings to be generalizable to a

broad population. One way to have access to a larger sample size would be to include more than one school in the study. This may provide more favorable results and a more realistic description of the impact of parental and family involvement. In addition, it could be productive to extend the time period of the study from six weeks to a semester of school. This extension of time would allow for various concepts to be covered, rather than just one unit.

The timing of the study, that is, when it was conducted, may have had several impacts. Since the study was linked to a particular math unit, Number Sense and Equations, the researcher had to work with other math educators to plan and discuss when they would be available to conduct the study. The math teachers were willing to work with the researcher and did what was necessary so that the researcher could conduct the study. The math educators rearranged their lesson plans and rescheduled the time when the unit would be taught. The Number Sense and Equations unit had been scheduled to be taught at the beginning of the second quarter of school; however, at the request of this researcher, the math teachers were willing to move the unit toward the end of the second quarter. The math teachers rearranged their lesson plan schedule so that the study could be conducted shortly after receipt of the Liberty University Internal Review Board (IRB) approval. This may have disrupted the normal teaching pattern for both the instructors and students. The study began the last week of November; three weeks prior to the Christmas break and ended near the end of January. Although the length of the study was only six consecutive school weeks, nine weeks of time elapsed, because students were out of school for three weeks during the Christmas break. This lapse in active schooling during the study may have had an impact on parental attendance at the math workshops. The researcher took note that the percentage of parents who attended the tutoring sessions was much higher prior to the Christmas break than during the three weeks following the Christmas break. The decline in

parental attendance may have had an effect on the findings from the study. Therefore, the researcher recommends that future researchers consider when to conduct a study of this nature in their planning. Furthermore, the researcher recommends that a study of the like be conducted at the beginning of the school year, when parents may be more motivated to attend workshops and participate. Another suggested time to conduct the study may be several weeks prior to administration of the state mandated test. This may motivate parents to become more involved, as they may be motivated to help their child pass the test.

Upon reflecting on the study, the researcher recommends additional contacts be made with the parents to remind them of the workshops. Parents were contacted only at the beginning of the study, either via letters sent home with their child or by an initial phone call.

During the additional contacts, it should be emphasized how important parents are to the school and to their child. Additional contacts could have a bearing on the results of the study, as it may contribute to a higher percentage of parents attending each workshop throughout the study. To assist in keeping parent attendance up at each workshop, additional contacts via phone calls, letters, emails, or text could provide parents with friendly reminders about the workshops. These reminders could be communicated on a biweekly basis to encourage parents to continue their participation. Buttery and Anderson (1997) emphasized that educators can advance parent involvement, if they project a positive, welcoming attitude toward parents and establish clear and effective communication. The restricted contact with parents could be averted by regular communication with parents during the research project, rather than limiting contact to an initial letter or phone call.

In Level 1 of the Hoover-Dempsey and Sandler (1995, 1997) model of parental involvement, the importance of communication through invitation is emphasized. Specifically,

the uses of motivational constructs, which influence a parent's decision to become involved, are recommended. In 2005, Walker, Wilkins, Dallaire, Sandler, and Hoover-Dempsey reiterated the value of parents' perceptions of general and specific invitations from school staff. When parents continue to receive invitations, they may be influenced or encouraged to continue their participation and be more aware that they are genuinely needed and are important.

Circumstantial issues may arise in regard to parents' attendance at school events; therefore, it is necessary to extend genuine invitations to parents. Level 2 of the Hoover-Dempsey and Sandler (1995, 1997) model, addresses parental involvement concerns related to circumstantial issues that affect parent involvement, once parents actually commit to becoming involved. Some of these issues are the amount of time and energy it will take to help their child, as well as the parents' skills and knowledge about the particular subject matter (Walker et al., 2005). If the parents in the current study had been regularly encouraged through personal contacts, it may have influenced them to find time to participate to gain the knowledge necessary to assist their child with homework.

In the study conducted, there was no way to know whether the parents followed through and assisted their child with homework. This could have had a notable impact on the study findings. Although parents attended the math workshops, the researcher does not know if they used the knowledge delivered to them to assist their child at home. It was assumed that, if parents made the effort to attend the workshops, they would use what they learned to help their child at home. This was an assumption, and there was no evidence gathered of parental assistance at home. Therefore, the researcher recommends that a strategy be in place to determine whether parents assist their child with homework. A check and balance system to verify that parents are assisting their child could be as simple as having parents sign students'

homework assignments or check a statement that specified they assisted their child and discussed the homework assignments with their child. Also, a check and balance could be utilized at each weekly parent workshop. Parents could sign a checklist or filled out a questionnaire in regard to the homework assignments for which they helped their child, and how much time they spent with their child in work on math assignments. Verification that parents do help their child at home may contribute to favorable results for future studies.

Future researchers may also wish to consider additional ways to assess academic achievement. Since the parents in this study were encouraged to assist their child on homework assignments, homework assignments could be one way to assess academic achievement. Other forms could be: (a) use more than one test score, (b) use students' grade point average (GPA), or (c) check to see how many homework assignments are completed. According to Fan and Chen (2001), measures of academic achievement can be indicated by test scores and GPA. Cordry and Wilson (2004) identified several indicators of students' academic achievement: (a) completes homework assignments, (b) demonstrate a positive attitude in regard to school, and (c) behaves appropriately in school. Future researchers could employ a combination of these factors, which may provide a better depiction of a child's academic achievement rather than base academic achievement on one posttest score.

With the availability of extensive forms of technology, an additional recommendation is to use the Internet as a source for parents to view and join the math workshops. Parents, who may not be able to physically attend the workshops, could Skype into the workshops. This may increase the number of parents who participate each week. Also, teachers could video record the workshops and have these recordings available on their webpage. Parents could be given a sign

in and password to watch the videos. When parents sign in to the video workshop, their name would be documented for attendance at the workshop.

Although this experiment was a quantitative study, one last recommendation may be to add a qualitative piece to the study. The findings from a survey could provide much insight for future studies. Additionally, separate focus group interviews with parents, students, and teachers could provide vital information about how these participant groups felt about the workshops. The participants' responses could provide information about what they thought went well and the positive or negative outcomes that they experienced. This would be very useful information for future studies.

Summary

In this study, the researcher sought to examine whether parent participation in math tutoring workshops would affect eighth grade math students' academic achievement and math anxiety levels. The underlying purpose of the study was to determine whether teaching parents the same concepts that their child learned in class and various ways to help their child at home would result in differences between students' achievement scores and math anxiety levels in the Experimental and Control Groups.

The results from the study indicated that there was no significant difference in the math achievement scores of eighth grade students, whose parents participated in math workshops and eighth grade students whose parents did not. Also, it was found that there was no significant difference in the math anxiety levels of eighth grade students whose parents participated in math workshops and eighth grade students whose parents did not. Although the findings from this study supported the retention of each null hypothesis, because of the abundance of research studies highlighted in the review of literature which support the significance of parental

involvement in students' academic affairs, it appears to be important that parents be involved in their child's schooling. In addition, much has been learned about achieving parental involvement. Given a natural decline in parental involvement as children progress through school and because optimal parent participation is not easily accomplished (Epstein, 2001), other researchers have emphasized the importance of building partnerships between teachers and parents. Furthermore, they have noted that it is vital to implement strategic parental involvement plans, which include all stakeholders. The results of the present study, as they did not reject the null hypotheses, when considered in light of the lack of reinforcement for parental participation also support this conclusion.

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APPENDIX A

IRB Approval Letter

LIBERTY
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The Graduate School at Liberty University

November 6, 2012

Susan McFather Scott
IRB Approval 1435.110612: The Effects of Math Tutoring Sessions for Parents on Eighth-Grade Students' Math Achievement and Math Anxiety

Dear Susan,

We are pleased to inform you that your above study has been approved by the Liberty IRB. This approval is extended to you for one year. If data collection proceeds past one year, or if you make changes in the methodology as it pertains to human subjects, you must submit an appropriate update form to the IRB. The forms for these cases were attached to your approval email.

Thank you for your cooperation with the IRB and we wish you well with your research project.

Sincerely,

Fernando Garzon, Psy.D.
Professor, IRB Chair
Counseling

(434) 592-4054

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APPENDIX B

Permission to Conduct Study

October 18, 2012

Dear Institutional Review Board:

This letter is to inform you that I give Susan McFather Scott permission to conduct the research study titled *The Effects of Math Tutoring Sessions for Parents on Eighth Grade Students' Math Achievement and Math Anxiety* at Early County Middle School. This letter serves as assurance that Early County Middle School complies with requirements of the Family Educational Rights and Privacy Act (FERPA) and the Protection of Pupil Rights Amendment (PPRA) and will ensure that these requirements are followed in the conduct of this research.

Sincerely,

Anthony Yarbrough
Principal

APPENDIX C

Letter to Parents/Guardians Informing Them of Study

Dear Parents/Guardians:

I am currently working on my doctoral degree at Liberty University. As part of my dissertation study, I will examine the effects of math tutoring sessions for parents of eighth grade students on students' math achievement and math anxiety. I will be conducting this study in the math classes of Mr. Lovett and Ms. Pittman. The study will last approximately seven weeks.

All the students in _____ and _____ eighth grade math classes will be taught the same curriculum material and take the same test and math anxiety questionnaire before and after the unit of instruction. Your child is being asked to be in the study because he/she is an eighth grade math student in either Mr. Lovett's or Ms. Pittman's math classes. As part of the study some parents/guardians will be asked to participate in math tutoring sessions that will provide the necessary tools for parents to assist their child in completing homework assignments. By having two groups, parents who participate in math tutoring sessions and parents who do not participate in math tutoring sessions, I will be able to compare and analyze students' scores of the two groups. You and your child's participation are voluntary. Your decision to participate will not affect your child's experience in his/her math class or experience at Early County Middle School. At any time and for any reason, you may change your mind about participating in the study and decide not to allow your child to participate in the study.

Sincerely,

Susan McFather Scott
Liberty University Doctoral Candidate

APPENDIX D

Assent of Child to Participate in a Research Study

What is the name of the study and who is doing the study?
Hello, my name is Susan McFather Scott, and I am conducting a project to learn about parental involvement and how it can affect you as a math student. The study is entitled "The Effects of Math Tutoring Sessions for Parents on Eighth Grade Students' Math Achievement and Math Anxiety".

Why are we doing this study?
I am interested in studying the benefits of math tutoring sessions for parents of eighth grade math students. The study will involve two different groups of students and parents/guardians. One group of the parents/guardians will participate in math tutoring sessions, and the other group of parents/guardians will not participate in math tutoring sessions. The math tutoring sessions for parents will be held on Monday evenings and will coincide with unit two of the math units that you will be learning in your math class.

Why are we asking you to be in this study?
You are being asked to be in this research study because you are an eighth grade math student at Early County Middle School. Your participation will help provide valuable information about the effects of parental involvement on eighth grade math achievement and math anxiety.

If you agree, what will happen?
If you are in this study you will participate in a math pre-test and a math anxiety questionnaire prior to beginning unit 2 in math. Following unit 2 in math, you will participate in taking a math post-test and another math anxiety questionnaire.

Do you have to be in this study?
No, you do not have to be in this study. If you want to be in this study, then tell the researcher. If you don't want to, it's OK to say no. The researcher will not be angry. You can say yes now and change your mind later. It's up to you.

Do you have any questions?
You can ask questions any time. You can ask now. You can ask later. You can talk to the researcher. If you do not understand something, please ask the researcher to explain it to you again.

Signing your name below means that you want to be in the study.

_____ _____
Signature of Child Date

Susan McFather Scott

Liberty University Institutional Review Board,
Dr. Fernando Garzon, Chair,
1971 University Blvd, Suite 1582, Lynchburg, VA 24502
or email at fgarzon@liberty.edu.

APPENDIX E

Parent Participant Form

PARENT/GUARDIAN INFORMED CONSENT
The Effects of Math Tutoring Sessions for Parents on Eighth Grade Students' Math Achievement and Math Anxiety
Parental Involvement
Susan McFather Scott
Liberty University
Education Department

You are invited to be in a research study regarding parental involvement in eighth grade mathematics. You were selected as a possible participant because you are a parent of an eighth grade math student, and I believe you will be a valuable participant in this research endeavor. Please read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by: Susan McFather Scott, a doctoral student at Liberty University.

Background Information:

The purpose of this study is to learn about parental involvement in eighth grade mathematics. This study will seek to answer how parent participation in math tutoring sessions effects student's math achievement and math anxiety. Therefore, this study will comprise parents participating in math tutoring sessions which will present them with the tools necessary to assist their child in learning math concepts and completing math homework.

Procedures:

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

1- Participate in six consecutive weekly math tutoring sessions that will take place on Monday evenings from 6:00-7:30. (The tutoring sessions will provide you with tools to assist your child with his/her math homework.)
2- During the six weeks of tutoring sessions, please spend time assisting your child with his/her math homework assignments.

Risks and Benefits of being in the Study:

There is little risk to you participating in this research project. The risks are no more than the participant would encounter in everyday life.

The benefits to participation are (a) examining eighth grade math issues that are important to you as a parent in the Early County School District, (b) the opportunity to learn the standards that your child will be learning in the number sense and equation unit in math, (c) being provided the tools necessary to help your child with his/her math homework assignments (d) receiving information on how or if parent/guardian participation helps students achieve in math or lower math anxiety.

Compensation:

Participants in this study will not be compensated.

Confidentiality:
The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be stored securely and only researchers will have access to the records. **Your identity will not be revealed. Your name will be assigned a code number and any information that you provide will be kept in a locked filing cabinet. This will ensure anonymity of all information about you regarding this study.**

Voluntary Nature of the Study:

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Liberty University or with the Early County School System. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

Contacts and Questions:
The researcher conducting this study is: Susan McFather Scott. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact me at_____
or_____. You may also contact my chair at_____.

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 1582, 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 and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

Signature: _____ Date: _____

Signature of Investigator:_____ Date: _____

IRB Code Numbers: 1435.110612

IRB Expiration Date: 11/06/13

APPENDIX F

Standards Used in the Number Sense and Equations Unit

MCC8.EE.1

Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{(-5)} = 1/3^3 = 1/27$

MCC8.EE.2

Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect squares. Know that $\sqrt{2}$ is irrational.

MCC8.EE.3

Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.

MCC8.EE.4

Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.

MCC8.EE.7

Solve linear equations in one variable

MCC8.EE.7a

Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case be successively transforming the given equation into simpler forms, until an equivalent equation of the form x=a, a=a, or a=b results (where a and b are different numbers).

MCC8.EE.7b

Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

MCC8.NS.1

Know the numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.

MCC8.NS.2

Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram and estimate the value of expressions.

APPENDIX G

Data

	Experimental (1) Control (2)	Math Pretest	Math Posttest	MAQ Posttest
1	1	32	44	2.727
2	1	48	88	4.364
3	1	76	98	3.545
4	1	56	86	5.364
5	1	48	86	6.273
6	1	38	74	4.091
7	1	30	58	2.364
8	1	36	72	2.818
9	1	52	76	1.000
10	1	26	76	4.091
11	1	18	96	5.273
12	1	46	98	4.274
13	1	50	78	3.818
14	1	40	84	4.000
15	1	46	70	2.727
16	1	30	62	4.636
17	1	26	60	4.909
18	1	44	80	4.909
19	1	44	68	3.455
20	1	28	76	4.091
21	1	44	86	4.455
22	1	40	84	2.812
23	1	40	64	1.727
24	1	32	68	3.727
25	1	36	48	4.273
26	1	38	76	4.455
27	1	24	72	3.182
28	1	30	52	3.545
29	1	22	84	3.273
30	1	32	48	1.818
31	1	24	84	1.364
32	1	48	86	5.636
33	1	26	50	3.455
34	1	30	80	4.455
35	1	26	92	3.636
36	1	20	82	6.909
37	1	38	86	2.182
38	1	38	64	3.182

39	1	38	86	3.455
40	1	14	60	2.182
41	1	24	64	1.545
42	1	26	78	4.727
43	1	24	70	3.818
44	1	38	68	5.182
45	1	38	84	2.727
46	1	34	62	4.909
47	1	36	74	3.636
48	1	30	48	1.545
49	1	38	48	2.909
50	1	38	58	2.818
51	1	36	72	2.818
52	1	28	58	3.091
53	1	44	76	2.909
54	1	22	52	2.364
55	1	48	64	4.364
56	2	34	60	3.727
57	2	26	64	4.727
58	2	20	82	2.182
59	2	76	86	4.091
60	2	54	78	2.091
61	2	64	70	3.545
62	2	58	82	2.363
63	2	44	92	3.182
64	2	38	84	4.055
65	2	42	66	1.091
66	2	48	86	3.727
67	2	42	82	4.000
68	2	28	68	5.455
69	2	52	90	3.364
70	2	52	82	6.273
71	2	50	66	1.727
72	2	44	94	3.182
73	2	64	84	4.091
74	2	44	76	5.000
75	2	60	90	2.636
76	2	42	44	1.545
77	2	38	70	2.545
78	2	26	80	4.545
79	2	32	74	3.818
80	2	32	68	3.364
81	2	32	56	1.091

82	2	28	66	2.909
83	2	38	74	6.818
84	2	18	36	1.818
85	2	36	40	6.264
86	2	30	60	2.545
87	2	22	76	4.000
88	2	32	82	2.727
89	2	30	80	4.364
90	2	28	70	3.545
91	2	18	56	3.818
92	2	28	60	3.636
93	2	16	70	3.364
94	2	28	72	2.545
95	2	28	32	3.909
96	2	22	46	5.818
97	2	32	74	5.273
98	2	40	60	4.818
99	2	26	58	4.273
100	2	30	54	2.818
101	2	14	56	2.364
102	2	40	56	3.545
103	2	22	64	3.364
104	2	38	76	3.545
105	2	24	76	5.000