

EFFECTS OF AN AFTERSCHOOL PROGRAM
ON ELEMENTARY AND MIDDLE SCHOOL
MATH ACHIEVEMENT IN GEORGIA SCHOOLS

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Effects of An Afterschool Program
On Elementary and Middle School
Math Achievement in Georgia Schools

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Abstract

Connie L. Hobbs. EFFECTS OF AN AFTERSCHOOL PROGRAM ON ELEMENTARY AND MIDDLE SCHOOL MATH ACHIEVMENT IN GEORGIA SCHOOLS. (Under the direction of Dr. Scott Watson) School of Education, April, 2012.

Due to the demands placed on schools to make Adequate Yearly Progress (AYP) on state standardized tests, many districts are looking at afterschool programs to help bridge the gap in achievement for students who are at-risk for failing to master standards. The purpose of this study was to analyze the effect an afterschool program had on upper-elementary and middle school at-risk student's math achievement on state standardized tests. The study scrutinized an afterschool program in north Georgia that is providing a 21st Century Community Learning Center (21st CCLC) for students Kindergarten through 8th grade. Standardized test scores in mathematics on the Georgia Criterion Referenced Competency Test (CRCT) between at-risk upper-elementary and middle school students who participated in the afterschool program were compared to a similar group of students who did not participate in the program. The researcher investigated quantitatively whether participation in the afterschool program had an impact on student achievement in mathematics. For this sample of 180 at-risk students, the ANCOVA method of data analysis was utilized to determine if there were differences between the groups of students in the afterschool program and those not in the program, based on 2011 CRCT math scores. This research study found no significant differences in math CRCT scores of those who attended the afterschool program and those similar students not attending the afterschool program.

Dedication

This dissertation is dedicated to my wonderful family. To my dear husband Von, you have always encouraged me to further my education and career. You have been there through the years taking care of the kids when I was in school or working on this paper. When I felt defeated, you were always there to pick me up. You have made all of this possible through your sacrifices, and I am forever grateful. To my three beautiful children, John Henry, Harrison, and Sara Beth, thank you for all of your hugs, back-rubs, and encouragement while I was working on this. Sometimes I was too busy, but you never complained. The three of you are my greatest accomplishments; you make me so proud. I also dedicate this work to my parents, my greatest fans. You never had any doubts I could do this; you encouraged me and provided support in countless ways. When I was too busy or tired to come for a visit, you never complained (at least not too much). My Daddy didn't make it through this long process, but he knew I could do it, long before I did. He was afraid his illness would stand in the way of my finishing. Daddy, I know you're looking down and smiling; I did it!

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CHAPTER ONE: INTRODUCTION

The 1983 report *A Nation at Risk* by The National Commission on Excellence in Education summarized that America's students were not being challenged and many students were lacking in basic skills. Most of our secondary students were not on their grade-level in mathematics, science, or reading. When high school students' test scores were compared with other industrialized countries on nineteen achievement tests, the United States was last seven times. High school students' average on achievement tests was found to be lower than it had been twenty-six years earlier. Until that point, society thought that schools could act alone to effectively prepare our students for the future. However, for the first time in history, children's proficiency level would not match their parents', much less surpass it. The gap between the educationally "haves and have nots" widened. This report came at a devastating time in history when technology began growing astronomically. As a result, our disadvantaged students would not be able to take full benefit of opportunities available in America.

Students were not being adequately prepared to enter the workforce in the 21st century. Education of parents, health care, absences from school, family income, harsh economic times, and other outside factors impacted student's achievement in schools. America's educational system had to make drastic changes to catch up with an innovative world. These changes were forced by the No Child Left Behind Act (NCLB) of 2001. NCLB proposes to bring all students up to their grade-level in achievement by the year 2014. Along with NCLB comes high-stakes testing and pressure on schools to make adequate yearly progress (AYP) in order to meet accountability.

With the significant changes in education brought about from NCLB and outside factors which affect student achievement, schools now more than ever before are looking for innovative means to meet goals. Researchers Weiss, Little, Bouffard, Deschenes, & Malone (2009) contemplate that schools will not be able to meet the 2014 deadline. They reveal that disadvantaged students do not have equal access to resources. Students who are at-risk for failure, for whatever reason, must have further means of bridging the achievement gap. Some of these resources include out-of-school opportunities like summer-school, afterschool, and family support programs. According to the National League of Cities report by Katz, Hoene, & de Kervor (2003), city leaders find that having access to afterschool programs is an integral part of families being successful in the local community. A provision of NCLB is Supplemental Educational Services (SES) which allows disadvantaged students of consistently unsuccessful Title I schools free access to tutoring in math and reading, outside of regular school hours. It is the consensus among legislatures, educators, and other stakeholders that a traditional school format is not enough to bring our students into the 21st century, particularly for those students who may already be disadvantaged.

Afterschool tutoring programs impact student achievement, especially for at-risk students. In one study the benefits of an afterschool tutoring program included increased student achievement, a higher self-esteem, more participation in class, and an increase in homework completion (Baker, Reig, & Clendaniel, 2006). Afterschool programs also benefit the school through providing additional support for teaching skills, benefit the parents with educational assistance for their child as well as extended day-care, and moreover, benefit the community in providing a safe environment for students after hours

(Saddler & Staulters, 2008). Reisner, White, Russell, & Birmingham (2004) found afterschool programs to not only increase student achievement in math, but to also increase school attendance for those participating in the program. The impact of an effective afterschool tutoring program can also continue to garner significant results well after the student no longer participates (Van Keer & Verhaeghe, 2005). Tutoring and afterschool programs certainly impact students, schools, and communities in countless ways.

Various program types which include, afterschool programs, tutoring services, extended-day-care, summer-school, Saturday-school, or a combination of these, have been implemented to meet the needs of disadvantaged students. These programs are as varied in their mode of delivery, format, goals, and instruction, as they are in their outcomes (Baker et al., 2006; Davenport, Arnold, & Lassmann, 2004; Jenkins & Jenkins, 1987; Juel, 1996; Ross et al., 2008; Saddler & Staulters, 2008). Van Keer & Verhaeghe (2005) studied the effects of cross-age peer tutoring on reading achievement versus the effects of same-age tutoring or traditional teaching methods and found significant effects with cross-age peer tutoring. According to Reisner et al. (2004), a non-profit community agency impacted student achievement in math with an afterschool program that involved tutoring, homework completion, and recreational time, while also involving the community and the schools in a close-working partnership. Other studies (Curran, Guin, & Marshall, 2002) had nominal gains in reading that incorporated cross-age tutoring, phonics, and reciprocal teaching strategies.

Problem Statement

Due to mandates from NCLB and schools broadening their supplementary

services, there is a greater need for concrete, data-driven evidence to better guide schools. Those schools receiving supplementary educational services are required to monitor the effectiveness of their programs. However, much of the evidence today is consumed with a lack of data, methodology errors, sampling problems, and is essentially not generalizable (Dowell, 1986; Hock, Pulvers, Deshler, & Schumaker, 2001; Zuelke & Nelson, 2001). Afterschool programs are extremely expensive to fund and with the nation's economy being in the shape it is, policymakers from the local level to the federal level are being forced to make cuts. Consequently, there is a profound urgency in obtaining substantial evidence for improving existing programs and implementing new afterschool programs that have been proven to be effective.

Statement of the Purpose

The purpose of this study was to analyze a 21st Century Community Learning Center (21st CCLC) afterschool program and to determine if there was a relationship between at-risk upper-elementary and middle school students' CRCT (Criterion-Referenced Competency Test) math scores of those who attended the afterschool program, as compared to those who did not attend the afterschool program. Due to funding issues across the nation and design issues of previous research studies, this study benefits the local school system in determining whether or not its afterschool program is affecting student's math achievement.

Research Questions

To determine whether an afterschool program impacts math student achievement, the following research questions guide this study:

1. What effect does participation in an afterschool program have on math achievement scores, as measured by performance on the Georgia Criterion-Referenced Competency Test in mathematics, of at-risk third, fourth, and fifth grade students?

Null Hypothesis: There will be no significant difference in mathematics achievement scores, as measured by performance on the Georgia Criterion-Referenced Competency Test in mathematics, of at-risk third, fourth, and fifth grade students who participated in an afterschool program as compared to those third, fourth, and fifth grade students who did not participate in the afterschool program.

2. What effect does participation in an afterschool program have on math achievement scores, as measured by performance on the Georgia Criterion-Referenced Competency Test in mathematics, of at-risk sixth, seventh, and eighth grade students?

Null Hypothesis: There will be no significant difference in mathematics achievement scores, as measured by performance on the Georgia Criterion-Referenced Competency Test in mathematics, of at-risk sixth, seventh, and eighth grade students who participated in an afterschool program as compared to those sixth, seventh, and eighth grade students who did not participate in the afterschool program.

To address the research questions, the study will either fail to reject or reject the null hypotheses.

Definition of Key Terms

For the purposes of this study, the following key terms will be defined.

Academic Achievement- Academic achievement refers to improvement or success as measured by scores on the mathematics portion of the Georgia Criterion-Referenced Competency Test.

Adequate Yearly Progress (AYP)- Adequate yearly progress or AYP is a part of the No Child Left Behind Act (NCLB). It measures year-to-year student achievement on the Criterion-Referenced Competency Test in Georgia. Several factors like percentage of students meeting or exceeding standards, attendance rates, and number of students participating in assessment, are all factored into the calculation for adequate yearly progress (Georgia Department of Education, 2008).

Afterschool Program – Afterschool program refers to an organized, after-hours academic and enrichment program that is offered to students. Participation in an afterschool program is usually free and on a voluntary basis. Afterschool programs are generally offered to disadvantaged students first and then opened up to others, if room is available.

At-risk student- An at-risk student is one who is not meeting local or state standards or who is in danger of not meeting those standards. At-risk students are usually lacking in basic skills and knowledge. They are generally viewed as possible drop-outs, poor, disadvantaged, minority, non-English speakers, have behavior issues, and poor attendance (Deschenes, Cuban, Tyack, 2001).

Georgia Criterion-Referenced Competency Test- The Georgia Criterion-Referenced Competency Test (CRCT) is a multiple-choice standardized test designed to measure how well students have mastered standards in the state of Georgia. It compares students

to a standard level of proficiency. The Georgia CRCT is given yearly in the Spring to students in first grade through eighth grade.

Georgia Performance Standards- Georgia Performance Standards (GPS) are the measure by which students are assessed in Georgia. They were created to provide specific information to students, parents, and teachers about what students are expected to learn in each grade in the subjects of math, science, social studies, and reading and language arts.

Middle School Students- Middle school students are those students that are generally in the sixth, seventh, and eighth grades. They are in the middle or between elementary school and high school.

Needs Improvement- Needs improvement is the term used to describe a school or school system that has failed to demonstrate Adequate Yearly Progress for three or more years as defined by The No Child Left Behind Act (NCLB).

No Child Left Behind Act (NCLB)- The No Child Left Behind Act (NCLB) is federal legislation that was passed in 2001 which requires schools to bring all students up to their grade-level of achievement by the year 2014. This legislation was signed by President Bush and requires all states to create academic standards and to test or assess all students on those standards (No Child Left Behind, 2001).

Performance Level- The performance level on the CRCT is a range of scores that describes a student's level of achievement on their state's standards. The CRCT has three levels of performance. Does Not Meet the Standard includes those scores below 800. Meets the Standard is the performance level for scores in the range of 800-849. Exceeds the Standard is those scores 850 and above.

Standardized Tests- Standardized tests are those tests that are the same, are given to all students in the same way, and are scored by the same method. They are considered to be more consistent and fair and allow for comparisons to be made between students.

Supplemental Educational Services (SES)- Supplemental educational services (SES) are a provision of No Child Left Behind for Title I schools that are not meeting adequate yearly progress for more than two consecutive years. It provides extra instructional time and/or free tutoring services for students of those schools.

Title I of the Elementary and Secondary Education Act of 1965- Title I was created to improve disadvantaged children's academic achievement. It ensures that "all children have a fair, equal, and significant opportunity to obtain a high-quality education and reach, at a minimum, proficiency on challenging State academic achievement standards and state academic assessments" (United States Department of Education, *Title I of the Elementary and Secondary Education Act of 1965*, 2010, p.1)

Title I, Part A-Disadvantaged Children- The Title I, Part A program provides financial assistance to schools and local educational agencies "with high numbers or high percentages of poor children to help ensure that all children meet challenging state academic standards" (United States Department of Education, *Title I, Part A-Disadvantaged Children*, 2010, p.1).

Upper-Elementary Students- Upper-elementary students are those students that are generally in the third, fourth, and fifth grades.

21st Century Community Learning Centers (21st CCLC)- 21st Century Community Learning Centers were authorized under Title X of the Elementary and Secondary Act during Clinton's presidency. They allow schools to stay open later to provide services to

families and children (De Kanter, Williams, Cohen, & Stonehill, 2000). Typically these centers are afterschool programs that provide tutoring, homework help, and enrichment activities for at-risk students.

Summary

This research aids the school district in evaluating the effectiveness of its afterschool program. This research study will also contribute to the body of research on the effectiveness of afterschool programs in terms of their effectiveness on mathematics academic achievement. With the pressures of NCLB and the added pressures recently of budget cuts, school districts more than ever before are looking at their practices to see what works and what does not work. The findings of this study aid the local district in making decisions concerning allocation of funds to programs, providing feedback, and assisting in decisions concerning the restructure of programs.

Chapter one of this study introduced the topic of the study, the background of the problem, the purpose and statement of the problem, as well as research questions and hypotheses. Definitions of terms related to the study were also included. Chapter two contains a review of the related research concerning afterschool programs. The literature reveals the theories behind the topic, issues related to the at-risk student, various models of afterschool programs, the need for afterschool programs, the effectiveness and ineffectiveness of those programs, research issues and attendance, math strategies to use, 21st Century Community Learning Centers, and criterion-referenced competency tests. Chapter three contains the methodology used in the study, which includes the design, data gathering, sampling methods, instrumentation, and data analysis. Chapter four discloses the data that was collected and an analysis of the data. Chapter five of the study

conveys the final results of the study, the limitations and implications of the study, and imparts recommendations for future research.

CHAPTER TWO: REVIEW OF THE LITERATURE

This study investigated an afterschool program and its effectiveness on student math achievement. Chapter 2 of the study discusses a review of the related literature. Key areas explored are the theoretical framework for the study and issues concerning at-risk students and their need for extended time. Types of programs and afterschool models are discussed. Research studies of existing afterschool programs and their findings are revealed, as well as the issues surrounding afterschool programs and program attendance. Also examined are effective math strategies and standardized testing.

Theoretical Framework

The focus of this study was the developmental period of middle childhood to early adolescence, which includes children typically between the ages of 8 and 14. According to Erik Erikson's (1950) model of psychosocial development, children go through a series of developmental stages, each known for a psychological "crisis" that must be mastered. Erikson strongly believed that these stages occur in a fixed order in a certain span of time and children should not be pushed to achieve too quickly or be held back due to their young age. Erikson's fourth stage is known as Industry vs. Inferiority, and typically includes children age seven to eleven. During this time children are developing their self-confidence and should be encouraged to be industrious and praised for accomplishments. If children are made to feel inadequate they begin to doubt themselves. The fifth stage of development is known as Identity vs. Role Confusion and includes children ages twelve to nineteen. These adolescents begin to question the role

they will play in their adulthood. They wonder how they will “fit” into the world and often experiment with different behaviors. During these times of drastic physical and cognitive growth that children experience, afterschool programs have the obligation to support their developmental needs.

Understanding the social, cognitive, and psychological changes that children undergo enables afterschool programs to be successful in providing interesting, motivating, and developmentally-appropriate activities. It is during this time of young adulthood that children have the opportunity to develop a sense of identity. They are moving away from their family and spending more time with peers and other adults from the community (Miller, 2003; National Research Council, 2002). According to Gootman (2000), afterschool programs should be designed in such a manner that children are provided with the opportunity to develop skills across a variety of their interests and across cultures, to learn from and interact with mentors and to be a mentor to others, to contribute to their community, and to work with adults who truly care about them.

Children who are unsupervised after school can develop numerous negative developmental effects (National Research Council, 2002). Afterschool programs have been called upon to deliver to students what they need developmentally (Miller, Snow, & Lauer, 2004). Halpern (2000) reflects that students spend countless hours per day on basic skills and should have their other developmental needs supported. They need to feel valued and cared for by adults, have time to play with peers, play sports, and the chance to explore their own interests, as well as help with the academics. The National Research Council (2002) recommends that afterschool programs provide not only help with academic skills, but also with feelings of self-worth and belonging and physical and

emotional safety. Afterschool programs which keep children's developmental needs in mind are yet another environment in which children can learn about themselves, interact positively with other students and adults, and experience success (National Research Council, 2004).

Students At-Risk

Deschenes et al. (2001) defined at-risk students as those students who are "outside of the mainstream mold, and who cannot meet the expectation of an academic set of standards" (p. 525). These are students who may be branded as low-achievers, possible drop-outs, unable to meet standardized testing requirements, poor, minority, discipline problems, non-English speakers, disadvantaged, unmotivated, or from broken homes. Donnelly (1987) states that at-risk students are those that are not experiencing academic success and may possibly drop out of school. These low-achieving students are seen as "at-risk". Slavin, Karweit, & Madden (1989) define at-risk as generally meaning those students who are at-risk for school failure. Lower student achievement and dropping out of high school are closely linked with racial or ethnic minorities, low socio-economic status, single-parent families, limited in speaking English, and mothers with little education (Downing & Harrison, 1990; Miller, 2003).

There are various complex reasons that lead a student to being at-risk for school failure. Due to social, societal, and individual constraints, low-achieving students have difficulty reaching the high standards placed upon them by society and the educational system (Hock et al., 2001). According to Van Acker & Wehby (2000), it is the general assumption that a student's school failure is due to the student's personal characteristics. While the student plays a part in his or her own failure, this failure is largely due to the social circumstances in which the student has been exposed. The child's socio-economic

status, ethnic background, and family structure fundamentally influence his academic success.

Minority students fall greatly behind white students in achievement comparisons as stated by Balfanz & Byrnes (2006). Many minority students face literacy problems and are challenged by culture differences at school. Many minority children speak little to no English or have parents who do not speak any English. This places the child at a detriment, stifles the school to home communication, and puts the child at-risk for academic failure. According to Miller (2003) and the National Research Council (2002), one of the major risks faced by our youth today is that of separation or isolation due to prejudice, cultural bias, and racism. Teachers often have lower expectations of minority children and do not respond to them positively. The divisions that are seen in society are often replicated in schools. As a result, these students have higher drop-out rates, discipline referrals, special education placement, and grade retention (Davis-Allen, 2009). Miller relates that successful minority children are often viewed as being bicultural; they are able to function both at home and in society. Miller (p.6) states, "They must maintain the strong personal identity that is key to psychological health and, at the same time, find ways to meet the expectations of the mainstream educational system."

The original Elementary and Secondary Act produced Title I partially due to data showing that children of poverty were subject to academic failure (Miller et al., 2004). Low-income children generally live in neighborhoods where safety, substance abuse, and crime are relevant issues. According to the Children's Defense Fund (2000), children of poverty are more likely to live in dangerous areas, have recurring health problems,

receive a less than desirable education, lack after-school care, and be subjected to violence. Inner city and rural environments have the highest incidence of low-income families. Children in these areas have less access to enriching environments with books and are generally less exposed to reading and explanatory language and meaningful interactions with adults (Duke, 2000). As a result, they often enter school already behind their peers. Van Acker & Wehby (2000, p.93) state that, “The daily routines of child and youth development occur primarily within the specific contexts of the family, neighborhood, and peer group. The school serves as an important point of convergence of these social contexts.” Children of poverty by and large do not enter preschool with the same soft skills (communication, social, and behavioral skills expected at school) as children from higher-income families (Miller, 2003; Payne, 2003). This leads to children feeling separated from the school culture and gives way to academic failure. As humans, we tend to gravitate toward those activities that we excel in and pull away from those that we do not.

Children of poverty are more likely to be latchkey children. Their parents are working longer hours at lower-paying jobs and are not able to afford after-school care. These neighborhoods are less safe and Lumsden (2003) reported that between 7 and 15 million children go home to self-care. During these unsupervised times, children are more likely to be involved in criminal behavior, poor school attendance, earlier sexual behavior, depression, and health issues (Brooks-Gunn & Duncan, 1997). There is a higher incidence of dropping out of school. Parents often feel estranged from the school environment and their work hours are often in conflict with school hours; therefore, they

are not likely to be involved in their child's education. These characteristics of children of poverty put a child at-risk for failure.

The basic structure of the family unit has pronouncedly changed in the last few decades. According to Lauer et al. (2004), there is an increasing occurrence of children raised in a home with a step-parent, no-parent families, single-parent families, and children born to an out-of-wedlock mother. According to Kids Count (2010), statistics reveal that the fifty states range from 18%-54% of children living with a single-parent. Single-parent families are typically headed by the mother who is non-educated and has a smaller income. These homes are lacking in adult supervision, health care, and the means to effectively raise a child alone. Children raised by a single-parent suffer from higher levels of poverty, depression and anxiety, substance abuse, lower academic achievement, more absences from school, and higher drop-out rates (Miller, 2003).

Afterschool programs were first begun due to children living in unsafe neighborhoods and then later, as more and more mothers joined the workforce, there was a tremendous increase in the need for after-school care. In more recent years, policymakers have viewed afterschool programs as a way to bridge the achievement gap (Halpern, 2002). Students at-risk tend to enter school behind their peers, lose ground during summer months, and continue to fall behind as they age. They must make more progress in one year's time than the higher-achieving students (Balfanz & Byrnes, 2006), due to the time constraints placed on them by the No Child Left Behind (NCLB) Act of 2001. Since the inception of NCLB, educators have been looking at methods to help at-risk students meet standards. The educational needs of at-risk students are varied and complex. Afterschool programs can provide support for efficacy, emotional and physical

safety, a sense of belonging, skill building, and improved test scores, especially for those students who are at-risk for failure (National Research Council, 2002). These students are typically lacking in enriching experiences that afterschool programs can provide. Tutoring, individualized instruction (Lauer et al., 2004), literacy instruction (Saddler & Staulters, 2008), and differentiated instruction (Davis-Allen, 2009) are key components of afterschool programs that benefit at-risk students. These students need opportunities to participate in civic activities and community services and to be exposed to caring adults who model high standards and have high expectations for all (Van Acker & Wehby, 2000). According to Miller (2003), an afterschool program that involves “caring adults and small groups” allows under-achieving students to feel “connected” (p.22). Druian & Butler (1987) reveal at-risk students’ educational needs can be met in small groups, community activities, positive relationships with adults and peers, differentiated instruction, and parent involvement. As stated by Miller, many of the situations at-risk students are faced with- single-parent homes, poverty, and cultural differences- can be diminished through the involvement in an effective afterschool program.

Need For Extended Time

The 1983 report entitled *A Nation At Risk* requested that educators take a closer look at how students spend their time while at school and to look at the amount of time they spend on schoolwork. Compared with many other countries, students in the United States spend less time in school, as well as less time spent on schoolwork, as a whole. The United States’ also have less instructional time during the day as compared to countries like Japan, France, and Australia (Organization for Economic Co-Operation and Development, 2005). With the ever-increasing demands placed on the system of

education for all students to meet standards, teachers are being required to cover more material with greater depth, in the same time-frame that school systems have had for over a century (Elder, 2009). According to Cosden, Morrison, Albanese, & Macias (2001), homework is the result of a student's need for extended learning time in order to comprehend and practice skills introduced during the regular school day. However, it can be extremely wearisome when there is no support system at home to reinforce those skills after school hours. Policy makers and research studies have recommended programs that extend the learning time of students, especially for those at-risk students and failing schools (Council of Chief State School Officers, 1999; Lauer et al., 2004; National Education Commission on Time and Learning, 1994; National School Board Association, 2005; No Child Left Behind Act of 2001; Weiss et al., 2009; Worthen & Zsiray, 1994).

At-risk students benefit the most from extended school time. According to the Carnegie Corporation (1994), school operating hours should be expanded and the community and schools should work together during this extended time. They also report that disadvantaged students are more likely to lose learning over the summer months. Title I was created due to the research showing that these children are at-risk for failure and would benefit from extended learning time, while Miller et al. (2004) reflect that the Elementary and Secondary Education Act was produced for this same reason. Research has shown that due to the diverse needs of at-risk students, typical schooling may not be adequate to fill the needs of these students (Cooper, 2007; Gordon & Meroe, 2005; Miller et al., 2004; Weiss et al., 2009). Smith (2001) reported that the achievement gap between at-risk students and their peers indicates that at-risk students simply need more time than

the other students to learn the same material. It is not that they are not capable of learning the material, they simply need more time. This idea was confirmed by John Carroll in 1963 when he stated that the degree of learning was related to the time needed for comprehension. More precisely he developed the following equation:

$$\text{Degree of Learning} = \text{Time Spent} / \text{Time Needed}$$

The National Education Commission on Time and Learning (1994) declared:

Learning in America is a prisoner of time. For the past 150 years, American public schools have held time constant and let learning vary. The rule, only rarely voiced, is simple: learn what you can in the time we make available. It should surprise no one that some bright, hard-working students do reasonably well. Everyone else—from the typical student to the dropout—runs into trouble. (p.1)

Elder (2009) summarized that since students' opportunities, experiences, and capabilities are varied, so too should their schedule and learning times be varied. It must also be noted that time alone is not enough; this extended time must be a quality usage of time (Evans & Bechtel, 1997; Lauer et al., 2004; Miller et al., 2004; Ogden, 2008). It is logical to believe that when student's time spent on quality learning increases, student achievement will follow.

Program Models and Their Effectiveness

Afterschool programs offer a wide-range of schedules and activities, goals and missions, and are provided by numerous groups and stakeholders. Some programs provide only afterschool care, help with homework, tutoring services, academics,

recreation, or arts and crafts, while other afterschool programs are a combination of one or more of these activities. Services may be provided by the school system, a local university, a non-profit community group or organization, or a blend of these groups (Gootman, 2000). The effectiveness of the different strategies and program models is as wide and varied as the list of activities provided.

Afterschool programs are offered by numerous groups. Many quality programs are offered through the community or a local non-profit organization, for instance, YMCA, Boys' and Girls' Clubs of America, and Los Angeles' Better Educated Students for Tomorrow (LA's BEST). Often, afterschool programs are housed in the neighboring schools, but run by a local organization as a joint venture between the schools and the agency. One such program is The After School Corporation (TASC) in New York (Miller, 2003). However, more than half of afterschool programs, like the 21st Century Community Learning Centers (21st CCLC), are operated solely by the local school system as reported by the United States Conference of Mayors report in 2003. Today, the percentage is much higher.

The afterschool program model is based on the organization's goals and purpose. If the program purpose is to provide a safe environment for unsupervised children or relieve the burden of day-care for working parents, subsequently the after school program selected would be afterschool care (Miller, 2003; Gootman, 2000). Supervision is the key component of this model and its purpose is to protect children during those unsupervised hours after school when students are subject to such ills as drug and alcohol abuse and crime (Miller, 2003). Another goal of an afterschool program might be to improve scores on standardized tests in order to reach the goals of NCLB. According to

Scott-Little, Hamann, & Jurs (2002), the program may desire to incorporate tutoring or homework help, core content, or computer-assisted instruction. When choosing to increase academic achievement, services that provide tutoring, study skills, and homework help may be selected. Scott-Little et al. (2002) adds that programs that prefer to bridge the gap in achievement for at-risk students may decide to do a combination of services including recreation, life skills, homework help, and/or tutoring.

The schedule for afterschool programs by and large depends on the purpose of the organization and funding. In 2000, Gootman reported that the typical afterschool program begins immediately after school and runs from two to three hours each day for three to five days per week. Some of these programs incorporate extended learning times before school, on Saturdays, and in the summer months. The activities offered are varied, depending on the focus of the program. Some of the services provided as reported by Gootman (2000) are: homework help, snacks, tutoring, arts and crafts, study and test taking skills, music and dance, recreation, mentoring, theatre, computer-assisted instruction, cooking, parent involvement, community service, academics, remediation, and technology.

There is no common thread among studies of afterschool programs that constitutes a quality program. Some studies were conducted on available programs regardless of quality or research method standards (Hock et al., 2001; Dowell, 1986; Elder, 2009; Little, 2009). Other studies (Lauer et al., 2006; Vandell et al., 2007; Kane, 2004; Jenner & Jenner, 2007) have only researched programs that have met with certain standards of quality. Beckett, Hawken, & Jackowitz (2001) grouped practices of high-quality afterschool programs from research into the categories of community

involvement, program practices, and staff practices. Community involvement included involvement of the families of the participants into the program, involvement of community-based organizations, and volunteers in the program from the community. Quality program practices include a low student to teacher ratio, understandable goals and appropriate methods to evaluate those goals, developmentally appropriate activities, and a link with the regular school day. Staff practices found in quality afterschool programs included desirable funds to attract and retain staff, staff development, and the hiring of certified staff. Quality afterschool programs are being asked to provide a wide-array of services for a diverse group of students with various needs. Afterschool programs in which students have a healthy relationship with one another, a variety of opportunities for support academically, a variety of enrichment activities including art and recreation, and the students and staff have a supportive relationship, are components of a quality afterschool program (Vandell et al., 2007). According to Gootman (2000) there are several strategies that have been proven to be effective components of afterschool programs. Some of these include tutoring, help with homework, grouping, trained and caring staff, coordinating with the regular day school faculty, and alignment of standards.

Tutoring has long been viewed as beneficial to students at-risk. One-on-one instruction is invaluable in closing the achievement gap, and findings by Juel (1996) and Ross et al. (2008) support the fact that the lower the ratio of student to teacher, the more effective the tutoring or grouping. The personal attention and immediate feedback provided in tutoring is a powerful strategy. Specific types of tutoring like peer tutoring (Jenkins & Jenkins, 1987) and cross-age tutoring (Van Keer & Verhaeghe, 2005) also

have the potential for significant results in an afterschool program. According to studies by Hock et al. (2001), tutoring in an afterschool program enabled students who were at-risk for failure and exceptional students to earn improved grades on tests and quizzes. Moss, Swartz, Obeidallah, Stewart, & Greene (2001) found in their studies of afterschool programs that tutoring had the greatest gains when “tutoring sessions occur at least three times a week, tutors receive training both prior to and during the course of tutoring, program is at least moderately or fully implemented, programs evaluate the effectiveness of their tutoring activities” (p. 54). According to Fashola’s (1998) research, one-on-one tutoring is a promising component of any quality afterschool program whose focus is on academic achievement. In addition, (Lauer et al., 2006) a review of the literature on out-of-school programs revealed that one-on-one instruction with students had the greatest effect sizes. Tutoring students is an effective component of an afterschool program focusing on academic achievement, especially for those students who are at risk for failure.

Students who are unsupervised in the afternoons often do not receive the adult support necessary to complete assignments. Afterschool programs that incorporate homework help into their services are providing an indispensable service to students, parents, and teachers. McComb & Scott-Little (2003) account that in their review of research on afterschool programs, all but one program incorporated help with homework. In 2004, Kane related in his study of 129 afterschool centers that a typical day would include working on homework either independently or with the help of peers, or an adult would provide instruction. Huang & Cho (2009) communicate that a homework help component in afterschool programs should include:

- Pre-set time for homework completion
- Structured settings that provide materials and space that are devoid of distractions for homework completion
- Instructional support for students
- Allotting sufficient time for homework completion as part of a routine daily schedule (p. 383)

Homework provides students with the opportunity to practice skills and to develop theories on content introduced, as well as to develop good study habits.

Coordination between afterschool staff and regular day staff is an integral part of an effective afterschool program. Tutoring and homework help benefits will be diminished if there is no purposeful communication between stakeholders. The services provided must meet the needs of the student and focus on the standards being taught in the regular classroom (Ross et al., 2008). Halpern (1999) argues, however, that afterschool programs should not look too much like the regular school day program. He discloses that afterschool programs are successful due to the fact that they are not like the regular classroom and they provide opportunities for students that are not ordinarily available to them during the regular day. Collaboration and communication between the two entities is still very important (Miller, 2003). The regular classroom teacher can learn from the afterschool staff because of the closer connection that is built with the students and families, while the afterschool staff can discover the standards and academic needs of the students and those strategies and activities that can meet those needs. Miller (2003) continues to reveal that “collaboration between in-school and afterschool programs is something that nearly everyone likes, but no one knows how to achieve”

(p.75). He notes the areas of most difficulty found in the literature on communication and collaboration between in-school and afterschool staff include:

- Afterschool programs serve students from several grade levels which makes it difficult to incorporate the school curriculum effectively
- Afterschool staff are not usually paid for meeting/planning outside the allotted time with the students
- Turnover rates for afterschool staff is usually high due to low pay
- Afterschool staff and in-school staff do not usually have aligned schedules
- In-school staff often do not value afterschool programs or view the afterschool staff as effective (p. 75-76)

Communication between the involved parties, however, allows staff to follow progress made and adapt the strategies and services being implemented to better meet the needs of the student, and is therefore beneficial and worth the effort.

Researchers agree that a mixed program model that incorporates a wide variety of activities is most likely to engage more learners and be successful (De Kanter et al., 2000; Donnelly, 1987; Gootman, 2000; Miller, 2003; Neuman, 2010). These successful afterschool programs are different from the regular school day. They are able to provide enriching activities that help the at-risk student make connections to school. According to Neuman (2010), “Good programs nurture children’s talents, expose them to interesting people, and set tough-love standards of behavior. The interaction among play, work, and intense study reinforces children’s growing self-efficacy, social development, and sense of commitment to and place in their community” (p.32). Academic skills are of importance, but afterschool programs that incorporate play, recreation, and life skills,

along with academics, will meet the needs of more at-risk students. Stewart reported in 2007 that research shows quality afterschool programs maintain a constructive atmosphere in which students feel cared for and safe and are able to take responsibility for their own learning, have sufficient resources and properly trained staff, individualized instruction, and both enrichment and educational activities. Vandell, Reisner, & Pierce (2007) add that a strong community partnership with the afterschool program is a beneficial component in empowering students to have a stake in their community. Key components of effective afterschool programs, as stated by Gootman (2000), include:

- Clear goals and intended outcomes
- Content that is both age appropriate and challenging
- Opportunities for active learning processes
- Positive and safe environment
- Adequate materials and facilities
- Well-prepared staff
- Culturally competent staff
- Outreach to diverse groups of children and adolescents
- Willingness to work with other community resources and partners
- Parental involvement
- Willingness to continually improve (p.17-20)

In addition, Neuman (2010) reports afterschool programs should offer choices and foster student's talents. Research reported by Scott-Little et al. (2002) showed that most quality afterschool programs included activities in the arts, help with assignments, academic enrichment, recreational activities, and risk prevention. Lauer et al. (2006) adds and

Miller (2003) would concur that different strategies will work best with different age groups and with different subjects; therefore, strategies should be individualized to the student. Beckett et al. (2001) note that quality developmentally appropriate afterschool programs consist of the following eight attributes:

- Time to build skills
- Chance to belong
- Adequate structure
- Community, school, and family involvement
- Support for feelings of value
- Physical and emotional safety
- Supportive, caring adults
- Positive peer relationships

More time in school is not the answer, especially for at-risk students, but rather a better quality of time.

Evidence of Afterschool Program Effectiveness

Opportunities to develop academically, physically, and socially outside of the regular school day are the focus of many afterschool programs. These programs offer at-risk students the prospect of being involved in enriching activities in a safe and nurturing environment versus being left unsupervised in the afternoon. In addition, the No Child Left Behind (NCLB) Act of 2001 has placed great emphasis on academic achievement and funding supplemental education services in order to ensure schools make adequate yearly progress (AYP). However, along with the federal funding for supplemental educational services also comes a close scrutiny of its effectiveness on academic gains.

The National Institute on Out-of-School Time (2000) reports, “In the past two decades, the term accountability, has undergone an evolution. Our society has moved away from a system that measures the value of programs by monitoring expenditures and activities, to one that emphasizes proven results” (p.1). Due to these increased accountability measures, research is plentiful on the effectiveness of afterschool programs (Huang & Cho, 2009; Jenner & Jenner, 2007; Vandell et al., 2007).

The research analysis by Kane (2004) for the William T. Grant Foundation is an ongoing examination of four studies conducted on different afterschool programs across the nation. This breakdown assessed four research studies of the following afterschool programs: Extended-Service Schools Initiative (ESS) conducted by Manpower Demonstration Research Corporation (MDRC) and Public/Private Ventures, The After-School Corporation (TASC) conducted by Policy Studies Associates, San Francisco Beacons Initiative (SFBI) conducted by Public/Private Ventures, 21st Century Community Learning Centers (21st CCLC) conducted by Decision Information Resources and Mathematica Policy Research. The study of ESS involved afterschool programs in ten schools over six cities and Kane reported a positive impact on student’s paying more attention in their regular class, as reported by the student. The study of SFBI involved three middle schools programs in San Francisco and was found to have the same positive effect on student effort in class. TASC analysis included all 96 of their programs that were first funded in years 1998-1999 and 1999-2000. Kane’s breakdown of the study revealed that school attendance improved for active participants. In math, participants made a .12 standard deviation gain, while active participants made a gain of .17 standard deviation units. The 21st CCLC study included 11 elementary schools and 46 middle

schools across the United States. The synthesis of the study conducted by Kane showed many positive accomplishments of the 21st CCLC afterschool programs. For middle schoolers, there were fewer absences and tardies in regular school. Students in the program were more likely to complete their homework to the teacher's satisfaction and parents were more active and involved in school activities and volunteering. Most importantly, there was an increase in student's math grades. The elementary students had an increase in their social studies' grades and parents were more involved in attending afterschool functions and helping with their child's homework.

According to a study conducted by Jenner & Jenner (2007) on 21st CCLC programs in Louisiana, the programs had significant results in social studies, language arts, and reading. Attendance in the programs was found to be a key element for effectiveness. "The results examined here offer strong empirical evidence that program attendance does positively impact the academic performance of at-risk children," (p.231). The study also reports that the recreational and enriching activities are the components of the program which students enjoyed the most and facilitated their attendance. Therefore, in order for the academic strategies to be effective, students must want to attend.

Huang & Cho (2009) studied afterschool programs which had a strong homework help component and had shown a gain in academic achievement for at-risk students. Their examination revealed seven "high-functioning" (p. 382) afterschool programs in which students had made grade level gains. The programs were located from across the United States and included rural and urban areas, as well as culturally diverse populations. The efforts of these programs resulted in not only academic gains, but also higher student self-esteem and self-efficacy in their academic abilities.

Thirty-five, high-quality afterschool programs were studied for two years involving nearly 3,000 students, both participants and non-participants (Vandell et al., 2007). These programs served culturally diverse, at-risk students from elementary and middle schools. The afterschool programs had recreational, enriching, and art activity components. They employed a well-trained and positive, nurturing staff and kept a low student to teacher ratio, as well as involving parents and the community in their program. They were found to actively engage students in developmentally-appropriate curriculum that incorporated games and tutoring to focus on reading and math skills. The students were categorized as Program Only (only attended the afterschool program), Program Plus (attended the afterschool program as well as participated in other activities after school like sports, Boy Scouts, etc.), and Low Supervision (inconsistent attendance in any supervised activity after school). The following outcomes were found for elementary school students as compared to the Low Supervision group:

- Program Plus and Program Only students made gains in their work habits and task resolution as reported by teachers and themselves
- Program Plus and Program Only students made significant gains in positive social behaviors and a reduction in aggressive behaviors
- Program Plus and Program Only students who had regular attendance in a high-quality afterschool program over the two-year study made significant gains in math standardized test scores (Program Plus effect size .73 and Program Only effect size .52)

The following outcomes were found for middle school students as compared to the Low Supervision group:

- Program Plus and Program Only students reported decreased misbehaviors and a significant decrease in their use of drugs and alcohol (Program Plus effect size .67 and Program Only effect size .47)
- Program Plus and Program Only students reported a significant gain in their self-reported work habits
- Program Plus and Program Only students who had regular attendance in a high-quality afterschool program over the two-year study made significant gains in math standardized test scores (Program Plus effect size .57 and Program Only effect size .55)

This study revealed negative effects for at-risk students who lacked supervision after school.

There are many close examinations of afterschool programs that reveal positive outcomes. Reported feelings of increased safety were accounted by participants in 21st CCLC programs across the nation (James-Burdumy, Dynarski, & Deke, 2007). After many improvements were made to the afterschool program, those students who attended most regularly had positive math gains in a study conducted by Zuelke & Nelson (2001). In a study of tutoring afterschool programs by Hock et al. (2001), 83% of program participants made gains in their academic grades.

An analysis of TASC programs in 2001-2002 completed by Reisner et al. (2004) revealed positive effects in many areas. Students reported positive social interactions with peers and staff and a feeling of community. The students felt they were given opportunities to learn life skills, to be a leader, and to learn through new experiences. Most importantly, students reported a higher engagement in learning. Principals of the

involved schools communicated positive outcomes of the program of parents' feelings of importance, student safety and self-esteem, and improved attendance by students in school and parents in school activities. Academically, participants (grades 3-8) in the TASC programs made greater gains in math, one-year participation had an effect size of .06 and two-year participation had an effect size of .42, than those who were not enrolled. The students who attended most frequently and for the longest time made the greatest gains, one-year participation had an effect size of .13, while two-year participation had an effect size of .79. From the students who made gains in mathematics, Blacks and Hispanics were found to be the racial groups making the most significant gains.

Horton (2010) conducted a study of the effect of 21st CCLC programs in rural Georgia on behavior and standardized tests of at-risk students in middle school. A significant difference was found between pre-treatment and post-treatment scores on the Mathematics Georgia Criterion Referenced Competency Test (CRCT), it was especially significant for females. A study conducted by Dreyer in 2010 focused on academic outcomes of students attending afterschool programs operated within charter schools in Pennsylvania. She found that those who participated in the program made greater gains in math than those who did not participate. It was also reported that boys in elementary school that participated made greater gains in reading than either girls or middle school students, also in the program. While a third study, conducted by Davis-Allen in 2009 in Georgia, found that fourth and fifth grade participants in the afterschool program made gains in reading standardized tests and fifth graders made significant gains in math.

DeKanter et al. (2000) reported the following benefits of 21st CCLC programs across the nation:

- Participants in programs in Chattanooga, Tennessee improved their school attendance
 - 40% drop in juvenile crime around the centers in Highland Park, Michigan
 - 72% of participants improved grades by five points (100 point scale) in one or more academic classes in Brooklyn, New York
 - 7th-10th graders stay at school after school and finish their homework or a project, play games, and have a snack instead of congregating around a nearby grocery store and liquor store in Bayfield, Wisconsin
 - 25% reduction in violence of regularly participating students in Montgomery, Alabama's afterschool Star Search programs
 - Teen pregnancies were reduced from six in 1998 to none in 2000 as result of an abstinence program implemented by these afterschool programs in Plainview, Arkansas
 - Substantial drop in use of tobacco, alcohol, and drugs since expansion of programs in Oregon at Huock Middle School
 - Palm Beach County, Florida reported that math and reading scores have increased for those participating
 - 120 students were not retained in grade as result of these programs in McCormick, South Carolina
 - Afterschool programs funded by Foundations in Philadelphia had fourth graders to achieve higher than nonparticipants in math, reading, and language arts (p.3)
- Miller et al. (2004) reported numerous achievements of at-risk students in afterschool programs across the United States. Sixth, seventh, and eighth-grade students

in rural Georgia afterschool programs accomplished a 31 percentile point increase in reading standardized testing. In the Project Accelerated Literacy (PAL) program for kindergarten students at-risk, a gain in literacy by 16 percentile points was made. Twenty schools in Austin, Texas involved in a parks and recreation afterschool program found a 12 percentile point gain in both reading and math, as well improved self-esteem of participants. In addition, the Howard Street Tutoring Program located in Chicago accomplished a 19 percentile point gain for afterschool students in reading achievement. These quality afterschool programs are making an academic difference in the lives of at-risk students.

In 2000, Bissell reported findings on California's After School Learning and Safe Neighborhoods Partnerships Program (ASLSNPP). The study focused on academic achievement gains. It was found that students who participated in the program had reading and math test gains exceeding the state average. Students were also less likely to be retained a grade in school, especially for elementary students. Another afterschool program in California, LA's BEST, was examined by Huang, Gribbons, Kim, Lee, & Baker (2000). The researchers found only modest improvements in standardized test scores; however, there was a drastic improvement in students' feelings toward school. Also, for those long-term participants (4 or more years) there was an increase in achievement. Based on the results of these studies and others, Brown, Frates, Rudge, & Tradewell (2002) predicted the high and low range of costs and savings of the After School Education and Safety Program Act of 2002. The researchers took into account reduced crime rates, higher graduation rates, decreased child care and welfare costs,

higher salary, increased costs for schooling, and found that these afterschool programs would result in savings in range of \$8.90 to \$12.90 for every dollar spent on the program.

A meta-analysis of quality evaluations of out-of-school programs for at-risk students was conducted by Lauer et al. (2006). The analysis included 35 studies, of which 30 had reading results, 22 had math results, and 17 addressed both math and reading. The out-of-school programs evaluated were found to have a significantly positive effect of at-risk students' reading achievement. For mathematics, out-of-school programs had positive effects on achievement of at-risk students with an average effect size, based on a fixed-effects model, of .09, and based on random-effects model, an average effect of .17. These positive effects were significantly greater than zero; this research shows out-of-school programs positively affect the math and reading achievement of at-risk students.

Afterschool programs do positively impact the academic achievement, self-efficacy, attendance, and behavior of the students who attend these programs, as revealed by these studies. There is also evidence that some afterschool programs do not make a positive impact on its students.

No Evidence of Afterschool Program Effectiveness

A large portion of the research on afterschool programs demonstrates a significant difference in one category and no difference in other categories. Moreover, many of the studies on afterschool programs do not show a significant difference on any of the tested moderators.

A research study carried by Little (2009) in a Title I school in Georgia sought to determine the effectiveness of the afterschool program. 510 students were included in the

study, half were participants and the other half served as a comparison group. 53% of students in the school received free or reduced lunches. Little found there was no significant difference in changes in CRCT math scores for those participating in the afterschool program, as compared to those who did not participate. It was also determined that there was no significant differences in reading and/or math scores for those participants who were eligible for free or reduced lunches, for minority groups, or for those who attended the year-long program versus those who attended a shortened program.

In a study conducted by Cooper (2007) in New York City on grades three through six, 714 afterschool participants were examined to determine if the supplemental educational services provided made a significant difference in reading, math, and language arts scores on standardized test scores. There was found to be no significant difference in reading or language arts scores, but for math there was a significant difference found. Horton (2010) found the same results in an afterschool study with a difference in math scores and no significant difference in reading scores. This study was conducted in two Title I middle schools in Georgia comprising 58 afterschool participants. In 2009, research performed by Elder found no difference in reading or math grades for participants in an afterschool program in Kansas. Length of attendance in the program was also not to be found as a determining factor for achievement.

A study conducted in a Title I suburban school in Augusta, Georgia by Ogden (2008) examined the afterschool program and Saturday School program to determine their effectiveness on achievement. The research also investigated whether regular attendance in these two programs would make more of a difference. The school was

classified as 95% minority and had failed to meet AYP guidelines for the past eight years. The study reported no significant difference in pretest and posttest scores on the CRCT for afterschool or Saturday school participants. Attendance was not found to make a significant difference for either program, as well.

According to Viadero (2007), there is little to no evidence that provisions of NCLB to provide afterschool tutoring to at-risk students is academically beneficial. She states, “While most parents report satisfaction with the services, the studies find, the added hours of tutoring have so far produced only small or negligible gains on state reading and mathematics tests” (p.7). Viadero questions the extra time and money spent on these afterschool strategies when research is not supportive. Ross et al. (2008) conducted a Tennessee state-wide study of supplemental educational tutoring services in afterschool. In addition, Dowell (1986) evaluated the afterschool tutoring program, CROSSROADS, in California. Both studies (Dowell, 1986; Ross et al. 2008) found little to no significant impact on academic achievement.

Evidence from the national evaluation of the 21st CCLC did not provide satisfactory results related to academic achievement. James-Burdumy et al. (2007) reveal that these afterschool programs allowed students to feel safe. However, the program did not make a significant difference in homework completion, had negative effects on student behavior, and most importantly, 21st CCLC afterschool programs had no effect on academic achievement. The authors noted that attendance in the program, communication between the program and regular school, and a focus on academics were problematic issues which may have limited the results.

Research Issues

Researching the effectiveness of afterschool programs has not been conclusive, as the previous studies have shown. According to Viadero (2007), NCLB has placed state education departments in charge of monitoring supplemental educational services, but has not directed them as to how to evaluate these programs or given them the funds or resources for conducting the evaluation. Afterschool programs, historically, have also not kept relevant data as to who is participating, how long they attend, and how their time is spent (Gootman, 2000). Policymakers are now driven by evidence that afterschool programs are affecting academic achievement. Gootman (2000) relates that it is imperative to collect high-quality research or “growth and long-term investments in programs would be limited” (p. 33). Researching afterschool program effectiveness is challenging, at best.

Research design is a problematic issue with afterschool evaluations. When researching educational topics which involve children, there are ethical issues that must be considered first and foremost and this may limit the use of a true control group. According to Miller (2003), “when it comes to out-of-school time, there is no such thing as a “no treatment” group” (p.88). Most all children do something after school and whether that activity is religious, recreational, sports, home with an adult, or home alone, these differences are difficult to discriminate from afterschool program differences. Children or their parents choose to participate in afterschool programs and that choice alone, distinguishes them from those that choose not to participate. These facts limit afterschool research and reliability (Miller, 2003). Without a true comparison group, it is nearly impossible to tell whether differences in the groups are the effect of the afterschool

group or from expected development. Kane (2004) discloses that much of the research to date has not used a baseline measurement to account for previous differences in the groups, which would limit the generalizations that could be made to other populations.

Research studies do not have a tendency to examine the detailed features of the program, but rather give general descriptions. Afterschool programs have their own particular definition of attendance and participation. 21st Century Community Learning Centers use 30 days to determine that a student is defined as actively participating (De Kanter et al., 2000). Jenner & Jenner (2007) study programs and place participants in a range of days of attendance from 30-59, 60-89, and 90 and greater. In-depth examinations of the intervention type would add to the literature and restructuring of programs to ensure effectiveness. According to Scott-Little et al. (2002), afterschool studies “tend not to examine specific features of after-school programs that might be associated with these positive outcomes” (p. 388).

Numerous research studies question the standard by which we measure a significance difference (Dreyer, 2010; Jenner & Jenner, 2007; Kane, 2004; Lauer et al., 2006; Ross et al., 2008). “An effect size is a statistical tool that is useful in interpreting the magnitude of the difference between two measures,” as stated by Vandell et al. (2007). Lauer et al. (2006) recommend that because afterschool programs reflect a small portion of the student’s day, the .20 small effect sizes for typical educational interventions might not be reasonable. The researchers add that due to the fact that afterschool programs are comprised of mostly at-risk students who typically struggle academically, that any effect size greater than .0 should be considered significant. Kane (2004) argues that “this [.20 standard deviation] is an unrealistically large impact” (p.3).

“The size of the impact one might reasonably expect should be a function of the nature of the program being evaluated” (p.4), he adds. Kane recommends estimating the impact of an entire year of education and then determining the effect of one or two more hours of instruction for afterschool. He notes that an effect size .05 would be a significant difference for afterschool participation.

Changes brought about by NCLB have increased the scrutiny of afterschool programs and the evaluations of these programs. Scott-Little et al. (2002) describe the field of afterschool evaluation as “emerging” (p.409). They go on to state:

It is a new day in the field of after-school services, and the stakes related to after-school evaluations are high. However, without solid evaluations and outcome measures that demonstrate effectiveness, the public and the funders may turn to other priorities (p.409).

They illuminate the following issues concerning high-quality evaluations of afterschool programs:

- Need for more evaluations and for those evaluations to be circulated
- Need for afterschool evaluations to address the Program Evaluation Standards
- Need for afterschool evaluations to apply proven evaluation designs
- Need for better measures of student outcomes
- Need for attention to issues concerning participants dropping from the study, but not from the program
- Need to pay attention to program quality and composition
- Need for longitudinal data
- Need to provide adequate evaluation reports (p.411-414)

Afterschool Attendance

When examining afterschool programs for quality and effectiveness, researchers scrutinize attendance rates and participation rates of students (Kane, 2004; Lauer et al., 2006; McComb & Scott-Little, 2003; Reisner et al., 2004). Quality afterschool programs significantly impact school grades and standardized test scores. The research suggests (Durlak & Weissberg, 2007; Posner & Vandell, 1999; American Youth Policy Forum, 2006) that increased participation in activities after school increases academic achievement, time on homework, school attendance, and improved student behavior. Reisner et al. (2004) reported that TASC programs were providing “evidence of program quality” (p. i) as the program focused on frequency and duration of attendance. TASC programs had an 85% median attendance rate for prekindergarten through eighth grade and 63% attended the following year. McComb & Scott-Little (2003) evaluated 27 studies of afterschool programs and found time and again that students who gain the most are the ones who attend more frequently and for longer periods of time. Better attendance in afterschool programs has been shown to improve students’ study skills, work habits, and academic achievement (Vandell et al. 2005), as well as graduation rates (Afterschool Alliance, 2008). Bissell (2002) reported that students in California’s After School Learning and Safe Neighborhoods Partnerships Program (ASLSNPP) improved their standardized reading test scores and those who had participated for more than 150 days had the highest gains. Other studies (Huang et al., 2000; Jenner & Jenner, 2007) concur that afterschool program attendance does make a significant difference in academic achievement of students at-risk.

Elementary students appear to attend more frequently and as students get older their attendance begins to drop and becomes almost non-existent for high-schoolers (Kane, 2004). It seems logical that because afterschool programs focus on positive interventions for students, that by participating in the intervention, students would make gains. The key would seem to be to engage students and to motivate them to attend more regularly or to provide incentives for their participation (Huang et al., 2000; Lauer et al., 2004).

Effective Math Strategies

Aptitude in mathematics is an essential life skill. Problem-solving skills, critical thinking skills, and mathematics knowledge are necessary for success in today's world. In many instances, however, America's students are not learning these skills. Miller et al. (2004) reports that only 29% of eighth graders and 32% of fourth graders performed at proficiency level on the National Assessment of Educational Progress in math in 2003. Students from poverty, at every grade level, who were eligible to receive free or reduced lunches, scored significantly lower in mathematics than students who were not eligible (Lauer et al., 2004).

Effective teaching strategies when presenting mathematical concepts is a critical component of raising the academic achievement of students and bridging the achievement gap for at-risk students. Teachers must use strategies that are proven to increase understanding and meaning of math concepts (Lubienski, 2007). Evidence-based research on effective instructional practices for teaching mathematics confirms that students learn best when presented with reality-based instruction. With reality-based instruction, students are given the opportunity to use their prior knowledge to solve real-

world, meaningful problems. Research supports the evidence that connecting math scenarios to real life situations benefits students and increases academic performance in math (Bottge, Heinrichs, Chan, & Serlin, (2001). Reality-based instructional strategies allow children to learn through discovery and promote in them the self-confidence they need to solve complicated math problems. Confidence and an eagerness to tackle math problems is a recurring characteristic of successful math students (Hoffman & Brahier, 2008). This research focused on the major variations in math instruction in the United States, as compared to that in Japan. Japan continues to do better than the United States in educational achievement. Hoffman & Brahier (2008) found that in Japan teachers focus on the discovery of the learning and encourage a student's frustration. Students are encouraged to work through the problem, which increases comprehension. The study revealed that in the United States, teachers are more concerned with a student's self-esteem and focusing on the steps and rules in solving the problem. The researchers hypothesized that the difference between the teaching strategies and methods of solving problems attributed to Japan's success over the United States.

Mathematics instruction in afterschool programs must address the needs of at-risk and low-achieving students. According to a research synthesis by Lauer et al. in 2004, "careful program design and program fidelity are important elements" (p.72) to consider when developing afterschool math programs. Miller et al. (2004) found the following program structures to have the highest gains in mathematics:

- Programs for high school students
- Programs for middle school students
- Programs that last between 45 and 100 hours

- Programs that combine mathematics instruction with social activities (pp.72-73)

Briggs-Hale, Judd, Martindill, and Parsley (2006) concluded that strategies that support student's physical, emotional, and social development will provide the most relevant connection between mathematics instruction and afterschool programs. Their research found three key strategies of effective math instruction:

- Encourage problem solving
- Develop and support math talk
- Emphasize working together (pp.5-6)

These three key ideas incorporate using math tools, math centers, games, tutoring, connecting mathematics with the family, and math projects. These type strategies incorporate real-world situations and problems from outside the classroom into the math instruction. They explore many solutions to problems through communication and open dialogue.

21st Century Community Learning Centers

Authorized under Title X of the Elementary and Secondary Education Act, during Clinton's presidency, 21st Century Community Learning Centers (21st CCLC) provide families and children with a safe environment in the critical hours after school (De Kanter et al., 2000). They are funded by grants through the U.S. Department of Education and allow schools to stay open later to provide services to families and children. De Kanter et al. (2000) go on to state, "They also provide students with access to homework centers and tutors and to cultural enrichment, recreational, and nutritional opportunities. In addition, life-long learning activities are available for community members in a local school setting" (p.1).

21st CCLC began with \$40 million in funding in 1998 and in 2008 was appropriated over \$1 billion, giving out 52 new grants that year, according to the United States Department of Education (21st Century Community Learning Centers, 2010). In 2006, there were 9,824 centers with 66% of all new grants being given to school districts, 20% awarded to community-based organizations and national non-profit groups, and 14% to other organizations. 89% of all centers are housed in schools with half of the centers serving only elementary students and 41% of all centers being staffed by mostly school-day teachers (Naftzger et al., 2007).

The mission of 21st CCLC is to provide enriching and academic programs that strengthen and support the regular school day, according to Naftzger et al. (2007). Center emphasis is broken down into the following components:

- 14% of centers provide mostly homework help
- 20% of centers provide mostly recreational activities
- 26% of centers provide mostly academic support
- 27% of centers provide a variety of the above activities (p.3)

The United States Department of Education (2003) evaluated the country's 21st CCLCs at the end of its first year of implementation and found no significant differences among the 5,300 students in the sample between those who had attended the afterschool programs and those who had not. This report became the basis for the drastic funding cuts by the federal government and widespread concern over the actual benefits of afterschool programs. However, this study also received extensive criticism over its methods and design and perceived generalizations. Riggs & Greenberg (2004) disclosed that the 21st CCLCs were in their first year of implementation and therefore were prone to

the first year issues of staff training and collaboration between the school and afterschool program. They also noted that some of the schools in the sample had other afterschool programs operating at the same time and a number of the students in the control group were attending those programs. According to Mahoney & Zigler (2006), elementary students had such low participation rates in these afterschool programs that it could have accounted for the lack of significant positive results. They go on to reveal that the researchers in the United States Department of Education study of 21st CCLC did not control for initial differences in the middle school group and the middle school intervention group was at a higher risk for failure than the control group.

The evidence on whether or not 21st CCLC programs are impacting academic achievement is mixed. James-Burdumy et al. (2005) found no impact on student achievement from 21st CCLC programs. Kane in 2004 revealed gains in student attendance in school, improved grades, and improvements in homework. In 2007, Jenner & Jenner reported an impact on reading, language arts, and social studies by 21st CCLC programs in Louisiana, for students attending more than 30 days. In spite of mixed reviews, there is still wide-spread support from parents, educators, communities, and policymakers.

Criterion-Referenced Competency Test

Criterion-referenced tests are intended to measure how well a student has learned the information and skills taught in a specific curriculum. They do not compare one student to another or rank them compared to others, like norm-referenced tests. The Georgia Criterion-Referenced Competency Test is specifically designed to assess students' knowledge of Georgia's performance standards. As a result, information is

available on the student's achievement, as well as the class, school, district, and state. The state's quality of education can be gauged, and strengths and weaknesses can then be identified to enable leaders to supply and adjust school programs accordingly (Georgia Department of Education, 2008).

Criterion-referenced test scores are generally reported as scaled scores, raw scores, and performance levels. The scaled score shows where a student's score is within a range of scores for that grade level and content area, while the raw score simply discloses the number of test items the student got correct. Performance levels reveal the amount of the content standards the student mastered.

The CRCT is Georgia's instrument for determining school quality and effectiveness. It is administered in the spring of each year to students in first through eighth grade. Some school systems require administration in Kindergarten, as well. Reading, mathematics, and english/language arts are tested in each year and third through eighth grade also test science and social studies. A score below 800 is deemed as not meeting expectations or performance level for that grade and content area. A score between 800 and 849 is deemed as meeting expectations, while scores 850 and above exceed expectations. The test is used to measure students' progress from year to year. Norm-referenced testing is required in third, fifth, and eighth grades as the scores are compared to national scores and also used in determining promotion of students to the next grade level. CRCT scores are also used to determine whether school systems are making Adequate Yearly Progress (AYP) under NCLB.

Summary

The review of the related literature on afterschool programs and their

effectiveness found many consistent themes. These themes included the theoretical framework in creating afterschool programs, at-risk students and their need for extended time, varying program models, evidence and non-evidence of afterschool program effectiveness, issues surrounding the research available on afterschool programs, attendance issues with afterschool programs, effective math strategies, 21st Century Community Learning Centers, and using criterion-referenced competency tests as an evaluation tool for afterschool programs.

Low-achieving students have difficulty reaching the high standards placed upon them by society and the educational system, due to social, societal, and individual constraints (Hock et al., 2001). Without intervention, the end product for these students could perhaps be a future of unemployment or crime. Students who are at-risk for failure or who are low-achieving must have a way to bridge the achievement gap. Out-of-school opportunities like afterschool programs provide these students with the opportunity to close that gap. Afterschool programs benefit not only the student and school through increased instructional time and meeting the requirements of NCLB, but also benefit parents and the community through extended day-care, safety, and help with homework (Saddler & Staulters, 2008).

The review of the literature provided the basis for the development of this study. This study investigated the effectiveness on math student achievement of a 21st Century Community Learning Center afterschool program in rural Georgia. Chapter three will discuss the methodology of the study, including a detailed description of the design used for the study, data gathering methods, participants in the study and sampling methods, instrumentation, and data analysis.

CHAPTER THREE: METHODOLOGY

This quantitative study was designed to determine the effectiveness of an afterschool program in increasing achievement of at-risk upper elementary and middle school students in mathematics as measured by state standardized testing. This chapter includes a description of the methodology that was used to conduct the study. It consists of a depiction of the design, participants and site used in the study, and the data collection and analysis methods that were applied.

Overview

This study examined at-risk upper-elementary and middle school students who participated in the 21st Century Community Learning Center afterschool program. Data from the 2010-2011 CRCT math scores were compiled. The study investigated the relationship between those at-risk upper-elementary students and middle school students who participated in the afterschool program as compared to those at-risk upper-elementary and middle school students who did not participate in the afterschool program. For this study two groups of students were compared. One group of at-risk third, fourth, and fifth grade students who participated in the afterschool program were compared to a control group of at-risk third, fourth, and fifth grade students who did not participate in the afterschool program. Another group of at-risk sixth, seventh, and eighth grade students who participated in the afterschool program were compared to a control group of at-risk sixth, seventh, and eighth grade students who did not participate in the afterschool program. The independent variable of participation in the after-school program was compared to the dependent variable of mathematics scores on the CRCT.

The specific questions which guided this research study are as follows:

1. What effect does participation in an afterschool program have on math achievement scores, as measured by performance on the Georgia Criterion-Referenced Competency Test in mathematics, of at-risk third, fourth, and fifth grade students?

Null Hypothesis: There will be no significant difference in mathematics achievement scores, as measured by performance on the Georgia Criterion-Referenced Competency Test in mathematics, of at-risk third, fourth, and fifth grade students who participated in an afterschool program as compared to those third, fourth, and fifth grade students who did not participate in the afterschool program.

2. What effect does participation in an afterschool program have on math achievement scores, as measured by performance on the Georgia Criterion-Referenced Competency Test in mathematics, of at-risk sixth, seventh, and eighth grade students?

Null Hypothesis: There will be no significant difference in mathematics achievement scores, as measured by performance on the Georgia Criterion-Referenced Competency Test in mathematics, of at-risk sixth, seventh, and eighth grade students who participated in an afterschool program as compared to those sixth, seventh, and eighth grade students who did not participate in the afterschool program.

Failing to reject the null hypotheses would allow stakeholders to reevaluate program content and design and also to reassess budget concerns. Rejection of the null

hypotheses would maintain the idea that afterschool programs are beneficial to the math achievement of at-risk upper-elementary and middle school students.

Design

The purpose of this study was to determine the impact of an afterschool program on math achievement that was proposed as a positive intervention for at-risk students. It was the goal of the study to determine whether upper-elementary and middle school at-risk students made significant gains in mathematics scores on the CRCT as compared to at-risk upper-elementary and middle school students who did not participate in the program.

A quantitative approach was utilized in this study. This approach was appropriate because numerical data was used to answer predetermined research questions and hypotheses (Ary, Jacobs, & Sorensen, 2010). The ex post facto (“after the fact”) research design or sometimes called causal comparative was used in this research study (Ary et al., p.332). This was suitable because the purpose was to determine the cause and effect relationship between dependent and independent variables. The variables could not be manipulated and randomization was not permitted. The groups were different on some variable and the goal was to determine what factor was contributing to the difference. The effect and the probable cause had already occurred and were studied after the occurrence (Ary et al.). These preexisting data and groups were used to determine the cause and effect. Ex post facto research was chosen over correlational research because correlational research involves two or more variables and only one group.

The limitation of ex post facto research was that because the groups were already formed, the same kinds of controls used in experimental research could not be used. This

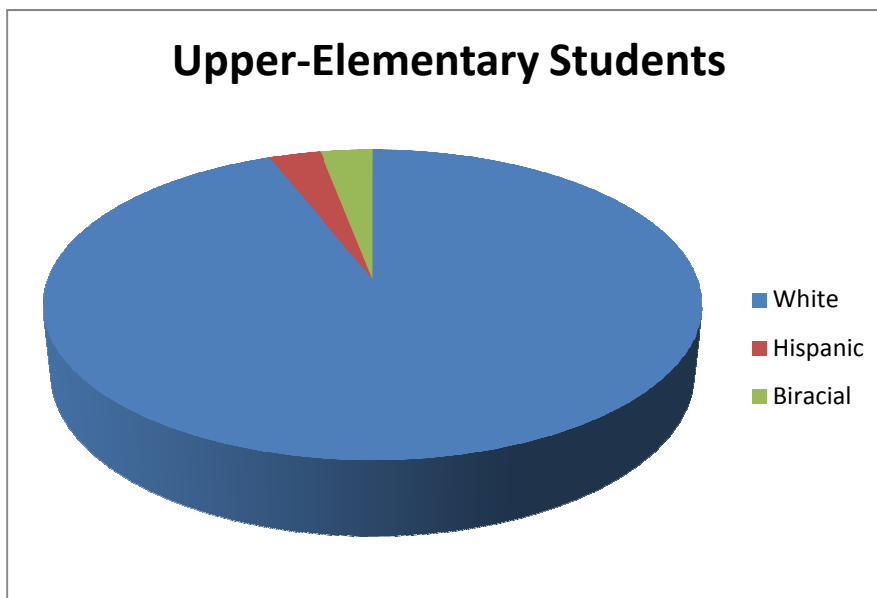
type of research is often used in educational studies when humans are involved due to the ethical nature of the study (Ary, et al.). Selection bias was a concern with this research. It is often not possible to randomly assign students to afterschool programs. Therefore, any factors which may result in groups being different may be attributable to the difference in the dependent variable. A comparison group must be used to counter this limitation. Therefore, a group with very similar characteristics was used as a control group throughout the study.

Participants

Participants in this study were chosen from two schools in Georgia. The sample for this study consisted of 57 at-risk third, fourth, and fifth grade students from an elementary school and 33 at-risk sixth, seventh and eighth grade students from a middle school who participated in the 2010-2011 school system's 21st Century Community Learning Center afterschool program. Students were invited to participate in the afterschool program based on 1) CRCT scores, 2) academic grades, and 3) teacher recommendation. Openings in the program were then filled by any interested students on a first-come-first-served basis. A waiting list was kept up to date. A comparison group of 57 at-risk upper-elementary and 33 at-risk middle school students who were invited to participate in the program, but who chose not to participate in the program, was utilized. The upper-elementary group, therefore, consisted of a total of 114 students. 51% were male and 63% female, with 82% receiving free or reduced lunches. 50% of these students were in fifth grade, 33% in fourth grade, and 18 % were in third grade. There was little variance in ethnicity of the upper-elementary group with 94% being white, 3%

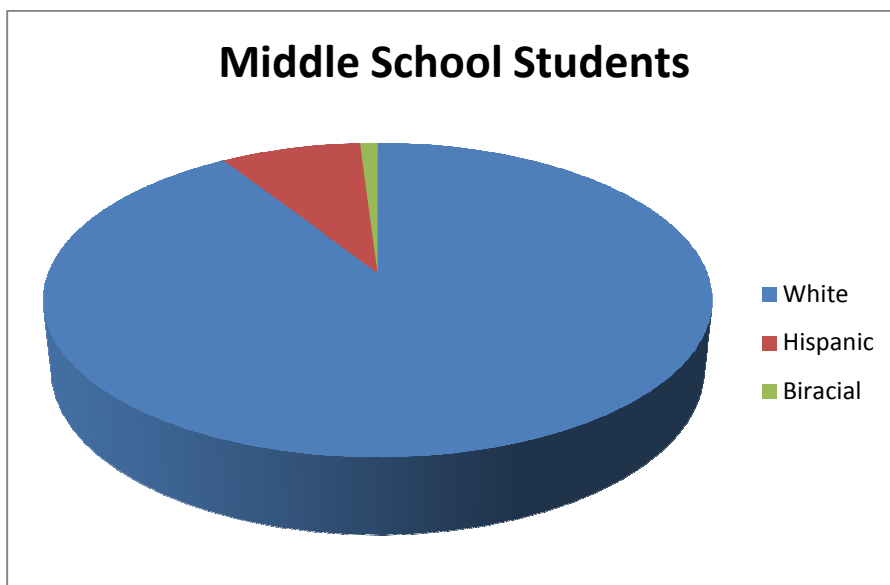
Hispanic, and 3% biracial. Figure 3.1 reveals the breakdown of ethnicity in the upper-elementary group.

Figure 3.1 Upper-Elementary Group Ethnicity



The middle school group had a total of 66 students both participating and not participating in the afterschool program. Gender was equally distributed with 50% males and 50% females in the group. 80% of the group received free or reduced lunches and the breakdown by grade level consisted of 27% from eighth grade, 52% from seventh grade, and 21% from the sixth grade. The ethnicity of the middle school group was comprised of 91% white, 8% Hispanic, and 1% biracial. Figure 3.2 discloses the breakdown of the middle school group by ethnicity.

Figure 3.2 Middle School Group Ethnicity



Setting

The setting of this study was a rural county in northeast Georgia. The school district contained three schools. The elementary school housed approximately 450 Pre-K through fifth grade students. The middle school contained grades six, seven, and eight with roughly 270 students. The high school contained around 320 students in ninth through twelfth grade. The three schools were all located on one campus within a small community. All three schools were Title 1 schools with 54% of the population receiving free or reduced lunch. The racial background of the school was 97% white and 3% other. The average student to teacher ratio was 24:1.

Instrumentation

Data were collected from the school district database, as well as from the afterschool program coordinator. Individual Georgia Criterion-Referenced Competency

Test scores in mathematics from the 2009-2010 and 2010-2011 school years were collected from the district database.

The CRCT was designed to measure how well Georgia students have acquired the knowledge as described in the Georgia Performance Standards. It assesses student achievement, thereby providing the basis for accountability as described by NCLB mandates. The CRCT is Georgia's instrument for determining school quality and effectiveness. It is administered in the spring of each year to students in grades first through eighth grade. Reading, mathematics, and english/language arts are tested in each grade and some grades include science and social studies. A score below 800 is deemed as not meeting expectations. A score between 800 and 849 is deemed as meeting expectations, while scores 850 and above exceed expectations. The test is used to determine if students in grades three, five, and eight are promoted and is also used to measure all students' progress from year to year.

Validity and reliability are the two most important concerns in evaluating and developing instruments. Validity is concerned with the interpretations of the scores (Ary, et al.) and the extent to which the instrument actually measures what it is supposed to measure. The CRCT was developed by content specialists and items were written specifically from the Georgia Performance Standards (GPS) for the Georgia CRCT. Committees of educators then reviewed each test item. Items cover the GPS with precision and clarity and involve higher order thinking skills. There is one clear correct answer, with appropriate distracters. Items should be free from bias (Georgia Department of Education, 2008). Reliability of the instrument is concerned with the degree of consistency to which the instrument measures what it is supposed to measure. When

measuring achievement, consistency of the results is a great concern (Ary, et al.). The 2004 CRCT test reliabilities ranged from 0.79 to 0.86 for Reading and 0.87 to 0.91 for Mathematics (Georgia Department of Education, 2008).

Procedures

Permission from the Institutional Review Board (IRB) of Liberty University was obtained to conduct this study. Permission to obtain essential data for the study was also acquired from the local school system superintendent and principals of the elementary and middle schools. There were no identifying factors on the data and numbers had been randomly assigned to all students, to eliminate researcher bias. Data collection began with information on the students participating in the 21st CCLC afterschool program. From district records, the researcher gathered information on gender, race, grade level, eligibility for free/reduced lunch program, grades, attendance to the school and afterschool program, and CRCT scores in mathematics for the 2009-2010 and 2010-2011 school terms. Data were also collected for those students who were eligible to attend the afterschool program, but did not attend. Based on the characteristics of the treatment group, a control group of students who were invited to participate in the afterschool program with similar gender, race, grades, CRCT scores, and eligibility for free or reduced lunch was randomly chosen. These included only students who were eligible for enrollment in the 21st CCLC afterschool program, but did not participate.

Data Analysis

Quantitative methods were utilized in this research study. The effectiveness of the 21st Century Community Learning Center afterschool program based on mathematics achievement on the CRCT was investigated. For research questions 1 and 2, a

comparison of mathematics CRCT scores of those students participating in the program was made with those not participating. Data were utilized using an analysis of covariance (ANCOVA) statistical procedure conducted on the post-test, CRCT Mathematics score from the 2010-2011 school year, with a confidence level of .05. The ANCOVA is a statistical technique used to take into account initial differences in the two groups (Ary, et al.). The ANCOVA seeks to examine if there are differences between the groups of an independent variable (afterschool group or no afterschool group) on a dependent variable (mathematics 2011 CRCT scores), while accounting for an independent variable. ANCOVA produces ordinary F tests for the main effect of the independent variable and an overall significance test for the effect of the covariate. The covariate (CRCT 2010) is included in this type of design because it can have a substantial relationship with the dependent variable and must be controlled. ANCOVA assumes equal variances among the groups; therefore, the Levine's test was calculated before the ANCOVA to ensure that the equal variances assumption had not been violated (Ary, et al.). A statistical software package was used to compile and analyze data with the assistance of a spreadsheet program.

Summary

This chapter provided an overview of the study and research methodology. The design of the study was clarified. The procedures for gathering data and the information regarding the instrumentation were also provided. Lastly, the sampling procedures and population were examined along with the measure for analyzing the data. The results from data analysis and an evaluation of the findings will be offered in the next chapter.

CHAPTER FOUR: RESULTS OF THE STUDY

The purpose of this study was to analyze a 21st Century Community Learning Center (21st CCLC) afterschool program and to determine if there was a relationship between at-risk upper-elementary and middle school students' CRCT (Criterion-Referenced Competency Test) math scores of those who attended the afterschool program, as compared to those who did not attend the afterschool program.

This chapter is organized into three sections. The demographic data of the participants in the study are discussed. The results of the data analysis are examined to determine the effectiveness of the 21st CCLC afterschool program on math achievement on the Georgia CRCT. A summary of the findings is included.

Demographic Data

Participants in this study were chosen from two schools in a rural school district in Georgia. The sample consisted of 57 at-risk third, fourth, and fifth grade students from an elementary school and 33 at-risk sixth, seventh, and eighth grade students from a middle school. These students had participated in the 2010-2011 school system's 21st Century Community Learning Center afterschool program. Students were invited to participate in the afterschool program based on 1) CRCT scores from previous years, 2) academic grades, and 3) teacher recommendation. This quantitative research study scrutinized the 2010 and 2011 CRCT mathematics scores of these 90 at-risk third through eighth grade students who regularly attended the 21st CCLC. Students were considered to be regularly attending the afterschool program once they had attended for 30 days. This guideline for regularly attending was mandated through the district's 21st CCLC grant.

Students who were not considered to be regular attendees, those who did not have two years worth of data, and those who took another form of the CRCT were eliminated from this study. A control group of the same number of at-risk third through fifth grade students and sixth through eighth grade students, who had been invited to attend the afterschool program, but who did not, was chosen for comparison purposes. In this study a total of 180 students participated. From the sample, 46.7% were female and 53.3% male. The majority of students were white at 92.8%, 5% Hispanic, and 2.2% biracial. Students enrolled in a free or reduced lunch program totaled 81.1%, while 18.9% were not enrolled in a lunch program. Table 4.1 shows that there were small differences between the intervention and no intervention groups. This was observed in both 2010 and 2011 and regardless of school type. When looking at the average scale scores of elementary students who participated in the afterschool program, there was a 1.06 decrease in the 2011 CRCT math scores as compared to those who did not participate in the afterschool program. However, the upper-elementary students who participated in the afterschool program in the 2011 school term increased their average score from 2010 by 3.22 points. Middle school students who participated in the program had a 4.55 increase in their average scale score over those who did not participate, and also an increase over their score from 2010.

Table 4.1

Descriptive Statistics for CRCT Variables by School Type and Group

	School Type	Group	M	SD	N
CRCT Math 2010	Elementary School	No Intervention	826.05	26.73	57
		Intervention	818.25	27.66	57
		Total	822.15	27.36	114
	Middle School	No Intervention	827.97	27.79	33
		Intervention	827.97	39.77	33
		Total	827.97	34.04	66
	Total	No Intervention	826.76	26.98	90
		Intervention	821.81	32.75	90
		Total	824.28	30.02	180
CRCT Math 2011	Elementary School	No Intervention	822.53	23.65	57
		Intervention	821.47	31.16	57
		Total	822.00	27.54	114
	Middle School	No Intervention	826.12	24.02	33
		Intervention	830.67	33.00	33
		Total	828.39	28.73	66
	Total	No Intervention	823.84	23.71	90
		Intervention	824.84	31.97	90
		Total	824.34	28.07	180

Results

A causal comparative design was used in this study to attend to the research questions offered in chapter one. The two research questions are acknowledged and the statistical information follows each research question. The analysis of covariance (ANCOVA) method of data analysis was used to determine if there were differences between the groups of an independent variable (afterschool program) on a dependent variable (2011 CRCT math scores), while accounting for the covariate. ANCOVA produces ordinary F tests for the main effect of the independent variable and an overall

significance test for the effect of the covariate. The covariate (2010 CRCT math score) was included in this type of design because it can have a substantial relationship with the dependent variable and must be controlled (Ary, Jacobs, & Sorensen, 2010). ANCOVA assumes equal variances among the groups of the independent variables. This was tested with a Levene's test. When significant, the Levene's test suggests that the equal variances assumption has been violated (Ary, et al.). This examined if the spread of the scores was approximately equal for the groups of the independent variable. The data were entered into an Excel spreadsheet and then imported into the Statistical Package for the Social Sciences (SPSS) for statistical analysis.

Research question one. Research question one asked what effect did participation in an afterschool program have on math achievement scores, as measured by performance on the Georgia Criterion-Referenced Competency Test in mathematics, of at-risk third, fourth, and fifth grade students. Normality of 2010 CRCT math scores and 2011 CRCT math scores of at-risk students in grades three through five were examined based on the descriptive statistics in Table 4.2. Normality is assumed based on the acceptable range of +/- 2 values of skew and kurtosis.

Table 4.2

Descriptive Statistics by Test-Upper-Elementary Group

	N	M	SD	Kurtosis	Skew
2010 CRCT Score	114	822.15	27.36	0.16	0.26
2011 CRCT Score	114	822	27.55	0.02	0.02

Normality is further established in Figures 4.1 and 4.2. The histograms point to the symmetric and unimodal 2010 and 2011 CRCT math scores of upper-elementary at-risk students.

Figure 4.1

2010 CRCT Math Scores by Intervention

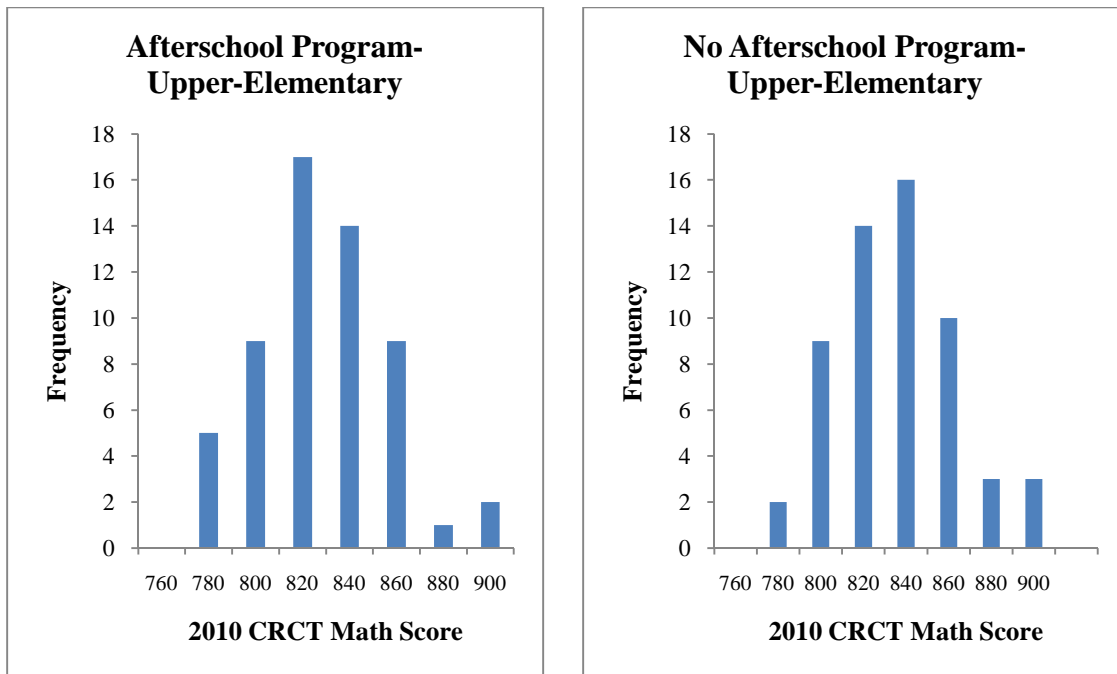
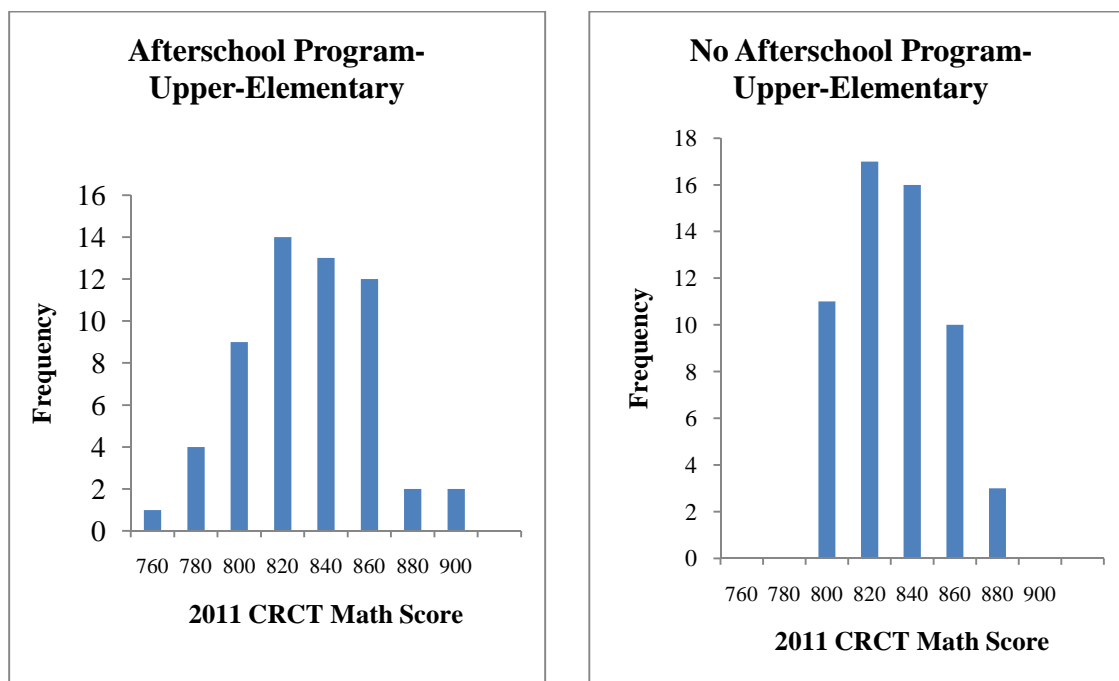


Figure 4.2

2011 CRCT Math Scores by Intervention

The data must also be evaluated to determine if the equal variances assumption was met. Levene's test for homogeneity tests the null hypothesis that the error variance of the dependent variable is equal across groups. In Table 4.3 the significance of Levene's is shown to be .17, which is not statistically significant (significance value greater than .05). The assumption of equal variances was not violated and it was determined that ANCOVA results would be valid.

Table 4.3

Levene's Test of Equality of Error Variances-Upper-Elementary Group

Dependent Variable	F	df1	df2	Sig
CRCT Math 2011	1.86	1	112	.17

Since it was established that no assumptions were violated, an ANCOVA analysis was utilized to test research question one. Following, in Table 4.4, are the overall F tests for the effects of the covariate (CRCT 2010) and the independent variable (Intervention Group) on the dependent variable (CRCT 2011).

Table 4.4

ANCOVA for CRCT Math by Group Among Elementary Students

Source	Sum of Squares	Df	Mean Square	F	Sig.
CRCT 2010	25125.68	1	25125.68	46.02	.00
Group	294.11	1	294.11	.53	.46
Error	60596.73	111	545.91		

The F test for the intervention group was non-significant (significance value greater than .05). There were no significant differences between the afterschool group and the control group. The study fails to reject the following null hypothesis: There will be no significant difference in mathematics achievement scores, as measured by performance on the Georgia Criterion- Referenced Competency Test in mathematics, of at-risk third, fourth, and fifth grade students who participated in an afterschool program as compared to those third, fourth, and fifth grade students who did not participate in the afterschool program.

Research question two. Research question two asked what effect did participation in an afterschool program have on math achievement scores, as measured by performance on the Georgia Criterion- Referenced Competency Test in mathematics, of

at-risk sixth, seventh, and eighth grade students. Grades six through eight at-risk students' 2010 and 2011 CRCT math scores were examined for normality in the descriptive statistics of Table 4.5. Skew and kurtosis values close to zero indicated that the score distribution was normally distributed.

Table 4.5

Descriptive Statistics by Test-Middle School Group

	N	M	SD	Kurtosis	Skew
2010 CRCT Score	66	827.97	34.05	0.73	0.02
2011 CRCT Score	66	828.39	28.67	0.17	0.96

The histograms in Figures 4.3 and 4.4 further establish normality. The CRCT scores in math of middle school at-risk students for 2010 and 2011 appeared unimodal and symmetric.

Figure 4.3

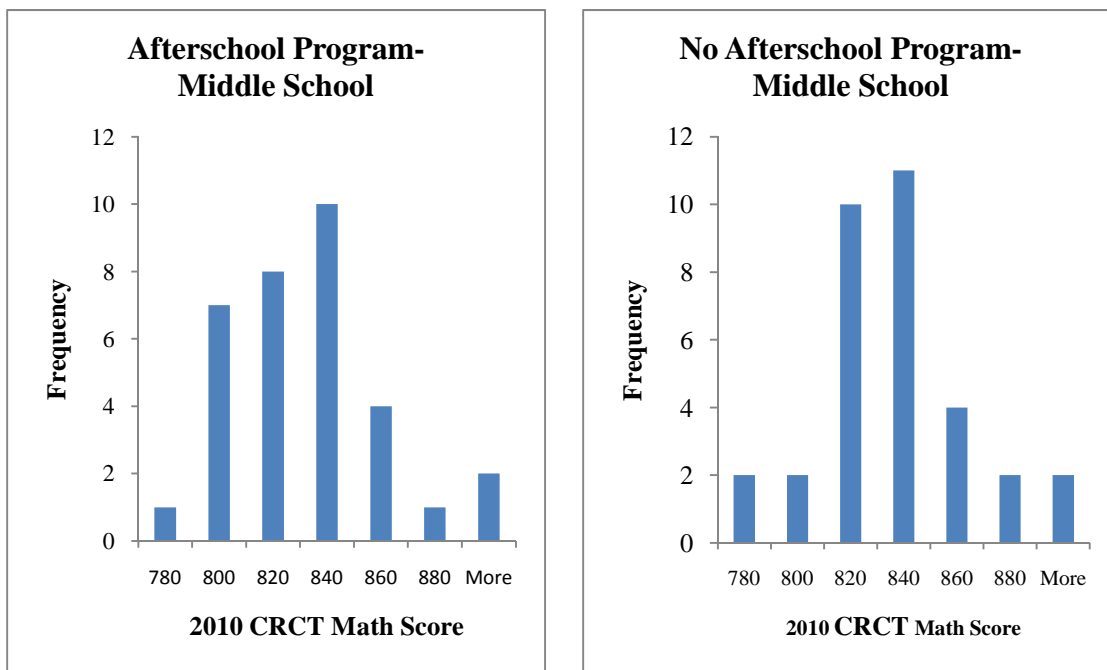
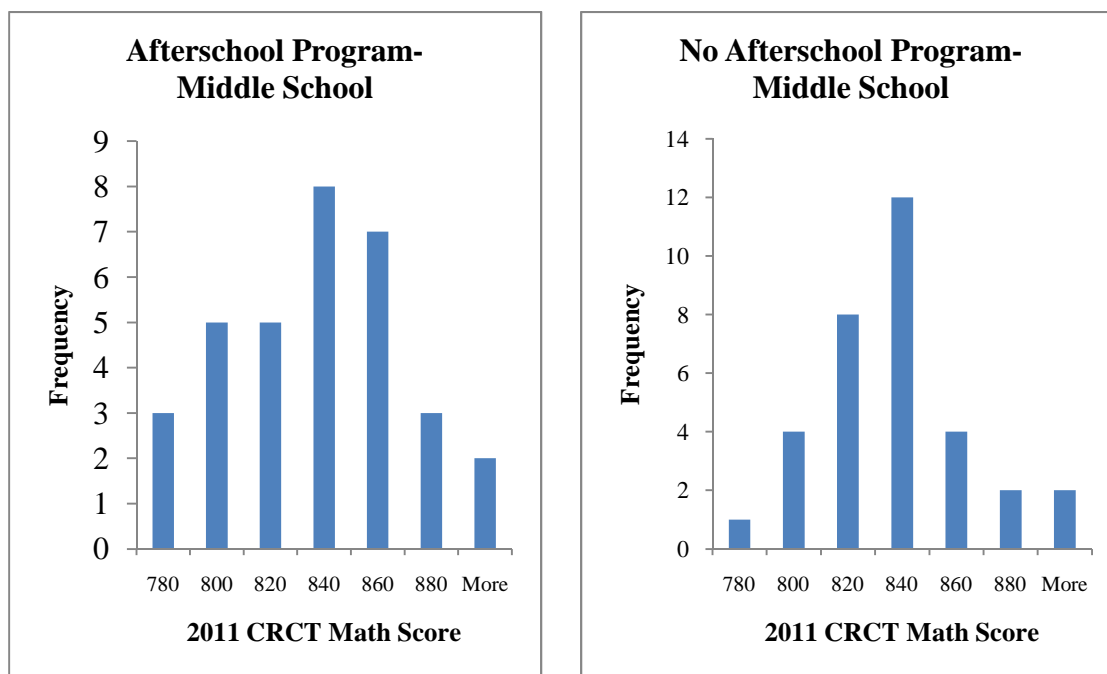
2010 CRCT Math Scores by Intervention

Figure 4.4

2011 CRCT Math Scores by Intervention

The data also had to be evaluated to determine if the equal variances assumption was met. The variance of the control groups and afterschool groups should be approximately equal. Levene's test investigated this assumption. Table 4.6 shows a significance of .79 on Levene's test, which is not statistically significant. Homogeneity of variance can be assumed and ANCOVA results would be valid.

Table 4.6

Levene's Test of Equality of Error Variances-Middle School Group

Dependent Variable	F	df1	df2	Sig
CRCT Math 2011	.06	1	64	.79

The ANCOVA analysis was used to investigate research two, since no assumptions were violated. Table 4.7 reveals the overall F tests for the effects of the 2010 CRCT math scores and the intervention afterschool group on CRCT math scores in 2011.

Table 4.7

ANCOVA for CRCT Math by Group Among Middle School Students

Source	Sum of Squares	Df	Mean Square	F	Sig.
CRCT 2010	19075.54	1	19075.54	35.09	.00
Group	340.91	1	340.91	.62	.43
Error	34247.3	63	543.61		

There were no significant differences between the control group and the afterschool as the F test for the afterschool group was non-significant. There was a failure to reject the following null hypothesis: There will be no significant difference in mathematics achievement scores, as measured by performance on the Georgia Criterion- Referenced Competency Test in mathematics, of at-risk sixth, seventh, and eighth grade students who participated in an afterschool program as compared to those sixth, seventh, and eighth grade students who did not participate in the afterschool program.

Summary

The purpose of this study was to determine the effectiveness of a 21st CCLC afterschool program on student math achievement. The CRCT math scores of at-risk upper-elementary students enrolled in the afterschool program were examined and

compared to the scores of a similar group of upper-elementary students not enrolled in the afterschool program. The same comparison of math scores was made with a group of at-risk middle school students and those similar students receiving no intervention. The research from this study indicates that there is no significant relationship between CRCT math scores and students participating in the afterschool program.

This chapter included the demographic data of the sample in this study. The results of the analysis of the 21st CCLC's effect on student math achievement and a summary of the findings were discussed. The next chapter will include a summary of the study and findings, a discussion of the results, limitations and implications of the research, and recommendations for future research.

CHAPTER FIVE: SUMMARY AND DISCUSSION

The previous chapter revealed the quantitative research analyses which utilized the ANCOVA statistical test to determine the impact of an after-school program on math achievement. The afterschool program was proposed as a positive intervention for at-risk students in rural North Georgia. The purpose of this chapter is to discuss and review those findings. This chapter is organized into the following divisions: statement of the problem, summary of the study, summary of the findings, discussion of the findings, study implications, study limitations, recent developments, and recommendations for further study.

Statement of the Problem

Educational systems have been more closely scrutinized over the past few decades as a result of the report, *A Nation at Risk*, and mandates from No Child Left Behind. Schools have become more accountable than ever in ensuring their students are meeting state standards. In attempting to meet the 2014 deadline of all students being on grade-level, schools must make Adequate Yearly Progress (AYP). School systems are implementing supplementary educational programs like afterschool programs, extended day programs, and summer school in order to meet these guidelines.

Research studies have recommended programs that extend the learning time for at-risk students and schools not meeting AYP (Council of Chief State School Officers, 1999; Lauer et al., 2004; National Education Commission on Time and Learning, 1994; National School Board Association, 2005; No Child Left Behind Act of 2001; Weiss, Little, Bouffard, Deschenes, & Malone, 2009; Worthen & Zsiray, 1994). According to

the Carnegie Corporation (1994), at-risk students benefit the most from an extended school day. Due to the diverse needs of at-risk students, typical schooling may not be sufficient to meet the needs of these students (Cooper, 2007; Gordon & Meroe, 2005; Miller, Snow, & Lauer, 2004; Weiss et al., 2009). As reported by Smith (2001), students not being on grade-level are simply an indication that some need more time than others to learn the same material. Schools receiving supplementary educational services are required to provide data showing verification of the effectiveness of their programs. However, much of the research studies today are beleaguered with methodology errors, sampling problems, and are not generalizable (Dowell, 1986; Hock, Pulvers, Deshler, & Schumaker, 2001; Zuelke & Nelson, 2001). As a result of the mandates placed on education, research methodology issues, and the tough economic times our nation now faces, there is a heightened need for better evidence that guides educational systems in implementing and analyzing their extended day programs. There is a call for evidence to determine the relationship between afterschool programs and student achievement and to establish which programs and which elements of those programs are the most successful. Thus, this study investigated an afterschool program and its relationship with math achievement.

Summary of Study

The sample for this study of 180 at-risk students came from two schools in rural Georgia that were located on one campus. It consisted of 57 at-risk third, fourth, and fifth grade students from an elementary school and 33 from a middle school of sixth, seventh and eighth grade students. The sample was comprised of 53.3 % males and 46.7% females. The breakdown of ethnicity was 92.8% white, 5% Hispanic, and 2.2%

biracial, while 81.1% of the sample received free or reduced lunches. These students participated in the 21st Century Community Learning Center afterschool program in 2010-2011. The 21st CCLC operated 116 days during the school year and met for 12 hours per week. They provided a snack, homework help, tutoring services, academic instruction, enrichment activities, and transportation. The program had a full-time, on-site program coordinator, 18:1 student to teacher ratio, and 48% of the staff was certified. College students from a local university were involved in tutoring and mentoring students, as well. Students were considered to be at-risk based on previous CRCT scores, teacher and/or counselor recommendation, and academic grades.

This study investigated the relationship between at-risk upper-elementary students and middle school students who participated in a 21st Century Community Learning Center afterschool program, as compared to at-risk upper-elementary and middle school students who were eligible, but did not participate in the afterschool program. One group of at-risk third, fourth, and fifth grade students who participated in the after-school program were compared to a control group of very similar students who did not participate in the program. Another group of at-risk sixth, seventh, and eighth grade students who participated in the after-school program were compared to a control group of similar students who did not participate in the after-school program. Participation in the program, the independent variable, was compared to CRCT mathematics scores, the dependent variable.

Georgia Criterion-Referenced Competency Test math scores from 2009-2010 and 2010-2011 were compiled. The CRCT is the instrument the state of Georgia uses to determine student gains and school effectiveness as described by NCLB. It was designed

to measure students' comprehension of the Georgia Performance Standards. These tests were given to students in grades one through eight in the spring of each year.

English/language arts, reading, and mathematics are tested in each grade, while science and social studies are only tested at certain grade levels. A scaled score between 800 and 849 is designated as meeting expectations, below 800 does not meet expectations, and 850 and above exceed expectations. These performance levels are used to exhibit Adequate Yearly Progress (AYP) by schools in meeting mandates by NCLB.

The analysis of covariance (ANCOVA) method of data analysis was used to determine if there were differences between the groups of students in the afterschool program and not in the program, based on 2011 CRCT math scores. ANCOVA produces ordinary F tests for the main effect of the groups and an overall significance test for the effect of the covariate. 2010 CRCT math scores (covariate) were included and controlled for in this study because of its potential to have a relationship with the dependent variable (Ary, Jacobs, & Sorensen, 2010).

Summary of Findings

Research question one. This quantitative research study's objective was to determine if participation in the 21st Century Community Learning Center afterschool program by at-risk third, fourth, and fifth grade students, would have an effect on the math scores of the Georgia Criterion-Referenced Competency Test, as compared to a similar group of at-risk students who did not participate in the program. To test research question one an ANCOVA analysis was utilized. The overall F test examines the effects of the independent variable (afterschool group or no afterschool group) on the dependent variable (math CRCT 2011), while accounting for the covariate (math CRCT 2010). The

F test for the afterschool group was non-significant (significance value greater than .05). There were no significant differences between the afterschool group and the control group. The study failed to reject the null hypothesis. The afterschool program did not have a significant effect on at-risk third, fourth, and fifth grade student's math CRCT scores.

Research question two. The purpose of this quantitative research study was to conclude whether or not participation in the 21st Century Community Learning Center afterschool program by at-risk sixth, seventh, and eighth grade students, would have an effect on the math scores of the Georgia Criterion-Referenced Competency Test, as compared to a similar group of at-risk students who did not participate in the program. To test research question two an ANCOVA analysis was also utilized. The F test for the afterschool group was non-significant (significance value greater than .05). There were no significant differences between the afterschool group and the control group. The study failed to reject the null hypothesis. The afterschool program did not have a significant effect on at-risk sixth, seventh, and eighth grade student's math CRCT scores.

Discussion of Findings

The mathematics portion of the Georgia Criterion-Referenced Competency Test was used in this study to determine the effectiveness of the 21st Century Community Learning Center afterschool program on at-risk upper-elementary and middle school student's math achievement. In 2011, after the intervention program, 19.3% of the elementary afterschool students did not meet proficiency. In 2010, 21% of the same group had not met proficiency. This group only had a 1.7% increase in the number of students meeting proficiency after the program. The elementary students not in the

intervention group, however, had a 1.8% decrease in the number of students meeting proficiency from the 2010 scores to the 2011 scores. The middle school group receiving the intervention had 24% of their students not meeting proficiency in 2010, but after the program only had 18% not meeting proficiency. This group attending the afterschool program had a 6% increase in the number of students meeting state standards. This accounts for two more students out of the group of 33 meeting standards, over the previous year. The middle school students from the no intervention group had no change from the 2010 scores to the 2011 scores in number of students not meeting proficiency, at 12% not meeting in both years. In 2010, the average math CRCT score of elementary students in the afterschool group was 818.25, and in 2011 the average CRCT score in math of this same group increased by 3.22 points to 821.47. The middle school intervention group also had an increase in average math CRCT score from 2010 to 2011 by 2.7 points, from 827.97 to 830.67. Both the elementary and middle school control groups had a decrease in average math CRCT scores from the 2009-2010 school term to the 2010-2011 school term. However, when examining the total mean score for all students in 2010 as compared to the mean math CRCT score in 2011, there was only a 0.06 increase. Following, in Table 5.1, the mean and standard deviations of the total of all students in both school groups is shown.

Table 5.1

Descriptive Statistics of Math CRCT for Total Sample by School Type

School Type		2010	2011
Elementary School	Mean	822.15	822.00
	SD	27.364	27.548
	N	114	114
Middle School	Mean	827.97	828.39
	SD	34.048	28.73
	N	66	66

Like many other research studies on the effects of afterschool programs on student achievement, this study found the 21st CCLC to have no significant effect on student math achievement. In a larger study involving 510 participants, Little (2009) also found no significant difference in CRCT math scores for those participating in the afterschool program, as compared to those who did not participate. There was also no significant difference across the subgroups of minority, free or reduced lunches, or those participants who attended more regularly. In 2003, the landmark study by the United States Department of Education on the effectiveness of the 21st CCLC was released. This study examined 1,000 elementary students across 7 school districts with afterschool students being compared to randomly assigned nonparticipants. It investigated 4,300 middle school students in 32 districts with afterschool students evaluated against a

comparison group. The study found no significant difference in academic outcomes of students who participated in the 21st CCLC as compared to those not participating and caused widespread doubt among policymakers concerning the effectiveness, and therefore, the need and justification for afterschool program funding. As a result, a 40% funding cut for this program was proposed the following year. Zief, Lauver, & Maynard (2006) conducted a meta-analysis of five experimental studies on afterschool program effectiveness that had incorporated a control group into their evaluation. This study found no considerable academic outcomes for students in kindergarten through twelfth grade in afterschool programs. In 2004, Kane was unable to show, from his meta-analysis of four large-scale afterschool programs that were being run across the country, any significant difference on achievement tests in the first year of implementation. There was no variation found in the academic achievement of middle school afterschool participants as compared to those not receiving the intervention, as well as, no significant difference in those who were actively participating compared to those who were frequently absent, as disclosed by Dynarski et al. (2003).

Many studies revealed mixed findings. Although this study of the 21st CCLC found no significant effect on student's math CRCT scores, the program itself reported many other positive student outcomes. The afterschool program found an increase in math and reading/language arts classroom grades. Parents reported being satisfied with their child's academic performance. Homework completion and participation in the regular classroom improved as reported by the regular classroom teacher. Participants in the afterschool program also revealed that they felt better prepared for class. Parent involvement in school increased and teacher's reported student behavior improved. In

addition, the 21st CCLC reported that 92% of participants in the afterschool program met or exceeded requirements on the reading CRCT and 79% met or exceeded on the math portion of the CRCT. As reported by Cooper (2007), supplemental educational services provided a significant difference on math standardized test scores, but found no difference in reading and language arts scores. Worthen and Zstray (1994) also found mixed results. Some of the programs studied revealed significantly higher student achievement, while the collection of studies indicated little to no difference, as compared to students enrolled in only a traditional school program. Miller (2003) and Halpern (2000) reported that programs that connected the regular school day instruction to the afterschool program instruction showed only nominal achievement gains. They suggested that the afterschool program should avoid looking too much like the regular day's instruction. At-risk students are in need of enriching learning opportunities that is often times missing in the regular day. However, they found little to no evidence that nontraditional settings in afterschool programs provided significant gains in academic achievement. In 2004, Kane revealed the analysis of several large afterschool programs across the country. He reported mixed results on the effectiveness of afterschool programs. He noted that these programs showed positive student outcomes in the areas of homework completion, parent involvement, and student motivation. However, there was no significant effect of these programs on student's standardized test scores. Similar results of positive student outcomes in nearly all areas, except gains on standardized tests, were found frequently by other researchers (Miller, 2003; Worthen & Zstray, 1994).

Many studies did show an impact on student's math achievement as measured by standardized tests. Dreyer (2010) found that afterschool participants showed greater

gains in mathematics test scores than nonparticipants. Jenner & Jenner (2007) revealed that at-risk students enrolled in a 21st CCLC showed greater gains in reading, math, and language arts standardized test scores. They also reported that those students who attended more frequently showed higher performance levels than those attending less frequently. In a study by Black et al. (2008), students enrolled in a traditional afterschool program were compared to students enrolled in an enhanced instructional afterschool program. The enhanced instructional afterschool program utilized 45-minute structured lessons on mathematics or reading, four days per week. Students in the enhanced mathematics program made significant gains on standardized test scores over those who were in the traditional afterschool program.

Implications

Research of afterschool programs addresses its impact on students' self-esteem, student safety and violence in the neighborhood, social skills, family day care and health care issues, crime and drug-abuse, and more recently on student achievement. There is much research that reveals positive effects on students enrolled in afterschool programs. However, data from this study did not find that the 21st Century Community Learning Center positively impacted math student achievement, as measured by math CRCT scores. The afterschool program had different program goals and objectives from that of increased CRCT math scores, which this study researched. The 21st CCLC afterschool program explored in the study had the goals of maintaining student enrollment and hours of operation, training staff, improving math and reading classroom grades, improving behavior, completing homework, and involving parents. Program coordinators and policymakers will benefit from the findings of this study when implementing an

afterschool program. The goals and objectives of the program drive the elements which are ultimately implemented and become the focus of the program. If increased CRCT math scores were to become the goal of the afterschool program, a different model and activities focused on math gains would need to be implemented.

Limitations

There are many obstacles and barriers that may influence a study of this type and design. It is extremely complicated to decipher which of these barriers or factors may have impacted the results or to determine if any prior associations may have existed. These major limitations hinder the research in generalizations that could have possibly been made to other similar programs.

The sample for this study was from a 21st Century Community Learning Center afterschool program from two small schools in a rural school district in north Georgia. The sample size was somewhat small and ethnicity in the study had little to no variance. The students in this study are very unique, as is the afterschool program. Afterschool programs and other 21st CCLC programs are complex and varied in their focus. Based on community goals, each individual afterschool program is distinctive in its objectives and format. The afterschool program in this study focused on academic grades, attendance, behavior, parent involvement, and homework completion. If the program had the goal of improving math CRCT scores, it would have impacted the results. This study may be limited in any generalizations of afterschool program's effect on math achievement that could be made to other populations with diverse demographics or dissimilar afterschool program models.

The students in the afterschool program were invited to attend the program based on factors which indicated they may be at-risk for failure. Any openings left in the program were then filled by interested students. Due to openings throughout the year, many students in the program were not at-risk for failure. As a result, there were a wide range of student abilities in the afterschool program. The 21st CCLC program was strictly run on a volunteer basis and attendance was not mandatory. As a result, selection bias is a potential limitation. Students are considered to be regularly attending this afterschool program once they have attended for 30 days out of its 116-day operation. Research concludes that improved attendance in regular school or afterschool programs improves academic achievement (Lauer et al., 2004; Miller et al., 2004; Weiss et al., 2009; Worthen & Zsiray, 1994). This limits the research in that some participants only attended the minimum of thirty or so days, while other students attended much more frequently.

This study used a secondary data analysis. The students in this study were not randomly assigned to the groups; the groups were already formed before the research study began. Because you are dealing with human subjects in this study, it is not ethical or moral to randomly assign students to the 21st CCLC afterschool program. Therefore, a selection threat exists due to potentially having non-equivalent groups. The ANCOVA statistical test was used with a covariate (2010 math CRCT) to aid in controlling for pre-existing differences in the groups; however, selection bias is still likely to occur.

This study of the afterschool program was limited in its time and duration. A relatively short period of time was examined with 116 days of afterschool at three hours per day; the research only investigated one year's worth of data. In addition, the exact

amount of allotted time spent each day on math tutoring or remediation was not identified and would have provided a better understanding of the program's impact on math achievement. Each day consisted of a variety of activities such as: snack, homework completion, academic instruction, tutoring, and enrichment activities. It would be unlikely to see a significant difference in the intervention groups without a longitudinal study of a quality afterschool program focused on math achievement.

Training of staff and program consistency are a limitation to this study. This was the first year of the 21st CCLC afterschool program with a full-time on-site program coordinator. Hiring new staff and implementing new procedures takes a period of time for adjustment, as well as time for training and collaboration. Training was provided for staff, but none in the area of math achievement. Certified teachers held the majority of afterschool positions; however, only three of the 26 certified teachers were minimally trained in teaching in the afterschool setting, specifically. Being certified to teach does not denote the teacher is trained in teaching in the afterschool environment. Staff should be specifically trained to teach in this non-traditional setting with a focus on the needs of at-risk students (Miller, 2003; National Research Council, 2002). Evidence has shown that an importance must be placed on program goals and research-based instructional strategies to attain those goals. Professional development is a major component of successful afterschool programs (Fashola, 1998). Gootman (2000) reveals that the afterschool staff in an effective program is both well-prepared and culturally competent. The afterschool staff must have a well-planned method of collaborating with the regular day school faculty. Program consistency or quality was not investigated. Students in the afterschool program were divided into grade levels each having a different teacher.

Elementary teachers may have taught middle school students and vice versa. Therefore, students at each grade level were exposed to different teaching styles and possibly varying subjects and or standards. Middle childhood is a unique developmental time when children move their focus to relationships outside the home and friends become more important. Their relationships become more complex and tasks involving groups working together is beneficial (Halpern, 2000). The training of staff on developmentally appropriate activities is a crucial part of afterschool training.

Attendance of students in the 21st CCLC is also a limitation to this study. Students were considered to be actively attending the program in this study once they reached 30 days of attendance. Students in the sample had a wide range of participation levels from 30 days to 116 days, and therefore, limit this study. When examining afterschool programs, for quality and effectiveness, researchers analyze the attendance rates of students in the program (Kane, 2004; Lauer et al., 2006; McComb & Scott-Little, 2003; Reisner et al., 2004).

Recommendations

Additional research is necessary based on the limitations of this study and other studies researched. First, research studies of afterschool programs require a more realistic measure of determining a significant difference between groups. Because afterschool programs reflect a small portion of the student's day, the .20 small effect sizes for typical educational interventions might not be reasonable (Lauer et al., 2006). Kane (2004) concurs that a .20 effect size is an unrealistic measure in which to evaluate the impact of an afterschool program, when compared to the student's regular school day. Does a couple of hours of afterschool instruction equally compare to all the hours of

instruction during the regular day? Kane (2004) goes on to add that these at-risk students are already behind and possibly have difficulty learning at the same pace as others to begin with, any differences found, no matter the size, should be considered an achievement.

A longitudinal study that uses more rigorous research methods such as a true random control group would be beneficial. There will always be questions surrounding and limitations to studies that do not involve strict research methodology. Initial differences in the groups hinder and limit the generalizations of the study that can be made to other populations. Investigating the afterschool program over several years when staff and guidelines are in place would be an improved study that would show a truer picture of its impact. It should be noted that the following year of this study, a different program coordinator was hired. Therefore, once again a time period of adjustment for staff and students would be expected.

Research that explores the facets of afterschool programs that attract upper-elementary and middle school children is recommended. Attendance in afterschool programs continues to be sporadic and therefore influences academic gains made by students. Quality programs are those that focus on attendance (Kane, 2004; Lauer et al., 2006; McComb & Scott-Little, 2003; Reisner, White, Russell, & Birmingham, 2004). Research reveals that students who gain the most are the ones who attend more frequently and for longer periods of time (McComb & Scott-Little, 2003). Until afterschool programs begin to draw children to them and then keep them attending and interested in their program, studies of these type programs will continue to be problematic. Program models must become more attractive to students in order to get them participating at a

higher rate and duration. Middle school programs should not use the same program models as elementary programs because these students have different developmental needs. Research needs to reveal which elements of afterschool programs motivate and engage which students the most. This study did not include observations of the afterschool program, its participants, its curriculum, or its staff. Data collected that explores student motivation and engagement and their choice in attending afterschool programs would be more revealing. Future research on afterschool programs would benefit from these types of data. A qualitative study of afterschool programs is likely to reveal the details and features of the program that are most valuable. Data on the participants' family, neighborhood, and community could be collected to more thoroughly understand the initial differences in the groups. In this type of study, the beliefs, feelings, and preconceived notions of all those involved could be more systematically explored.

Lastly, to be most beneficial, the focus of the research study should match the focus of the afterschool program being studied. This study focused on math achievement gains made on the CRCT. However, the afterschool program investigated did not have the goal of improving math CRCT scores. To get a true picture of math gains, research should focus only on those quality afterschool programs that have incorporated research-driven, effective math strategies.

Recent Developments

Under a new administration and with widespread public questioning of mandates by No Child Left Behind (NCLB), Congress has failed to reauthorize and update the law since 2007. The guidelines of NCLB require schools to make Adequate Yearly Progress

(AYP) each year till the deadline of 2014, in which all students would then supposedly test on their grade level in reading and mathematics. The United States Department of Education (2012) now has several options that provide regulatory and statutory relief to states, as well as amendments to state accountability. In February of 2012, news was released that the state of Georgia and nine other states were granted a waiver from the requirements of No Child Left Behind for the upcoming school year. Most other states have requested or either expressed their desire to request a waiver, as well. The request by Georgia in the United States Department of Education (2012) report states:

Although NCLB has served as an impetus for focusing our schools on disaggregated subgroup performance, it has fallen short in serving as a school improvement tool, a teacher-leader quality tool, a catalyst for ensuring a more comprehensive delivery of college and career readiness, and has limited focus to adequacy in specific subject areas. (p.16).

Since these are new developments, it is unclear at this time how long Georgia or these other states will be granted flexibility in the NCLB requirements. As a result of these waivers, in the upcoming school term, schools in the states with waivers will no longer be labeled as having met or not met AYP. These schools will be given an index rating of one to one hundred, like a grading system. Their rating will be based on a number of factors, not one standardized test score. With this type scoring system it is expected that the public will better understand how a school is performing. Student test scores will no longer be the only determining factor in assessing school success. School performance will be evaluated on a number of factors including, standardized test scores, progress over time, achievement gaps, college-readiness, and attendance. The size of subgroups

that had to be reported has been lowered, but under the waiver, the performance of one subgroup can no longer cause a whole school to fail. Tutoring and supplemental educational services will still have to be provided if a school fails, but the school has more of a say in determining when, where, and how those services will be provided in order to better meet their own needs (United States Department of Education, 2012). This waiver package is temporary and it is difficult to say exactly how schools and afterschool programs will be affected, until the Elementary and Secondary Education Act has been reauthorized.

Conclusion

The purpose of this study was determining the effectiveness of a 21st Century Community Learning Center's afterschool program on at-risk students, as it relates to math achievement on the Georgia Criterion Referenced Competency Test. In this study, no significant differences were found between groups of students who participated in the afterschool program and those who received no type of intervention. This research investigated one small, unique sample of students from a rural school district in north Georgia. Practitioners should not proceed on these results alone and conclude that afterschool programs do not affect math achievement; consider that these results are simply from one research study of many related studies across the country on the effects and benefits of afterschool programs. When quality-designed, the afterschool program is simply one component of the system that is attempting to address the academic and developmental needs of students, and therefore, attempting to meet guidelines set forth by the No Child Left Behind Act.

The benefits of afterschool programs contrast from achievement gains to providing afterschool care for working parents to increasing a student's self-esteem and positively impacting social skills. The afterschool program sampled in this study found, as reported by the program coordinator, an increase in reading/language arts and math classroom grades. Homework completion and participation in the regular classroom improved, while parents reported an improved satisfaction with their child's academic progress. Students in the program also reported feeling better prepared for class. Afterschool programs provide the additional learning time that some students need to be successful.

Many questions remain to be unanswered. How large of an impact can be expected from a couple of additional instructional hours a few times a week? What factors must be present in the afterschool program for the program to be considered effective? What constitutes an effective, quality program? How is the success of the program measured? Is success measured by academic achievement in the classroom or increased standardized test scores? Is success measured by student and parent feelings of success and an increased sense of belonging in the community? Or, is program success measured by the community in the number of youth no longer walking the streets after school hours? Do the benefits of the program outweigh the costs? These are all questions that must be answered on a program by program basis and that can only be answered by the stakeholders in that community.

Afterschool programs can be viewed as a powerful tool in the collection of tools necessary to facilitate a student meeting his or her highest potential. It is the desire that educational systems across the country will continue to explore programs and strategies

that incorporate a collaborative and systematic approach that better facilitates student outcomes.

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Appendix A

Demographics and Math CRCT Scores for Upper-Elementary Afterschool Group

	Gender	Ethnicity	Grade	2010 CRCT	2011 CRCT
1	Male	White	4	826	838
2	Female	White	4	850	815
3	Female	White	3	850	841
4	Female	White	4	883	894
5	Female	White	5	824	860
6	Female	White	3	832	876
7	Male	White	3	777	769
8	Male	White	5	797	807
9	Male	White	3	783	800
10	Female	White	5	827	824
11	Male	White	5	764	782
12	Female	White	5	818	827
13	Female	White	5	800	843
14	Male	White	5	821	818
15	Female	White	4	816	800
16	Female	White	4	891	856
17	Female	White	5	818	815
18	Male	White	5	824	833
19	Male	White	4	779	818
20	Female	White	4	819	838
21	Female	White	4	829	818
22	Male	Hispanic	3	805	742
23	Female	White	5	846	812
24	Male	White	3	801	794
25	Male	White	5	809	836
26	Male	White	4	782	793
27	Male	White	5	842	836
28	Male	White	5	850	851
29	Male	White	5	872	860
30	Male	White	5	838	804
31	Male	White	5	809	843
32	Male	White	4	763	767
33	Male	White	3	813	841
34	Female	White	5	797	840
35	Female	White	4	809	812
36	Male	White	4	800	801
37	Female	White	4	833	821
38	Male	White	5	809	785
39	Male	White	4	803	800
40	Male	White	3	807	841
41	Female	White	5	827	860
42	Male	White	5	797	782
43	Male	White	5	838	818
44	Female	White	3	811	837
45	Male	White	5	803	841
46	Female	White	4	785	791
47	Female	White	4	854	842
48	Female	Mixed	5	850	889
49	Male	Mixed	5	764	771
50	Female	White	3	841	833
51	Male	White	4	845	770
52	Male	White	4	837	804
53	Female	White	5	821	833
54	Male	White	5	834	870
55	Female	White	4	816	804
56	Male	White	5	815	801
57	Male	White	5	786	827

Appendix B

Demographics and Math CRCT Scores for Upper-Elementary Control Group

	Gender	Ethnicity	Grade	2010 CRCT	2011 CRCT
1	Male	White	3	801	788
2	Male	White	3	822	833
3	Female	White	3	819	794
4	Male	White	3	829	841
5	Female	White	3	882	845
6	Male	White	3	824	809
7	Female	White	3	817	837
8	Female	Hispanic	3	829	809
9	Female	White	3	824	788
10	Female	White	3	845	800
11	Male	White	4	841	831
12	Female	White	4	819	801
13	Male	White	4	864	851
14	Male	White	4	813	842
15	Female	White	4	841	788
16	Male	White	4	813	818
17	Male	White	4	859	838
18	Female	White	4	813	804
19	Male	White	4	883	862
20	Male	White	4	891	868
21	Female	White	4	841	842
22	Female	White	4	859	793
23	Female	Hispanic	4	841	812
24	Male	White	4	816	809
25	Male	Hispanic	4	833	809
26	Female	White	4	829	856
27	Male	White	4	816	824
28	Male	White	4	800	812
29	Male	White	4	791	788
30	Male	White	5	824	818
31	Female	White	5	834	821
32	Male	White	5	818	812
33	Female	White	5	792	796
34	Male	White	5	800	809
35	Male	White	5	831	836
36	Female	White	5	846	824
37	Male	White	5	866	818
38	Male	White	5	792	790
39	Male	Mixed	5	792	788
40	Female	White	5	815	821
41	Male	White	5	824	860
42	Female	White	5	789	782
43	Male	White	5	797	827
44	Male	White	5	818	818
45	Female	White	5	860	840
46	Female	White	5	806	801
47	Female	White	5	827	824
48	Female	White	5	821	809
49	Female	White	5	850	860
50	Male	White	5	834	851
51	Female	White	5	821	875
52	Male	White	5	880	860
53	Male	White	5	778	840
54	Male	White	5	838	836
55	Male	White	5	818	824
56	Female	White	5	792	812
57	Female	White	5	767	840

Appendix C

Demographics and Math CRCT Scores for Middle Afterschool Group

	Gender	Ethnicity	Grade	2010 CRCT	2011 CRCT
1	Female	Hispanic	6	840	812
2	Male	White	7	842	846
3	Female	White	7	802	789
4	Male	White	8	825	800
5	Male	White	8	813	797
6	Female	White	8	805	800
7	Female	Hispanic	8	834	821
8	Female	White	7	817	841
9	Female	White	7	813	843
10	Male	White	8	834	821
11	Male	White	7	842	846
12	Female	White	6	825	837
13	Male	White	7	789	793
14	Female	White	8	813	802
15	Female	White	7	798	795
16	Male	White	6	990	919
17	Male	White	7	839	853
18	Female	White	8	846	830
19	Male	Hispanic	6	822	825
20	Male	White	7	815	812
21	Male	White	6	840	832
22	Female	White	7	850	871
23	Male	White	7	787	876
24	Male	White	7	796	833
25	Male	White	6	919	919
26	Female	White	7	794	795
27	Male	White	8	811	841
28	Female	White	6	834	846
29	Female	White	7	794	812
30	Male	White	7	794	821
31	Female	White	7	794	795
32	Female	White	7	874	871
33	Female	White	8	832	818

Appendix D

Demographics and Math CRCT Scores for Middle Control Group

	Gender	Ethnicity	Grade	2010 CRCT	2011 CRCT
1	Female	White	6	813	823
2	Male	White	6	837	825
3	Male	White	6	844	835
4	Male	White	6	877	835
5	Female	White	6	828	832
6	Female	White	6	828	821
7	Male	White	6	834	827
8	Male	White	7	855	883
9	Female	White	7	792	825
10	Female	White	7	811	810
11	Male	White	7	792	830
12	Female	White	7	839	883
13	Female	White	7	809	825
14	Male	White	7	819	838
15	Female	White	7	817	823
16	Male	White	7	811	806
17	Male	White	7	898	857
18	Male	White	7	809	828
19	Female	Hispanic	7	836	861
20	Male	White	7	811	823
21	Male	White	7	770	833
22	Female	White	7	822	838
23	Male	White	7	780	825
24	Female	White	7	829	843
25	Female	White	8	883	837
26	Male	Hispanic	8	865	834
27	Female	White	8	840	810
28	Male	White	8	843	805
29	Female	White	8	818	770
30	Male	White	8	827	797
31	Female	Mixed	8	822	800
32	Male	White	8	811	797
33	Female	White	8	853	783