

Mathematics Achievement of African American Students in Georgia from 2009-  
2014 after the Enactment of NCLB: A Comparison of Two City  
and County School Systems

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Tiffanie Shiver Warren-Williams

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This dissertation, "A Study of the CRCT Achievement of African American Students in Georgia from 2009-2014 after the Enactment of NCLB: A Comparison of Two City and County School Systems," by Tiffanie Shiver Warren-Williams, is approved by:

**Dissertation  
Committee  
Chair**


  
\_\_\_\_\_  
Ellice P. Martin, Ed.D.  
Professor of Middle and Secondary Education

**Dissertation  
Research Member**

  
\_\_\_\_\_  
E-Ling Hsiao, Ph.D.  
Associate Professor of Curriculum, Leadership, and  
Technology

**Committee  
Members**

  
\_\_\_\_\_  
Donald W. Leech, Ed.D.  
Professor of Curriculum, Leadership, and Technology

  
\_\_\_\_\_  
Sandra D. Trowell, Ph.D.  
Associate Professor of Mathematics and Computer  
Science

**Dean of the  
Graduate School**

  
\_\_\_\_\_  
James T. LaPlant, Ph.D.  
Professor of Political Science

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## ABSTRACT

The purpose of this study was to examine mathematics achievement for African American students from Grades 3 through 8 for two county school districts and two city school districts over the years 2009 to 2014 in order to determine the trend of mathematics achievement of African American students and to examine achievement gaps between African American students and Caucasian students over that time period. Data from City School District A and County School District A as well as City School District B and County School District B from 2009 to 2014 were analyzed to achieve the purpose of the study. These analyses also provided data for considering the effect of the No Child Left Behind national education legislation on mathematics achievement. A quantitative, non-experimental approach was used to assess the changes in performance in both City School Districts and County School Districts in reference to African American and Caucasian students' academic progress and achievement in mathematics after the enactment of NCLB. There was a comparison of City School Districts' academic performance to County School Districts' academic performance, in addition to a comparison of African American students' academic performance to Caucasian students' academic performance within each school district and between the pairs of school districts. Results of chi-square tests showed that a statistically significant achievement gap existed between African American and Caucasian students in all four systems from 2009 to 2014, though passing rates did improve. In all four school districts, the percentage of African American students meeting or exceeding the passing score increased in Grades 3, 4, and 5. Three of the four districts showed

increased passing percentages for Grades 6 and 8, and two of the four districts showed increases over the time period for Grade 7. When compared to Caucasian students, statistically significantly lower passing percentages for African American students were identified in 124 out of 144 comparisons over the 6 years of the study. Comparisons between city and county school districts in the same geographic area were similar, and African American students' passing percentages were generally higher in county systems than in city systems. Mathematics achievement did improve after the enactment of NCLB; however, achievement gaps still existed.

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## DEDICATION

This dissertation is dedicated to my late grandmother, Ernestine Akins Shiver. You raised me to be the woman that I am and I know that you would be extremely proud of my accomplishment.

## Chapter I

### INTRODUCTION

Since the end of the Civil War, major changes geared toward eliminating the academic disparities that existed between African American and Caucasian students in the United States had been made. The Supreme Court judgment in *Brown v. Board of Education (1954)* was one of the foremost events that sparked modifications within education for African American children. The 1954 milestone decision unanimously ruled that the racial separation of students in public institutions failed to comply with the Fourteenth Amendment. The *Brown v. Board of Education (1954)* ruling reversed *Plessy v. Ferguson (1896)*, which made it legal to separate public institutions by race only if both institutions offered the same opportunities (McBride, 2006). In spite of serious concerns about educational equality in society, underprivileged African American children were left behind.

The opportunity to make educational equality a priority and to educate stakeholders on its importance was lost. The topic of educational equality seemed to become only an undercurrent of discussions. In 1977, Thomas Arciniega stated the following:

Public education thus has successfully shifted the blame for the failure of schools to meet the needs of minorities onto the shoulders of the clients they purport to serve. They have pulled off the perfect crime for they can

never be truly held accountable, since the reasons for failure in school are said to be the fault of poor homes, cultural handicaps, linguistic deficiencies, and deprived neighborhoods. The fact that schools are geared primarily to serve monolingual, white, middle class, and Anglo clients is never questioned. From the multicultural education perspective this is perhaps the most serious problem fact of present school organization existence (Arciniega, 1977, p. 62).

In spite of America's worry, patterns entrenched in African American academic growth in reference to environmental stimuli were usually overlooked, particularly in the southern region where most African Americans lived (Morris & Monroe, 2009). The United States' South was historically referred to as "the reservoir of African American culture in the nation" (Morris & Monroe, 2009, p. 21), a significant location for studying the problem of student achievement (Morris & Monroe, 2009). This geographic region was the poorest region in the nation; however, it presented exceptional financial and societal opportunities, mainly for African Americans. It was the sole area of the U.S. where most public school students were economically disadvantaged. African American students' unequal representation among economically disadvantaged populations caused them to be impacted the most by poverty (Morris & Monroe, 2009).

#### *Overview of Pertinent Educational Legislation*

Beginning in 1965, Congress approved legislation to provide additional support to systems that served the neediest students of all races (Nelson & Weinbaum, 2009). Federal aid was distributed to neighborhood schools



depending upon each individual state's population of students in Grades K through 12 whose families' yearly salaries were below \$2000. This legislation was signed into law by President Lyndon B. Johnson as the Elementary and Secondary Education Act (ESEA) (Nelson & Weinbaum, 2009). There were several components, referred to as titles, which made up ESEA. The first title was called Title I. The purpose of Title I was to provide learning institutions with federal funding to advance the educational opportunities and outcomes for the poorest students. Title I placed the focus on the students and not the schools. In reality, ESEA was not an original law; it amended the Impact Aid Law of 1950, which later became Title VIII of ESEA (Nelson & Weinbaum, 2009). The Impact Aid Law also aimed to support educational opportunities and outcomes for economically disadvantaged students who may have lived in low-income housing or other federal properties. Because the federal funds used by schools were meant for the sole purpose of students' educational opportunities and outcomes, school districts used funding to purchase materials and programs for the instruction of disadvantaged children (U.S. Department of Education, 2008). Not long after ESEA was implemented and Title I monies were released to local schools, stakeholders began to have concerns about the best method to balance the learning outcomes for disadvantaged students. Many stakeholders feared that some components of ESEA, such as Title I, would have possibly slowed down the pace of racial desegregation (Nelson & Weinbaum, 2009).

The matter of racial inequality in public schools was more prominent during President Richard Nixon's administration, from 1969 to 1972 (Nelson &

Weinbaum, 2009). This racial inequality was brought to light when a policy analysis on the Title I program was conducted by two policy analysts, Ruby Martin of the Southern Center of Studies in Public Policy and Phyllis McClure of the NAACP Legal Defense and Education Fund. The analysis showed that numerous states did not use Title I funding appropriately, and as a result, were undercutting its objective. For an example, Title I aid was not equitably distributed to inner-city schools and excessive resources were given to suburban schools. Also, when Title I programs were audited, it was discovered that appropriate data-collection practices were not used: poor time and attendance reports were maintained, there was no evidence to support compensation for additional time worked by Title I teachers, bad bookkeeping practices for contract work were used, there were no inventory procedures for equipment control, and unused monies were unremitted. Most disappointing of all, minimum effort was put into tracking the correlation between Title I spending and student learning between Title I's underprivileged African American students (Nelson & Weinbaum, 2009). Schools did not collect the necessary information to track the correlation between Title I spending and student achievement because federal evaluation forms did not require it. As a result, in 1969, ESEA was amended to include federal monitoring of student outcomes in certain contents, therefore, linking aid to achievement (Nelson & Weinbaum, 2009).

From the late 1960s to the early 1970s, integration transitioned from the southern states to the northern states (Frankenberg & Taylor, 2015). In 1970, an ESEA amendment was initiated to expand integration mandates to educational

institutions affected by segregation in the North and the South. However, with the passing of this amendment, parents' rights to choose schools for their students were forfeited. In 1974, Congress passed an Equal Educational Opportunity Act and federal funding was increased. The additional funding was meant to provide economically disadvantaged neighborhoods with supplemental programs (Frankenberg & Taylor, 2015).

In 1981, at the beginning of President Ronald Reagan's administration, state leaders supported accountability reforms, shifting many responsibilities back to the states. President Reagan swayed Congress to reduce funding given to schooling and also to reduce the amount of federal regulations in learning institutions (Nelson & Weinbaum, 2009). These reductions were part of the Educational Consolidation and Improvement Act (ECIA). With implementation beginning in the summer of 1982, the ECIA was the most up-to-date ESEA modification. Different from the 1965 ESEA, the ECIA did not promote civil rights and integration, leaving local representatives to handle the fallout. Under this system, urban school districts received comparatively smaller grants. However, President Reagan's objective to give executive power to the state and local agencies did not stop his cabinet from condemning the efforts put forth by state and local representatives (Nelson & Weinbaum, 2009).

In 1983, the Reagan administration issued a report that described the condition of the United States' educational system. This report was known as *A Nation at Risk: The Imperative for Educational Reform* (United States, 1983). In the report, high-stakes assessment results were used to depict the performance

levels in schools. *A Nation at Risk* called for a new assurance to learning institutes and a system of standardized assessments across the country. These requirements began a new period in national education reform, one where the same educational experiences were measured by standardized assessments. In 1987, ECIA returned to the categorical framework of ESEA (Nelson & Weinbaum, 2009). However, in 1994, ESEA was significantly revised during the administration of President Bill Clinton. This major revision of the law was known as the Improving America's School Act (IASA) of 1994 (Kosar, 2011). The IASA called for identical standards for all students, Title I or not. The Clinton legacy transformed the national education reform with the modification of the ESEA (Nelson & Weinbaum, 2009).

As President Clinton transitioned out of the White House and President George W. Bush transitioned in, just like his predecessors, he placed education at the top of his agenda. After winning the presidential election in 2000, President Bush signed into law the No Child Left Behind Act (NCLB) of 2001. This bill was his first legislative proposal as president of the United States. He proposed NCLB as a response to the standards and assessment movement caused by the Reagan administration's 1983 release of *A Nation at Risk* (Nelson & Weinbaum, 2009).

The NCLB law integrated new requirements into the modification of the Elementary and Secondary Education Act of 1965 (ESEA), which was previously revamped and renamed under President Clinton's administration as the Improving America's Schools Act of 1994 (IASA). It used IASA requirements as

its foundation, which called for uniform standards and tests for all students in all states. Like previous reauthorizations of ESEA, such as IASA, its signature program was Title I (Nelson & Weinbaum, 2009). Under NCLB, the federal government did not try to obtain funding that would be distributed equally. Instead, with this law, congress implemented standardized assessments as a school improvement measure. This school improvement measure of standardized assessments mandated states to test primary and middle school students who were in Grades 3 through 8. The children were to be tested in the areas of reading and mathematics. It was Congress's belief that if assessment scores were publically announced, educators and schools would have worked diligently to prepare their students to be successful on the assessments (Ravitch, 2011). This practice increased the influence of assessments in the world of not only educators and students, but also in the world of all other stakeholders. This act brought about a new paradigm in the world of public education, one that included accountability, local control, and parent involvement (Jorgensen & Hoffmann, 2003). NCLB mandated states to develop assessment systems that would track all students' academic achievement on the state selected standards. It became the responsibility of schools to guarantee that all students were being taught the required state standards and to hold schools responsible. Funding became a part of the accountability expectations (Jorgensen & Hoffman, 2003).

### *High-Stakes Standardized Assessments*

*National testing.* High-stakes testing had a long history in the United States. As early as 1845, Horace Mann urged students in the Boston Public

Schools to show their knowledge of the state standards by way of written exams in lieu of oral exams that had been previously given. Mann's overall objective was to uncover and duplicate best practices so that all students were offered the same quality of education. Many of the earlier standardized assessments that were adopted by schools were not developed to measure achievement, but instead ability, which was the opposite objective of Mann's exams. Aptitude tests had a quality of scientific objectivity, and they were popular in the early 20th century. During World War I, the Army Alpha and Beta Assessments were developed and were used to group soldiers by their intellectual capabilities (Gershon, 2015).

Schools adopted some of those same models. Gershon (2015) suggested that ability assessments were used to discover academically talented students without wasting resources on students who were performing below average. This practice went along with the increase of academic tracking to determine which career paths were appropriate for students. In the 1960s, the federal government did begin implementing innovative achievement tests meant to assess instructional practices and learning institutes. As the Cold War and the international economy started focusing on schools' creation of a trained labor force, the weight placed on assessments grew over decades.

According to Long (2014), schools that were located in communities that were identified as economically disadvantaged, incorporated an overwhelming amount of testing and test preparation. This new testing reform was due to the fear of test scores that were not categorized as proficient. Because of the 2001

NCLB law, tests were used as predictors. So that teachers and schools were not blindsided by low assessment scores, they provided students with many testing opportunities for the purpose of preparation for the most important assessment, usually toward the end of the school year.

*High-stakes testing in Georgia.* Achievement testing in Georgia began with high school graduation tests. High-stakes testing in Georgia to comply with NCLB was the next step. In the spring of 2000, the Criterion Referenced Competency Test (CRCT) was put into practice in Georgia and became the tests that were used as measures of achievement for NCLB accountability. These summative assessments were administered toward the end of the school year to fourth, sixth, and eighth graders. However, these students were evaluated in Reading, English/Language Arts, and Mathematics only. During the spring of 2002, students in third through eighth grades were evaluated in Science and Social Studies, making 2002 the first year of testing in those two subject areas. Furthermore, students in the first, third, fifth, and seventh grades were assessed in Reading, English/Language Arts, and Mathematics (Georgia Department of Education, 2015d).

The CRCT was a standards-based assessment that was created to evaluate the way learners obtained the skills and knowledge outlined in the state-required Reading, English/Language Arts, Mathematics, Science, and Social Studies standards (Great Schools Staff, 2016). The testing program was two-fold; it diagnosed individual student and program strengths and weaknesses as related to the instruction of the Georgia Performance Standards (GPS) and the

Quality Core Curriculum (QCC) and measured the quality of education in the state (Georgia Department of Education, 2006). The assessments provided data on academic achievement at the tested levels. The data helped to detect student strengths and deficiencies in reference to the teaching of the state standards, as well as measuring the effectiveness of schooling in Georgia (Georgia Department of Education, 2015d).

The contractor of the CRCT categorized student scores in one of three levels: *did not meet*, *meets*, or *exceeds* (Great Schools Staff, 2016). It also provided data that was separated into specific categories at three levels: state, system, and school (Georgia Department of Education, 2015d). The data presented student achievement results for all students in their prospective subgroups. The results were made public for all grades between first and eighth in the subject areas of Reading, English/Language Arts, and Mathematics, and for all grades between third and eighth in the subject areas of Science and Social Studies (Georgia Department of Education, 2015d).

#### *Achievement Gap and Factors Affecting the Gap*

*Definition and context.* In education, the *achievement gap* was defined as the inequality in academic performance between groups of students. The academic disparity was observed in grades, high-stakes assessments, course selection, dropout rates, and college-completion rates, among other achievement measures. It was mostly used to define academic disparities between students from different races and socioeconomic statuses (Editorial Projects in Education Research Center, 2011a).



Statistics from the National Assessment of Educational Progress (NAEP) revealed some gains toward improvement in math for African American students over time. Yet, there was still a disparity in learning among African American students and Caucasian students. Although the achievement gap in mathematics for grade 8 decreased from 1992 to 2007, the 2015 report by the National Center for Education Statistics (NCES) revealed that African American students lagged behind Caucasian students on the NAEP math assessment at grade 8 by almost two grade levels (National Center for Education Statistics, 2015).

According to Editorial Projects in Education Research Center (2011a), achievement gaps were usually caused by socioeconomic factors. Of all children under the age of 18 residing with families in the United States, over 15 million were living below the poverty level. According to Grillo (2012), about 26% of Georgia's children were living in poverty. Tennessee, North Carolina, West Virginia, and Georgia all ranked sixth in the nation as having the largest percent of poverty. Grillo (2012) suggested that race and class were strong indicators of students' academic achievement, and the lowest performing public schools had a tendency to be located in the poorest areas, while higher performing schools were found in affluent neighborhoods.

*The achievement gap and African Americans.* Because most disadvantaged African American students lived in separated economically disadvantaged communities, isolated from middle and upper-class communities, they often attended segregated schools (Rothstein, 2014). Grouping these

disadvantaged African American children in racially and economically homogeneous schools brought about further suppression. According to Rothstein (2014), the academic achievement of the poorest African American children could not have been greatly improved by school reform alone; the improvement of their economic conditions should have been addressed. The impoverished home lives that many African American students experienced had been passed down through many generations. This factor could have also impacted student achievement (Rothstein, 2014).

Other factors, such as motivation (Usher, 2012) and teacher expectations (Gershenson, 2015), could have had powerful positive effects on students, and were important factors in overcoming any achievement gap. Motivation could have impacted how students viewed school, interacted with their teachers, performed on tests, and devoted time to their studies. Furthermore, unmotivated students could have distracted others from learning, thereby impacting the classroom or school setting (Usher, 2012). The expectations that teachers had set for students could have hindered or helped them. Therefore, it was important that teachers had the same standards for African American students and non-African American students (Gershenson, 2015).

### *Statement of the Problem*

One of the foremost goals of NCLB was to increase academic success and narrow the academic disparity by putting into place yearly assessment goals for subgroups of students, keeping in mind “100 percent proficiency” (Darling-Hammond, 2007, p. 2) by 2014. NCLB flagged variances in student achievement

by race and class; it highlighted the age-old discriminations and triggered emphasis on needs of students who were ignored in many learning environments (Darling-Hammond, 2007). Haycock (2006) raised the following question: “Are students learning more as a result of this greater focus on achievement for all?” (p. 39). In 2010, there was not enough evidence to prove that NCLB was doing what it was designed to do (Benson, 2010). Five years later, after 2014, there was a flurry of debates on the question of “whether NCLB achieved its objectives” (Di Carlo, 2015). Therefore, how and to what extent NCLB impacted the rate of achievement, specifically in mathematics for African American students in Georgia, was unknown.

In 2001, when No Child Left Behind was first enacted and Georgia was to use the Criterion Referenced Competency Test (CRCT) results as the performance indicator (Georgia Department of Education, 2015d), requirements for meeting the Annual Yearly Performance (AYP) targets were the same for all systems in Georgia. Georgia’s AYP contained separate measures for both reading and math. These measures applied to individual students as well as students in subgroups, including male, female, American Indian or Alaskan Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, White or Caucasian, Two or More Races, Hispanic, students with disabilities, limited English proficient, economically disadvantaged, and migrant students (Georgia Department of Education, 2015c). To meet AYP requirements, a minimum of 95% of students in each subgroup, in addition to 95% of the school’s total student population, had to take the state test.

Additionally, each year, Georgia put into place its Annual Measurable Objectives (AMO), which had to be met or exceeded by each subgroup of students (Editorial Projects in Education Research Center, 2011b). The Georgia Department of Education (2015) defined Annual Measurable Objectives (AMO) as minimum levels of improvement, based on student performance on the state test. Schools and school districts were required to achieve at these minimum levels within the time frames specified in NCLB to meet the 100% proficiency goal for 2014. Beginning in 2003, the AMO for math was 50% and the AMO for reading was 60% (Georgia Department of Education, 2015c).

By 2009, some slight changes had been made to the AYP requirements. As originally designed in NCLB, required passing percentages moved up year by year, and for 2009, meeting AYP targets meant that in Grades 3 through 8 the Annual Measurable Objectives (AMO) increased in math to 59.5% and increased in reading to 73.3%. However, all other AYP requirements remained the same (Department of Education, 2015c). National expectations were for all school systems to have in place policies and actions that moved all students toward the 2014 goal, which was 100% of students meeting expected minimum/passing scores on the state test. In Georgia, that test for Grades 3 through 8 was the CRCT.

The underlying question addressed in this study was whether legal national standards for schools, such as those that were set forth in No Child Left Behind, could have brought about improvement for all students, and particularly for African American students, no matter the demographics of the schools they

attended. Was it possible that application of consistent expectations for academic progress would result in academic growth for all? Would states, school districts, and individual schools be motivated to provide whatever was necessary to see that all students met the required standards? In other words, was it possible for a national law to create conditions for educational progress?

### *Purpose of the Study*

The purpose of this study was to examine the changes in achievement for African American students from Grades 3 through 8 for two county school districts and two city school districts over the years 2009 to 2014 to determine the trend of mathematics achievement of African American students and to examine achievement gaps between African American students and Caucasian students over that time period. These analyses then provided data for considering the effect of NCLB on mathematics achievement.

Data from City School District A and County School District A as well as City School District B and County School District B from 2009 to 2014 were analyzed to achieve the purpose of the study. To measure changes in achievement, the Mathematics Criterion Referenced Competency Test (CRCT) scores for Grades 3 through 8 for City School District A, County School District A, City School District B, and County School District B, from 2009 to 2014, were used as achievement indicators. Additionally, this study compared data for African American students from City School District A to data for African American students from County School District A, which were both located in Town A and compared data for African American students from City School

District B to data for African American students from County School District B, which were both located in Town B. Lastly, the study included comparisons of data for African American students from City School District A and County School District A to data for Caucasian students from City School District A and County School District A as well as data for African American students from City School District B and County School District B compared to data for Caucasian students from City School District and County School District B.

The researcher chose to compare the academic achievement of African American students to that of Caucasian students on the Mathematics CRCT because of the long history of disparity in education between the two groups of students. Wilson (2010) suggested that this problem dated back to the early 1800s, and although many efforts were made throughout the years, a plethora of research corroborated that this inequality in education was still an issue in our nation today.

A 6-year time period from 2009 to 2014 was chosen for this study. According to Hall and Hord (2011), "The Implementation standard states: Professional learning that increases educator effectiveness and results for all students applies research on change and sustains support for implementation of professional learning for long-term-change" (p. 52). Hall and Hord (2011) suggested that learning happened through change and varying change efforts involved different lengths, levels of consistency, and combinations of support. However, it took time for change to have occurred and for results to have been observed. It also took time to identify those aspects and practices that were

needed for the sustainability of using a reform over a long period of time (Hall & Hord, 2011). Therefore, for the purpose of this study, the researcher chose a time period of 6 years.

### *Research Questions*

The following questions were addressed:

1. What was the trend of CRCT mathematics achievement of African American students in School Districts A and School Districts B from 2009 to 2014 after the enactment of NCLB?

2. To what degree, if any, was there an achievement gap in CRCT mathematics scores in the following comparisons following the enactment of NCLB from 2009 to 2014:

a. Between African American students and Caucasian students in City School District A?

b. Between African American students and Caucasian students in County School District A?

c. Between African American students and Caucasian students in City School District B?

d. Between African American students and Caucasian students in County School District B?

e. Between Caucasian students in City School District A and County School District A?

f. Between Caucasian students in City School District B and County School District B?

g. Between African American students in City School District A and County School District A?

h. Between African American students in City School District B and County School District B?

### *Definition of Key Terms*

The primary sources used for the definitions below were the Georgia Department of Education, the GeorgiaGOV, the Governor's Office of Student Achievement, and the Merriam-Webster's Online Dictionary. Relevant terms and acronyms are defined below:

*School district.* School district was a unit for administration of a public school system usually comprised of several towns within a state (School district, n.d.). It is also defined as an area that contained schools that were governed by a school board (School district, n.d.). In this study, each of the four school districts was governed by one school board.

*Georgia Department of Education.* Georgia Department of Education (GaDOE) was the entity that governed public education in Georgia (Georgia GOV, 2016). The GaDOE also kept all stakeholders updated on the changes in education (GeorgiaGOV, 2016).

*Governor's Office of Student Achievement.* Governor's Office of Student Achievement (GOSA) was an organization that offered important teaching and learning information to stakeholders across Georgia (Governor's Office of Student Achievement, 2013). It focused on all levels of learning, from pre-



kindergarten to institutions of higher education (Governor's Office of Student Achievement, 2013).

*Achievement gap.* Achievement gap was defined as the difference in student performance between subgroups of students (Georgia Department of Education, 2015b). It is the idea of one subgroup outperforming another subgroup where the variation in average scores for the two subgroups was statistically significant (Georgia Department of Education, 2015b).

*Academic achievement.* Academic achievement was a student's success in meeting short- or long-term goals in education (Georgia Department of Education, 2015d). In reference to the CRCT Mathematics Assessment, academic achievement was represented by a score of 800 or greater (Georgia Department of Education, 2015d).

*Criterion Referenced Competency Test.* Criterion Referenced Competency Test (CRCT) was the standardized test that Georgia used to determine Adequate Yearly Progress (AYP) for schools (Georgia Department of Education, 2015d). It was also used to determine mathematics achievement. The CRCT Mathematics Assessment was used for the purpose of this study (Georgia Department of Education, 2015d).

*No Child Left Behind Act.* No Child Left Behind Act (NCLB) was the 2001 reauthorization of the Elementary and Secondary Education Act of 1965 by President George W. Bush (Georgia Department of Education, 2015a). The law was created to ensure that by 2013-2014 students in all states would reach

proficiency in reading and mathematics (Georgia Department of Education, 2015a).

### *Framework and Design*

Four theories served to support the framework and design of this study. Those theories included the theory of standards and school accountability as described by Redd (2013), critical race theory, social theory as first posited in the Coleman Report (Coleman et al., 1966), and theory of change as defined by Organizational Research Services (2004).

Standards and school accountability was one of four theories that guided this study; it was the principal theory represented by No Child Left Behind (NCLB) (Redd, 2013). This theory came from the broader idea that measuring achievement and reporting those measurements would lead to improvement. On the other hand, if something was not measured, it could not be determined if it changed for the better. NCLB required states to create standards for each grade. Also, state-wide standardized assessments had to be administered by any public learning institution that received federal funding. To determine if schools met the Annual Yearly Progress (AYP) requirements, student scores were compared to the previous year's results. The idea was to develop standards, measure those standards, and report performance so that learning would improve (Redd, 2013).

The second theory that guided this study was critical race theory (CRT); it was the principal theory represented by the educational inequalities that existed between African American and Caucasian students (Ladson-Billings, 2011;

Ladson-Billings & Tata, 1995; Sleeter, 2012; Wun, 2014). CRT highlighted social, political, and historical consequences of race and discrimination in America as well as a framework for understanding the inequalities in education that occurred because of race (Ladson-Billings, 2011; Ladson-Billings & Tata, 1995; Sleeter, 2012; Wun, 2014). An accelerated rate of educational reform was sought after by CRT. CRT evolved from a critical legal studies movement where a group of legal scholars began to question why the assurances of the civil rights movement had come to a halt. These scholars were curious about why critical legal studies had minimal input about race as a deep-rooted form of oppression, and how the law was used to undermine racial justice. Even after the 1954 ruling of *Brown v. Board of Education*, racial practices were continued in education, housing, banking, and employment institutions. It was in this context that the scholars scrutinized how racism continued, despite legal fixes and national rhetoric of racial progress. Critical race theory placed race at the center of analysis and the overall purpose of theorists was to reveal systemic ways in which racism took place (Ladson-Billings, 2011; Ladson-Billings & Tata, 1995; Sleeter, 2012; Wun, 2014).

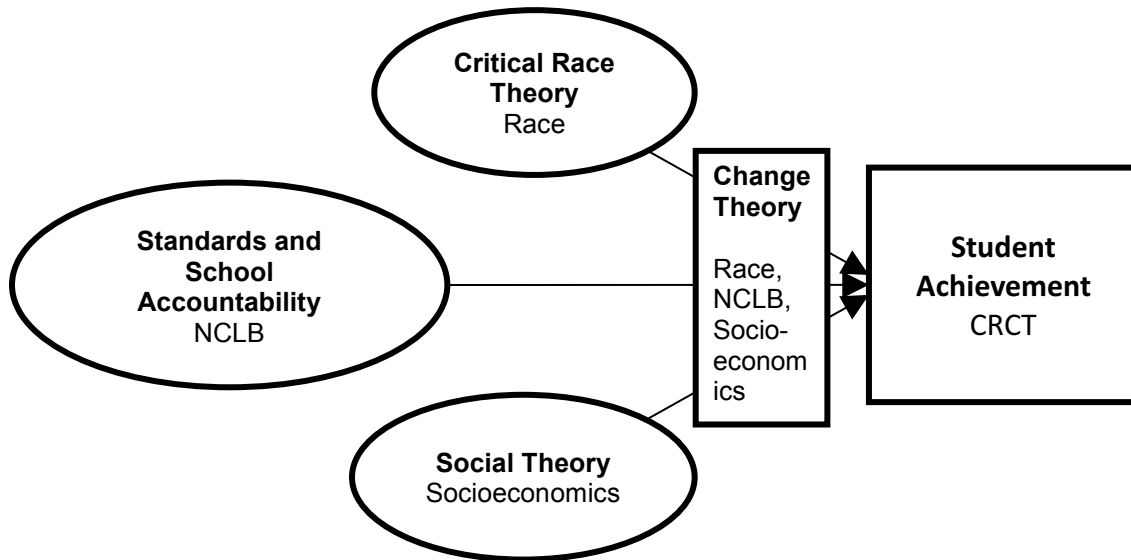
The third theory that guided this study was social theory; it was the principal theory represented by socioeconomics. The foundation of this theory involved the function of social systems of behavior (Coleman, 1987). Through observations, researchers focused on a part of the system, rather than the whole (Coleman, 1987). In 1966, the United States Government published a debatable, yet significant, study that was mandated in the Civil rights Act of 1964 (Coleman

et al., 1966). This study, referred to as the Coleman Report, began with the idea that equality of opportunity should have been evaluated by equality of outcome instead of equality of input. The Coleman Report acknowledged the accessibility of equal educational opportunities for minorities in public schools in comparison to the opportunities for their majority counterparts. Particularly, the study outlined the magnitude in which minority students and teachers were placed in segregated schools as well as the correlation between students' achievement on standardized assessments and the neighborhood schools they attended. The results in the 1966 Coleman Report offered suggestions on how to remedy social inequalities, including the desegregation of schools, by way of busing. The findings defied President Johnson's idea that increased spending on education would have remedied social deficits (Coleman et al., 1966).

The theory of change was the fourth and final theory that guided this study; it was the theory represented by student achievement. A theory of change typically referred to outcomes for long-term and positive change in the lives of at-risk children and families (Organizational Research Services, 2004). However, a variety of changes must have occurred in order to have attained the preferred outcomes. These outcomes could have been in many different areas; however, for the purpose of this study, the outcome areas were changes in financial status, changes in education, changes in economic conditions, and changes in social conditions. These changes could have occurred for individuals or entire populations and the Annie E. Casey Foundation defined these changes as "impact" (Organizational Research Services, 2004, p. 3). Usually, individual

changes were the first to take place due to community initiatives and as more individual changes transpired, the chance for population change to have occurred became greater (Organizational Research Services, 2004).

Figure 1 illustrates a connection of the four theories as the first three theories act through change theory to impact student achievement. Student achievement, as measured by the CRCT, could have been impacted by race, socioeconomics, and potentially by NCLB. Although the factors were different, they were also related. According to Rothert (2005), the enactment of No Child Left Behind increased the nation's efforts in trying to close the achievement gap between various subgroups of students on state specific standardized assessments, such as Georgia's Criterion Referenced Competency Test. States were forced by NCLB to report test scores by various subgroups, such as race and socioeconomics. The academic gap between African American and Caucasian students existed for many years and it was not until NCLB that the government intervened. Socioeconomics could have impacted students' achievement. Grillo (2012) suggested that race and class were synonymous in impacting students' achievement. African American students typically lived in economically disadvantaged areas, and the lowest performing public schools had a tendency to be located in those poor areas. However, Rothstein (2014) suggested that school reform, such as NCLB, would not have improved the academic achievement (CRCT) of the poorest African American students without having addressed the socioeconomic issue.



*Figure 1.* Factors that impact student achievement

This research study was designed to assess the changes in African American students' academic progress and achievement in mathematics. Data from two city school districts and two county school districts were compared. The researcher used data from the GaDOE, GOSA, and Georgia School Council Institute covering a span of 6 years from 2009 to 2014. Quantitative, non-experimental statistical methods were used to assess collected data and conclude whether there was a major change in the achievement gap between African American and Caucasian students located in both city school districts and county school districts during the span of the 6 years. The research procedures determined whether academic achievement for African American students had been significantly impacted since the enactment of NCLB.

*Significance of the Study*

Dating back to the Civil War, the education of African Americans was, in some states, a criminal offense (Wilson, 2010). Throughout the years after the

Civil War, the fight for equitable learning for African Americans was a long challenge, and although the nation made some gains, the nation's education system continued to struggle with problems related to equitable education for African American students. Despite the fact that educational advances occurred over the past 25 years, African American students in America's schools had been achieving at a slower rate when compared nationally. In 2015, as reported by the National Assessment of Educational Progress (NAEP), 19% of African American students in the fourth grade were proficient in mathematics, and the percentage of eighth-grade African American students who were proficient in mathematics was 13% (Camera, 2015). This issue had been an ongoing national one that needed to be addressed. The federal government expended significant funding with NCLB to address the identified educational deficiencies, and it is of significant interest to determine whether the actions and expenditures made a difference for all students.

The findings for this study should provide all stakeholders, including parents, teachers, principals, district office staff, and policy makers, an insight into the effectiveness of NCLB in the area of mathematics that might have accounted for the academic achievement for African American students. This information should further assist in the understanding of instructional practices that were favorable to academic achievement. If growth in mathematics achievement for African American students was observed, the information from this study could be used to help improve instructional practices in schools. This

study should raise awareness of NCLB and the effects of its reauthorizations at all levels.

### *Limitations*

The researcher recognized the limitation of sample size surrounding the study. The sample size was relatively small, with four school districts and 23 schools selected for the study. This limited sample may have affected the generalizability of the study to other districts. The researcher also recognized the limitation of the standardized assessment used for this study, which was the Criterion Referenced Competency Test (CRCT). The CRCT was implemented in the spring of 2000. However, the CRCT program was retired after the 2013-2014 Summer Retest administration. Therefore, the researcher was not be able to compare data from years past 2014.

### *Assumptions*

The following assumptions were used as a guide in this study:

1. Data for all school years identified in the dissertation proposal were available for retrieval from the GaDOE, GOSA, and Georgia School Council Institute publicly accessible databases.

2. All data that were obtained from the GaDOE, GOSA, and Georgia School Council Institute publicly accessible databases possessed data integrity and have not been corrupted due to the archival or web retrieval procedures utilized.



3. Changes in the 2009 through 2014 Mathematics CRCT scores of the third through eighth grade students used in the proposed study were at least in part attributable to the effect of the enactment of NCLB.

4. The target school districts fully complied with NCLB.

### *Summary*

Chapter 1 provided a background for this study by including an overview of educational legislation that is pertinent to understanding the development of NCLB. A long history of high-stakes testing in the United States, including the implementation of national and state assessments was also discussed in this chapter. The achievement gap, as used in this study, was defined and historic information was provided. Included in this chapter are the problem statement and purpose of the study, the research questions, the theoretical framework and design, and additional foundational information.

Before the enactment of NCLB, many educational legislations were passed for the purpose of addressing the concerns of educational inequalities that existed between African American students and their Caucasian counterparts. The significance of this study was to provide all stakeholders an insight into the effectiveness of NCLB in the area of mathematics that might have accounted for the academic achievement for African American students. This information should further assist in the understanding of instructional practices that were favorable to academic achievement.

An extensive review of the literature necessary to validate why this study is relevant is in Chapter 2. In Chapter 3, the researcher provides an overview of

the quantitative methodology used, including a description of the research participants and the procedures for the data collection and analysis. The results of the quantitative data collected are presented in Chapter 4. Lastly, in Chapter 5, the researcher includes a description and discussion of the findings, implications for professional practice, and recommendations for future studies.

## Chapter II

### REVIEW OF THE LITERATURE

In Chapter 2, a review of literature for this study is provided. As part of the analysis of the academic success of African American students, it was necessary to research the history of education. It was also necessary to include in this chapter an in-depth explanation of NCLB, high-stakes assessments, CRCT, and the achievement gap. Lastly, because the Mathematics CRCT assessment was the instrument of choice for this study, it was applicable to include an overview of the math education reform offered in the United States during the enactment of NCLB.

#### *Brief History of Education in America*

Following the year 1800, which was in the middle of the slavery era, formal education for African Americans in the south was not available (Wilson, 2010). At that time, formal education was mostly considered to be occupational training. Denying African Americans a formal education was due to a fear of slave rebellions. Even after President Lincoln signed the Emancipation Proclamation, education for African Americans was limited to segregated learning institutions that received little to no financial support (Wilson, 2010). In 1896, the Supreme Court Case of *Plessy v. Ferguson (1896)* concluded that public schools that were separated were indeed lawful, if the schools were alike (McBride, 2006). However, by the middle of the 20<sup>th</sup> century, civil rights

activists put into place lawful and partisan obstacles to discrimination. In the early 1950s, NAACP attorneys launched class action grievances in the interest of African American students and their families in Kansas, South Carolina, Virginia, and Delaware. The objective was to seek an official proclamation that required systems to permit African American learners to go to Caucasian public schools. One of these class action lawsuits was accredited for being the most referenced Supreme Court judgments of the 20th Century. Plaintiff Oliver Brown, parent of a student who was deprived of the right to attend a public Caucasian school in Topeka, Kansas, filed a lawsuit against the Topeka, Kansas school board. This historical lawsuit was known as *Brown v. Board of Education (1954)* (McBride, 2006). It was Brown's belief that Topeka's African American and Caucasian schools were unequal, which went against the Constitution's Equal Protection Clause. Brown's claim was dismissed by the federal district court, which ruled that the segregated public schools were equal enough to be legal under the Plessy doctrine. An appeal to the Supreme Court was made by Brown, which resulted in all school segregation class action lawsuits being combined and reviewed together (McBride, 2006). In the Supreme Court's final opinion, Chief Justice Earl Warren stated:

Today, education is perhaps the most important function of state and local governments. Compulsory school attendance laws and the great expenditures for education demonstrate our recognition of the importance of education to our democratic society. It is required in the performance of our most basic public responsibilities, even service in the armed forces. It

is the very foundation of good citizenship. Today, it is a principle instrument in awakening the child to cultural values, in preparing him for later professional training, and in helping him to adjust normally to his environment. In these days, it is doubtful that any child may reasonably be expected to succeed in life if he is denied the opportunity of an education. Such an opportunity, where the state has undertaken to provide it, is a right which must be made available to all on equal terms (*Brown v. Board of Education of Topeka*, 1954, p. 3).

The 1954 decision in *Brown v. Board of Education* was disregarded by most states, and in 1955, the local courts were ordered by the Supreme Court to immediately integrate schools (McBride, 2006). Using their authority, the Supreme Court and the U.S. Constitution safeguarded the privilege of an education from being violated by state governments. This decision ensured that states could not discriminate in education. After some time, government funded schools in the United States that used to be a rampart for African Americans, opened the doors to every child, paying little respect to race and financial status (McBride, 2006).

For the first century of the United States, Congress had a restricted position in terms of action related to schooling (Martin, 2012). However, in 1865, after the Civil War, Congress's position in education was expanded. Also in 1865, the government mandated that states come together to offer free public education, and they developed an earlier version of the Department of Education. Between 1930 and 1990, the Supreme Court's disapproval of congressional

power declined, making it possible for the federal government to play a bigger part in student learning. The government's role in schools increased as legislation offered aid to build new schools, pay teacher wages, and enhance school nutrition. Conversely, the aid often went to wealthier school districts, which negatively impacted disadvantaged, urban schools, which again neglected the learning of African American students (Martin, 2012).

Beginning in 1965, Congress approved the Elementary and Secondary Education Act (ESEA) to provide more support to school systems that served the most deprived students (Camera, 2016; Gamson, McDermott, & Reed, 2015; Georgia Department of Education, 2011; Guilfoyle, 2006; Klein, 2015; Nelson & Weinbaum, 2009; Ravitch, 2011; Veney, 2013). As years passed, the 1965 legislation went through numerous amendments and reauthorizations. The reauthorization of ESEA in 2001 was titled No Child Left Behind (NCLB) and the requirements and guidelines of NCLB contained far-reaching achievement improvement targets for the purpose of raising educational levels for all students to meet specific targets (Benson, 2010; Darling-Hammond, 2007; Darling-Hammond & Berry, 2006; Di Carlo, 2015; Gershon, 2015; Guilfoyle, 2006; Haycock, 2006; Jimerson, 2005; Jorgensen & Hoffmann, 2003; Kamenetz, 2014; Klein, 2015; Kosar, 2011; Long, 2014; Nelson & Weinbaum, 2009; Peterson & Kaplan, 2013; Ravitch, 2011; Ravitch & Cortese, 2009; Redd, 2013; Rose, 2015; Rothert, 2005; Rothstein, 2014; Wong & Sunderman, 2007; Wun, 2014).

According to Veney (2013), the integration of schools in separated societies was ineffective. In reality, there was financial separation as well as

racial separation. As a result, to challenge the inequalities in educational systems, powerful federal legislation like the Elementary and Secondary Education Act (ESEA) of 1965 was passed by Congress. This law was passed to ensure that all children would have access to quality elementary and secondary educations. ESEA was implemented in the hope of closing achievement gaps between all students. The authorization of monies for professional learning, teaching supplies, the support of educational programs, and parent involvement were mandated by this act (Veney, 2013).

Although ESEA offered a large amount of funding to districts and states, districts could not receive any of the funding unless they agreed not to separate students by race (Reed, 2015). Those southern school districts that opted to participate to receive funding from ESEA had a boost in the amount of African American students who attended schools with Caucasian students. In fact, in these districts the number of African American students who attended schools with Caucasian students increased 26% within 4 years after the enactment of ESEA. On the other hand, northern school districts were building schools in either predominantly Caucasian neighborhoods or predominantly African American neighborhoods, using residential segregation as a loophole (Gamson, McDermott, & Reed, 2015).

By 2015, 50 years since the enactment of ESEA, African American and Caucasian children were attending school together in the same buildings, but there was concern that they might not be receiving the same quality of education. According to Cook (2015), although formal education for African Americans

progressed after *Brown v. Board of Education (1954)*, U.S. schools were not truly integrated or equal. This situation was evident through the learning disparity among African American students and Caucasian students. America's educational system did not provide the level of education needed to meet the needs of children of color. Rees (2014) suggested that in terms of class availability, highly-qualified teachers, and discipline, there were inequalities for African American and Caucasian students. She went on to explain how African American students were not given the opportunity to take basic high school courses that would have helped them to become college and career ready. Rees also described how African American students were confined to schools that employed teachers who were not highly-qualified and who had less experience. Lastly, she described the unfair practices used by schools to discipline African American students compared to discipline of Caucasian students. For example, the number of out-of-school suspensions assigned to African American students was significantly greater than the number of out-of-school suspensions assigned to Caucasian students. For decades, there had been educational inequalities between African American and Caucasian children and through many different initiatives, these educational inequalities were being addressed. However, this problem was still a concern in the United States (Rees, 2014).

According to Gershenson (2015), the expectations that teachers had for their students in regard to their learning ability was impacted by the racial mismatch between students and teachers. There was evidence to prove that this type of mismatching impacted students' capability to achieve. The expectations



that teachers had set for their students could have neutralized or supported negative expectations held by disadvantaged students. These students did not have positive role models in their lives. Therefore, it was pertinent that African American teachers as well as teachers of other races had high expectations for their African American students (Gershenson, 2015).

*No Child Left Behind Act of 2001 (NCLB)*

In 1981, a task was given to the National Commission of Excellence in Education to review literature on the state of the United States' education system (Jorgensen & Hoffmann, 2003). *A Nation at Risk* was the result of their task and it stated:

Part of what is at risk is the promise first made on the continent: All, regardless of race or class or economic status, are entitled to a fair chance and to the tools for developing their individual powers of mind and spirit to the utmost. This promise means that all children by virtue of their own efforts, competently guided, can hope to attain the mature and informed judgment needed to secure gainful enjoyment, and to manage their own lives, thereby serving not only their own interests but also the progress of society itself (National Commission on Excellence in Education, 1983, para 11).

The National Commission of Excellence in Education found that the curriculum in some learning institutions had been watered down, there were no student expectations, time for learning was not being used wisely, and teacher training programs were not effective (Jorgensen & Hoffmann, 2003). It was A

*Nation at Risk* that ushered in the new standards and assessment era nationally. Between 1994 and 2000, numerous states were onboard with implementing standards and using standardized assessments. However, there was no accountability from state assessment programs. The additional factor of accountability was then offered by No Child Left Behind (Jorgensen & Hoffmann, 2003).

In the United States Constitution, America's establishing fathers did not particularly address the governmental issues in regard to the educational framework (Wong & Sunderman, 2007). The Tenth Amendment of the Constitution allocated states the ability to preside over policies not specified in the constitution. Henceforth, the state governments accepted most of the responsibility over instruction. The states then assigned a part of the responsibility to local governments, and this action then permitted each of the branches of government, federal, state, and local, to make educational policies. However, with the No Child Left Behind (NCLB) Act of 2001, federal legislation became more influential in the educational process (Wong & Sunderman, 2007). The No Child Left Behind Act marked an essential shift from the conventional government part in instruction (Wong & Sunderman, 2007). NCLB was a noteworthy programmatic development of government power over education. To begin with, it determined what was considered a deteriorating school and what had to be done for it. Second, it brought fresh governmental issues into federal-state interactions. Even though NCLB had national bipartisan backing, its

creation was not a coordinated effort of the federal government working with state and local authorities (Wong & Sunderman, 2007).

According to Klein (2015), NCLB was the result of a coordinated effort among civil rights and business leaders, Democrats, Republicans, and President George W. Bush's administration, which tried to promote nationwide competitiveness and eliminate the academic disparity among underprivileged, minority children and their privileged counterparts. Subsequent to 2002, NCLB made a huge impact on teaching, learning, and school improvement. It also became progressively a topic of debate with educators and with the general public (Klein, 2015).

The No Child Left Behind Act, which made it through the legislative body with strong bipartisan support, referred to the latest redesign to the Elementary and Secondary Act of 1965 (Klein, 2015). The NCLB law, which was implemented from worry that the U.S. educational system was no more globally focused, drastically expanded the government's responsibility in holding schools accountable for the educational achievement of every child. Furthermore, it focused on guaranteeing that states and schools would help specific groups of children to be academically successful by moving away from schools reporting average scores for all students. Instead, scores were reported by the percentage of students who met a standard passing score set by the state. In addition to overall passing percentages, states were required to disaggregate scores and to assess passing percentages for subgroups of learners. For instance, NCLB focused on several subgroups of learners, including disaggregated scores for

ethnic subgroups, English-language learners, Students with Disabilities (SWD), and socioeconomically disadvantaged students. The identified subgroups were chosen because the academic performance of those subgroups had typically trailed their counterparts. States were not forced to act in accordance with new guidelines, but there was a significant financial incentive: if states did not follow guidelines, they jeopardized their Title I funds (Klein, 2015).

Title I was the largest program within the Elementary and Secondary Education Act (ESEA) (Georgia Department of Education, 2011). The Title I section of ESEA was an arrangement of plans implemented to provide aid to community learning organizations and institutes that were highly populated with students from economically disadvantaged families; it was also used to guarantee that all students met the academic standards set forth by the state. To meet the criteria of a Title I school, at least one-fourth of the student body would have come from families with salaries lower than the poverty level (Georgia Department of Education, 2011).

In compliance with the 2010-2011 Title I Programs Annual Report, (the most recent data obtainable that included Adequate Yearly Progress (AYP)), Georgia housed 1,543 Title I schools, and of those schools, 468 of them did not make AYP in 2010-2011(Georgia Department of Education, 2011). On the other hand, there were 694 non-Title I schools, and of those schools, 140 of them did not make AYP. Title I budgeted funds allocated for the 2011 fiscal year totaled almost \$500 million, with the majority of the funds being used for the instruction of students (Georgia Department of Education, 2011).

During the 2005-2006 academic school year, a new allocation formula for Title I distribution was used, resulting in a decrease of funding for over half of the school districts that were identified as Title I (Caref, 2007). It was the students from economically disadvantaged families who were impacted the most. States had to use the monies that they pulled from these poor school districts to fund NCLB requirements (Caref, 2007).

No Child Left Behind was created to advance learning opportunities for every child in America, no matter what neighborhood they lived in (Jimerson, 2005). Ironically, there were some prejudices against children who attended rural learning institutes. These biases were found in major components of NCLB. It was understood that NCLB would advance public education in all locations, not excluding the smaller communities, but there were issues in rural schools related to accountability and requirements for highly-qualified teachers. It was the provisions for highly-qualified teachers that made it hard to employ and keep teachers in rural areas (Jimerson, 2005).

After the enactment of NCLB, the turnover rate for teachers averaged 30% a year in schools that were classified as “in need of improvement” (Darling-Hammond & Berry, 2006). All students needed to be taught by teachers who were well-equipped, especially those students who were from disadvantaged backgrounds. This need made the teacher-quality provision a very important part of NCLB and a very important part of improving education for disadvantaged students. The law required states to provide every student with a highly-qualified teacher, highlighting the importance of student access to qualified teachers.

There had been worries about some states lowering their teacher certification requirements for the sake of adhering to the NCLB mandates. One accountability measure related to teachers really put pressure on states and districts, and that was the requirement that the school district notify parents of students who were taught by a non-qualified teacher for more than 4 weeks consecutively. Without doubt, this forced districts to come up with creative ways to hire and retain highly-qualified educators. On the other hand, that was not the case for all states. Actually, some states increased their teacher certification requirements. Additionally, these same states provided incentives to teachers who agreed to remain in the field (Darling-Hammond & Berry, 2006).

Almost one-fourth of the states had as many as 30% or of their teachers who were not considered to be highly-qualified, as outlined by NCLB (Darling-Hammond & Berry, 2006). According to the NCLB law, a highly-qualified teacher of a core academic subject should have obtained at least a bachelor's degree, certification from their state, and shown proficiency in their identified content area. In many states, this requirement caused the teaching-quality gap to increase between disadvantaged schools and schools that were well off. Even with the implementation of programs funded through Title I for the improvement of teacher effectiveness, districts still experienced difficulty in hiring and keeping good teachers for those students from economically challenged communities (Darling-Hammond & Berry, 2006).

A large portion of United States' youth resided in rural areas, and 35% of them were classified as disadvantaged (Jimerson, 2005). Almost 13 million

students went to schools in rural communities, and 29% of U.S. schools were found in small towns. There were 58% of Title I schools that were located in rural areas of the United States and the rural school populations in the South had concentrations of African American students. Throughout history, disadvantaged children underperformed in academics when compared to advantaged children. The population of students who were most susceptible to this gap was disadvantaged African American children (Jimerson, 2005).

The following statement was written by Haycock (2006), the author of *No More Invisible Kids*:

The biggest benefit of all? There are no more invisible kids. NCLB has shone a spotlight on the academic performance of poor and minority students, English language learners, and students with disabilities—students whose lagging achievement had previously been hidden. As a result, schools are now focusing more attention on these students' education (p. 38).

NCLB helped teachers who were trying to make a positive change in student academic achievement (Haycock, 2006). The law empowered teachers to continue their efforts toward raising academic achievement and narrowing the gap. They received much needed support from the government to support those efforts. No Child Left Behind had its flaws, but teachers were encouraged to adopt a success-oriented philosophy for all students (Haycock, 2006).

While NCLB addressed racial inequalities, it also impacted school experiences, such as teaching practices and suspension rates (Wun, 2014). To meet the

requirements of NCLB, educators tailored their instruction to the content that would be tested by the standardized assessments. Because Reading, English/Language Arts, and Mathematics scores were the determining factors for calculating AYP, the content areas of Science and Social Studies were sometimes neglected. As a negative effect, the number of police officers hired in schools increased tremendously, and suspension and expulsion numbers increased on a national level. A criticism was that the requirements of NCLB were directly responsible for what were sometimes considered cruel discipline plans and for the criminalization of struggling, and often African American, students in learning institutions. The “school to prison pipeline” (p. 470) increased in learning institutions after NCLB passed (Wun, 2014). The school to prison pipeline was a nationwide phenomenon that often forced African American students out of school and into the justice system by using particularly harsh policies and practices (Dunn, 2014).

Usually when there were major economic or social changes in the nation, criticisms of learning institutions seemed to follow (Rose, 2015). Learning institutions were made responsible for all educational issues. School reformers consistently supported positions by presenting failures of America’s educational system, and as a result, more power over schools was given to the government. However, in the past, school reform was presented as an effort to help prepare students to become globally competitive (Rose, 2015).

In order for the United States to have competed globally, measures were needed that guaranteed learners were well prepared to attend college or begin



their careers (Ravitch & Cortese, 2009). It was the country's education system that had the largest impact on its global economic rank. However, history has shown that U.S. students did not score as well as their global counterparts on international assessments, mainly in the subject areas of reading, math, and science. As of 2009, NCLB had not helped to narrow that international gap. In fact, because the law forced states to focus on the subject areas that were directly tied to NCLB, it may have made the international comparisons even worse. While it seemed that America limited students' learning opportunities to assessment preparation, their foreign counterparts were completing rigorous assignments in numerous subject areas as well as focusing on the arts. Ravitch and Cortese (2009) noted that the belief that mastering basic skills would prepare students for the workforce did not prepare them to be competitive globally.

The NCLB law was developed to ensure that all students performed at a level of *meets* or *exceeds* on their state's assessments by the year 2014 (Kamenetz, 2014). Therefore, in Georgia, by the year 2014, all students should have performed at a level of *meets* or *exceeds* on the Criterion Referenced Competency Test. What were the results in 2014? There were some increases that were observed in math on national assessments, as a result of NCLB, leading to the assumption that the achievement gap had been narrowed. However, according to Kamenetz (2014), the national comparisons were still poor for some subgroups. The number of African American students who performed at the proficient level, defined by NAEP, in mathematics for Grades 4 and 8, was below 50% (Kamenetz, 2014).

### *Math Education Reform*

Over the past century, education in mathematics had been a revolving door for reforms, including many debates over the implementation of effective teaching and learning, perhaps stemming from governing cultural beliefs (Ellis & Berry, 2005; National Council of Teachers of Mathematics, 2014). In his January 1998 address to the American Mathematical Society and Mathematical Association of America, former United States Education Secretary Richard Riley referred to these debates as “math wars” (Klein, 2002). Generally speaking, the math wars were best characterized as a long-drawn-out battle between content and pedagogy, but in actuality, the two should have worked simultaneously to achieve the common goal of teaching and learning. Content was the “what to teach” and pedagogy was the “how to teach.” The math wars began when the decision had to be made about which to begin with, content or pedagogy. Strong arguments were made on both sides about the possible limitations when beginning with either (Klein, 2002).

Some of the early reform began in the earliest part of the 20th century, one of the most prominent educational leaders, William Heard Kilpatrick, shaped the future of mathematics education in the United States (Klein, 2002). Kilpatrick believed that content material should be taught depending upon the direct practical value to the student, or if they wanted to learn the content material through independent study. His views rejected the idea that mental discipline was impacted by the study of mathematics and he challenged this idea when asked, in 1915, by the National Education Association’s Commission on the

Reorganization of Secondary Education, to preside over a committee tasked with examining the problem of teaching mathematics in the high schools. However, many mathematicians objected to Kilpatrick's report because they viewed it as an attack against the field of mathematics. Therefore, the Mathematical Association of America (MAA) responded forcefully to Kilpatrick's report, and in 1916, began the National Committee on Mathematical Requirements. This committee was credited for the 1923, 625 page volume entitled, *The Reorganization of Mathematics for Secondary Education*, also known to as the *1923 Report* (Klein, 2002).

In 1920, the MAA prompted the establishment of the National Council of Teachers of Mathematics (NCTM) (Ellis & Berry, 2005; Klein, 2002). NCTM vowed that the values and interests of mathematics would be kept at the forefront for the educational world and mathematics teachers, instead of educational reformers, would be responsible for curriculum, reforms, and adjustments. Although, one of the main reasons the NCTM was established was for the opposition of the progressives' doctrine for mathematics and it was very instrumental in circulating the *1923 Report*, it expanded and evolved over time. As a result, leaders who were easily influenced by professional reform movements were drawn to the NCTM (Ellis & Berry, 2005; Klein, 2002). The idea of teaching students, rather than the subject came about in the 1930s (Ellis & Berry, 2005; Klein, 2002). Also in the 1930s, key themes of progressivism were supported in educational materials for principals and teachers. The 1930s was also the decade for the Activity Movement's

endorsement of integration of subjects in elementary and its opposition of isolated instruction in math. Elementary schools in the U.S. quickly adopted the Activity Movement, which was inspired by Kilpatrick's writings. However, this movement was not favored by high school teachers who received formal training in their content (Ellis & Berry, 2005; Klein, 2002).

By the mid-1940s, the Life Adjustment Movement emerged for the purpose of strengthening public school students' academic abilities so that they were prepared for college and career (Ellis & Berry, 2005; Klein, 2002). This movement was prompted after it was revealed, through public scandal, that army recruits had very poor math skills and could not perform basic bookkeeping and gunnery tasks. However, by 1949, the Life Adjustment Movement had gained the support of not only teachers, but also federal and state education organizations. It was the belief that Life Adjustment would meet the needs of all U.S. children. Unfortunately, because of parent resistance, many of the nation's schools continued to teach the subject even when Life Adjustment curriculum was available. Nevertheless, by the 1950s, the Life Adjustment Movement was phased out and progressive education was withdrawn (Ellis & Berry, 2005; Klein, 2002).

Moving away from progressives' policy during the previous half-century, New Math emerged in the early 1950s and sustained through the 1960s, which was not a monumental movement (Ellis & Berry, 2005; Klein, 2002). This New Math was a conflict between skills instruction and comprehension and its curriculum highlighted coherent logical justifications for the mathematical

procedures taught in math classrooms. The many initiatives and projects that emerged during the New Math era included the University of Illinois Committee on School Mathematics (1951), the College Entrance Examination Board's Commission on Mathematics (1955), the National Defense Education Act (1958), the American Mathematical Society's School Mathematics Study Group (SMSG) (1958), the National Council of Teachers of Mathematics' Secondary School Curriculum Committee (1959), the Ball State Project (1959), the University of Maryland Mathematics Project (1959), the Minnesota School Science and Mathematics Center (1959), and the Greater Cleveland Mathematics Program (1959). The implementation of calculus courses in high school was one contribution that the New Math movement made. However, by the early 1970s, New Math had fallen out of favor after it was criticized by a large number of mathematicians (Ellis & Berry, 2005; Klein, 2002).

After the demise of the New Math movement, progressive education had reemerged from the 1950s and there was a huge push to go back to the basics in mathematics (Ellis & Berry, 2005; Klein, 2002). The 1970s recurrence of progressives' programs, which were prominent from the 1920s to the 1950s, was referred to as the Open Education Movement. Affording students full autonomy and decision making power over what they learned each day, was the nature of the Open Education Movement and it was deemed as revolutionary. Conversely, just like in the previous decades, this movement had its drawbacks. The Open Education Movement was not conducive to socioeconomically disadvantaged students, particularly African American students. Due to limited resources and

tutoring in basic skills outside of school, this movement could have been devastating for African American students. By the mid-1970s, most states implemented basic skills competency assessments in order to hold the Open Education Movement accountable; nevertheless, those assessments were not rigorous enough to hold students to high standards. By the 1980s, these standardized assessments were completely phased out (Ellis & Berry, 2005; Klein, 2002).

In the early 1980s, national attention was brought to the weakening of math and science education in the U.S. (Ellis & Berry, 2005; Klein, 2002). An account of the poor quality of education that was being offered was documented in two well-known reports, *An Agenda for Action (1980)* and *A Nation at Risk (1983)*. *An Agenda for Action* was released by the NCTM to require a new focus in mathematics, which in 1989 became national standards. The report placed problem solving at the forefront of school mathematics in the 1980s, along with new pedagogy (Klein, 2002; National Council of Teachers of Mathematics, 2014). *A Nation at Risk* was released by President Ronald Reagan's National Commission of Excellence in Education to make known the issues in mathematics education (Ellis & Berry, 2005; Klein, 2002).

The mid-1980s brought about a huge push for basic skills and unambiguous high standards in mathematics (Ellis & Berry, 2005; Klein, 2002). Because of this push for basic skills and high standards, in 1986, the NCTM revamped its standard's agenda by launching the Commission on Standards for School Mathematics and in 1987, the *Curriculum and Evaluation Standards for*

*School Mathematics* was developed (Ellis & Berry, 2005; Klein, 2002; National Council of Teachers of Mathematics, 2014). However, it was immediately revised in 1988. Input from classroom teachers across the country was solicited for this document and the final work was published in 1989, known as the *NCTM Standards* or *Standards*. These standards were characterized by Harold Stevenson, a psychologist at the University of Michigan, as being vague. The *NCTM Curriculum and Evaluation Standards for School Mathematics* was made up of two parts, general standards for grade bands K-4, 5-8, and 9-12 and “Evaluation Standards.” The *NCTM standards* were much like the progressive education from the 1920s (Ellis & Berry, 2005; Klein, 2002; National Council of Teachers of Mathematics, 2014).

In the late 1980s, the *NCTM Standards* were supported by major organizations like the American Mathematical Society, the Mathematical Association of America, and the Council of Scientific Society Presidents (Ellis & Berry, 2005; Klein, 2002; National Council of Teachers of Mathematics, 2014). Just a few years later, as add-ons to its standards, NCTM generated a manuscript spotlighting pedagogy in 1991 and another manuscript spotlighting assessment in 1995. Many states had implemented mathematics standards closely aligned to those of the NCTM by 1997. However, this would not have been possible if not for the help of the National Science Foundation (NSF). NSF was the force that pushed the *NCTM Standards* out across the United States. The Education and Human Resources and Division (EHR), a subsidiary of NSF, developed a chain of Systemic Initiative grants for the purpose of changing

mathematics and science education in the country. Taking root in 1991, the Statewide Systemic Initiatives were implemented to persuade state education organizations to adopt *NCTM Standards*. In 1994, the NSF also implemented the Urban Systemic Initiative (USI) for the purpose of employing the NCTM program in bigger cities; yet, it advanced into the Urban Systemic Program by 1999 (Klein, 2002). In 2000, the NCTM published *Principles and Standards for School Mathematics* (PSSM) to wrap up the 1990s decade of mathematics education and to deal with criticisms of the 1989 *NCTM Standards* (Ellis & Berry, 2005; Klein, 2002; National Council of Teachers of Mathematics, 2014).

The work to improve the 1989 Standards did not cease after its 2000 expansion through NCTM's *Principles and Standards for School Mathematics* (National Council of Teachers of Mathematics, 2014). After the enactment of NCLB in 2002, the improvement of the 1989 Standards continued in 2006 via *Curriculum Focal Points for Pre-kindergarten through Grade 8 Mathematics: A Quest for Coherence*. Through this body of work pertinent mathematical concepts and skills were selected from each grade level, Pre-kindergarten through Grade 8. In 2009, high school mathematics was targeted through a different body of work entitled, *Focus in High School Mathematics: Reasoning and Sense Making*. However, 2010 was the year for the next phase of mathematics standards, Common Core State Standards for Mathematics. The National Governors Association and Council of Chief State School Officers developed the Common Core State Standards for Mathematics and received a commitment from 45 states to implement the these standards. Although, there



was much to be celebrated in reference to mathematics education and student achievement, there was still a great deal of work in the area of mathematics education that remained to be accomplished (National Council of Teachers of Mathematics, 2014).

### *The Impact of High-Stakes Standardized Assessments*

The idea of standardized written tests was introduced in 1845 by Horace Mann (Holmes, 2010). It was his goal to create assessments that would evaluate students' present achievement levels for the purpose of moving them up to higher levels. The assessment results were not negatively used against students. However, since then, testing has changed from multiple points of view. The United States, along with other countries in the world, uses high-stakes assessments to measure the accomplishment, development, and advancement of students. Government sanctioned assessments were not generally utilized for precisely the same reasons as they have been used in recent years, nor were they as imperative and as intensely depended upon by educational systems (Holmes, 2010). As a result of the new testing accountabilities, results of high-stakes assessments were made public to serve as a consequence for those educational systems that were not performing at a proficient level (Amrein & Berliner, 2002).

Do standardized tests help or hurt students from disadvantaged backgrounds? Grodsky, Warren, and Felts (2008) researched the complicated relationship between testing and social inequality. They found that some supporters of testing encouraged it at minimum as a method for making classes

more strictly structured. For example, the Scholastic Aptitude Test (SAT) was designed in part to turn the best colleges into places for bright young men from all walks of life, not just the children of the privileged. However, it has been recently noted that standardized assessment results were greatly impacted by socioeconomic status, partly because students from privileged backgrounds with average scores could have increased their results by taking expensive private test preparation courses (Gershon, 2015). According to Holmes (2010), the reasons for government sanctioned tests transitioned from a helpful tool for equal opportunity to an apparatus of isolation, used to divide students by knowledge, as well as by financial status, which ultimately led to division by race. The enactment of the No Child Left Behind Act of 2001 placed an extraordinary accentuation on state sanctioned assessments to such an extent that assessments are presently pivotal to the progress of American children (Holmes, 2010).

High-stakes standardized assessments became the trend for educational institutions, thanks to the enactment of NCLB in 2001. Caref (2007) suggested that those who supported high-stakes assessments argued that the accountability piece that testing offered was good for monitoring those schools that did not meet the needs of African American students from economically disadvantaged families. Conversely, other research disputed this theory. Disadvantaged, African American students' opportunities were limited because of standardized assessments. Educational institutes used these assessments for the purpose of tracking. Educational tracking for African American students

usually landed them in lower level courses, preventing them from ever taking advanced courses. Therefore, these students were held to a lower standard, which often led to students feeling inadequate and defeated. Many students who felt this way about education ended up dropping out of school (Caref, 2007).

Caref (2007) suggested that prior to testing reform, the achievement gap began to close among African American and Caucasian children in the area of mathematics. This was during the time frame of 1971 to 1988. The achievement gap began to decrease due to the implementation of supplemental programs that afforded African American students additional educational opportunities. These programs were encouraged by the Civil Rights Movement, though the academic gap started to increase once more after the era of high-stakes standardized testing began (Caref, 2007).

Because of NCLB, school districts were impacted by standardized assessments in a way that was so much different from previous adaptations of the law. When the Elementary and Secondary Education Act of 1965 was first enacted, its goal was to help school districts that were overpopulated with poor students (Guilfoyle, 2006). Over 30 years later, with the enactment of No Child Left Behind, a stipulation was put on the funding that was given to the poorer districts. NCLB incorporated an accountability piece that was not included in the original 1965 ESEA law. Federal funding was tied to the results of high-stakes standardized assessments. Those schools and districts that neglected to meet the assessment requirements of NCLB had to fulfill even more requirements. If

schools and districts did not meet the additional NCLB requirements, they faced the possibility of being reorganized or taken over by the state (Guilfoyle, 2006).

### *Georgia's High-Stakes Test Compared to the Nation's Test*

After the enactment of NCLB, each state was mandated to administer an annual high-stakes assessment that was aligned to each state's content standards (National Center for Education Statistics, 2010). As noted in Chapter I, the Criterion Referenced Competency Test (CRCT) was put into practice in Georgia in the spring of 2001, and these test results were used as measures of achievement for NCLB accountability. The CRCT results provided data at the school level, district level, individual student level, and subgroup level, and the results were used to determine whether a school and district had met Annual Yearly Progress (AYP). This plan was sufficient to meet the federal accountability requirements.

However, annual high-stakes assessments varied from state to state, which made it impossible to compare scores between states. To rectify this problem, Congress required all states that received Title I funding to participate in the National Assessment of Education Progress (NAEP). The NAEP was a project of the National Center for Education Statistics (NCES) within the Institute of Education Science (IES) of the U.S. Department of Education (National Center for Education Statistics, 2010). Through NAEP the same mathematics and reading assessments were administered in each participating state to students in Grades 4 and 8 every 2 years. The purpose of the NAEP was to measure student performance on a national level and report the changes over time, while

the CRCT's purpose was to measure the progress of schools, districts, and the state in meeting AYP goals and state education goals (National Center for Education Statistics, 2010).

Overall, Georgia's elementary and middle schools showed increases in the CRCT scores from 2009-2013 and a slight decrease in 2014 (Georgia Department of Education, 2015d; Governor's Office of Student Achievement, 2013; Georgia School Council Institute, 2014). However, the results did not compare favorably to scores from other states on the National Assessment of Educational Progress (NAEP).

A relatively low bar had been set for proficiency on the CRCT (Peterson & Kaplan, 2013). Georgia's cut scores (the score that must be achieved to receive a score of *meets* expectations) for the CRCT were developed through a joint effort between the State Board of Education, GaDOE, and GOSA (Governor's Office of Student Achievement, 2013). Georgia's standards were set at fairly low levels, perhaps to make it more likely the state could comply with NCLB assessment requirements (Peterson & Kaplan, 2013). It is possible that lower cut scores resulted in lowered expectations and affected student performance. Though Georgia's students were improving in mathematics during the time period of this study (2009 to 2014) based on improvements on the CRCT, Georgia's NAEP math results were low, placing them in the bottom half of all states (Governor's Office of Student Achievement, 2013). Although, the CRCT and NAEP varied in content and scope, both were be used to track progress (National Center for Education Statistics, 2010). It is still possible, however, to

compare academic growth of subgroups within the state by comparing results of those groups on the same test.

*The Impact of Socioeconomics on the Achievement Gap*

Several authors (Grillo, 2012; Jensen, 2013; Lacour & Tissington, 2011; Potter, 2013; Rich, 2015; Sampson, 2016; Tagami, 2015) have written on the impact of different socioeconomic backgrounds on student achievement. They found disparities between the academic foundation and achievement of disadvantaged and advantaged students.

Lacour and Tissington (2011) presented information from a number of studies to support conclusions related to the effects of poverty on achievement. On some assessments of reading from the studies, students from disadvantaged backgrounds were in the 19<sup>th</sup> to the 30<sup>th</sup> percentile, whereas advantaged students were in 66<sup>th</sup> percentile to the 70<sup>th</sup> percentile. Families who were economically disadvantaged tended to receive funding from Aid to Families with Dependents Children (AFCD) or welfare. A few studies which compared student achievement prior to and after family income increases did not find differences, perhaps because family dynamics did not change. Lacour and Tissington also reported finding that students underperformed academically if they received welfare benefits, and they often had discipline issues. Factors such as mother's education level or even family or community beliefs could also have impacted student achievement, as could have the absence of academic encouragement in the home (Lacour & Tissington, 2011).

Jensen (2013) used research to highlight the differences in experiences of middle class students and low-income students as they affect school success, and he pointed out potential actions on the part of teachers that can improve students' success rates. There were several observable differences between poor and middle class students. Poorer students experienced more health issues than middle class students. Middle class students usually received regular check-ups and appropriate foods, whereas poorer students may not have had access to those supports. Middle class students were exposed to a larger vocabulary bank than low-income students. By the time low-income students reached 4 years of age, they would have been exposed to 13 million words, compared to a middle class student's 26 million words and an upper class student's 46 million words. Jensen also noted that disadvantaged students were not as motivated as their advantaged peers, and he suggested that the lack of drive may have been caused by the financial struggles they observed in the home.

If the word "poor" was defined by receiving free or reduced-price lunch, then over half of the nation's public school students were considered to be poor, as reported by Rich (2015). In 2013, 51% of public school students were from disadvantaged backgrounds because they qualified for free or reduced lunch; this was an increase of 13% from 2000. The southern states were impacted the most, with almost 14 states housing the majority of the nation's poor children. It was evident that an unprecedented number of poor children were being educated in the southern part of the United States (Rich, 2015).

In the early 2000s, small town schools made up a third of Georgia's education system, making Georgia the leader in the nation of having the largest number of schools located in rural areas (Sampson, 2016). Georgia went through some school consolidations, but many rural schools remain, and many of these schools served a large number of economically disadvantaged students. Economically disadvantaged children from rural communities made up 13% of the nation's population, while in Georgia, 15% of disadvantaged children are from rural communities. Additionally, 26% of minority children were reported as living in the rural communities of Georgia (Sampson, 2016). The concentration of minority children in rural communities combined with the struggles of rural communities to find highly qualified teachers can increase academic risk.

*The Atlanta Journal Constitution* (Tagami, 2015) reported that, since 2006, there are more Georgia students living in school districts with high poverty. One of the past debates had been about whether or not increased funding resulted in increased academic performances. As Tagami reported, there was a push for more funding for schools located in high-poverty communities, because these areas did not have good land values, and income from property taxes, which helped fund schools, was low. Low property tax revenue from poor communities left those community schools in distress. By the year 2014, low-income students made up 62% of the students in Georgia's public schools. Nationally, Georgia ranked number seven with the largest population of economically disadvantaged students (Tagami, 2015).



The effect of low family income on students was studied. In Georgia, underprivileged students were about four times as likely as their more privileged counterparts to score below standards on the Criterion Referenced Competency Test (CRCT) (Grillo, 2012). Some politically led education reforms and legislative initiatives focused on teacher assessment, were costly, and were dependent on high-stakes assessments or expansion of charter schools, but no reforms addressed student living conditions, which had a profound impact on student and school performance (Grillo, 2012).

The financial status of a child's family plays a huge role in academic success, but so did the financial status of their counterparts that they interacted with. Underprivileged students who attended mixed-income schools performed better than underprivileged children attending poor schools (Potter, 2013). Studies in favor of socioeconomic assimilation referred to the Coleman Report of 1966, which discovered the best school-related indicator of student success was the economic composition of the student population. Data showed the correlation between student success and student population makeup. According to a 2010 meta-analysis, children from all walks of life were likely to have greater mathematics success if they enrolled in economically and racially mixed schools (Potter, 2013).

### *The Inequalities of African Americans' Education*

The National Assessment of Education Progress (NAEP) offered insight into the academic disparity of national assessment scores in reading and math (Miksic, 2014). Dating back to the early 1970s, NAEP results had indicated

performance levels for African American students lower than that of their Caucasian peers. Between 1970 and 1980, the academic gap did decrease slightly. Nevertheless, in the 1990s, the gap did not change for reading, but increased nationally for mathematics (Miksic, 2014).

On the national level, the academic gap between African American and Caucasian students had been a concern for over 50 years (Camera, 2016). Even with movements like *Brown v. Board of Education (1954)* and the numerous enactments of school reforms, the gap between African American and Caucasian students has not narrowed as projected (Camera, 2016). The United States' public schools that were populated with African American students tended to be more strongly affected by the academic gap between African American and Caucasian students (Rabinovitz, 2016). Assessment results placed African American students two grade levels beneath their Caucasian counterparts. There was a correlation between the academic disparity between African American and Caucasian students and racial segregation (Rabinovitz, 2016).

According to the Center on Education Policy (2010), the performance of African American students in Grades 4, 8, and 9-12 increased on state assessments after the passing of NCLB in 2002. Between 2002 and 2008, the majority of states reported increases on standardized assessments for African American students. Although African American students in most states increased their performance levels on state exams, African American students as a collective were still performing at low levels (Center on Education Policy, 2010).

Considering the academic disparity between African American students and their Caucasian peers, the gap did decrease slightly in math (Center on Education Policy, 2010). However, there were some limitations when trying to analyze academic gaps from state to state. Depending on where individual states had set their proficiency goal, disparities could have emerged as wider as or narrower than they would have been with different state level goals. In order to get a more accurate view of the gaps, mean scores of African American and Caucasian students were analyzed (Center on Education Policy, 2010). This analysis took into account the fact that state assessments varied; therefore, median percentage proficient scores were used. When African American students' 2008 median percentage proficient scores were compared to the scores of Caucasian, Asian, Latino, and Native American students, the comparison showed that out of the five subgroups, African American students had the lowest median percentage proficient scores in math on the national level, making them the lowest-performers in math among their peers (Center on Education Policy, 2010). Although Georgia's assessment scores increased, African American students from economically disadvantaged backgrounds were still having difficulty in school (Rice, 2016). It was of the utmost importance for Georgia to close the disparity gap between African American and Caucasian students (Rice, 2016).

African American students who attended Georgia schools with populations that were predominantly low-income were less likely to receive a quality education (Boschma & Brownstein, 2016), creating racial disparity in academic achievement. Boschma and Brownstein (2016) reported that, even

though there have been many school leaders and teachers who transformed schools into effective learning environments and earned impressive assessment results, confining African American students to disadvantaged schools can undercut college and career readiness. There was still a strong connection between poverty and the achievement gap (Boschma & Brownstein, 2016).

### *Summary*

Dating back to the early 1800s, there had been an inequality with African Americans receiving a formal education. To rectify this problem, the federal Elementary and Secondary Education Act (ESEA) was enacted in 1965 to show a commitment to equal opportunity for all students. Throughout the years, ESEA had taken on various names; however, in 2001, it became known as the No Child Left Behind Act. Although the school reform took on a new name, the overall purpose was the same as that of the ESEA. However, with the enactment of NCLB, federal funding for states was now tied to the results of high-stakes standardized assessments, which was a new requirement not mandated under the ESEA law of 1965. The CRCT was Georgia's high-stakes standardized assessment of choice. It was used to measure the accomplishment, development, and advancement of Georgia's students.

Research showed that African American students from low-income families were still performing at lower levels in school when compared to their Caucasian counterparts. Nevertheless, the population of low-income and African American students was a growing percentage of the student population in Georgia. This demographic shift concerned employers because of the decline in

the graduation rate, which would eventually affect global competitiveness.

Therefore, the researcher found it necessary to explore the impact of race and socioeconomics on students' math achievement after the enactment of NCLB.

An overview of the quantitative methodology used, including a description of the research participants and the procedures for the data collection and analysis are presented in Chapter 3.

### Chapter III

#### METHODOLOGY

In Chapter 3, the research questions are given with an explanation of the purpose for each question. In addition, the design of the study, quantitative data, sample selection, instrumentation, data collection, and analysis are included. The purpose being addressed in the study was whether legislated national standards for schools, such as those that were set forth in No Child Left Behind, could have brought about improvement for all students, no matter the demographics of the schools they attended. This study used data from four school districts to examine the effect of NCLB on mathematics achievement for students in Grades 3 through 8 from 2009 to 2014.

#### *Research Questions*

The following questions were addressed:

1. What was the trend of CRCT mathematics achievement of African American students in School Districts A and School Districts B from 2009 to 2014 after the enactment of NCLB?
2. To what degree, if any, was there an achievement gap in CRCT mathematics achievement in the following comparisons following the enactment of NCLB from 2009 to 2014:
  - a. Between African American students and Caucasian students in City School District A?

b. Between African American students and Caucasian students in County School District A?

c. Between African American students and Caucasian students in City School District B?

d. Between African American students and Caucasian students in County School District B?

e. Between Caucasian students in City School District A and County School District A?

f. Between Caucasian students in City School District B and County School District B?

g. Between African American students in City School District A and County School District A?

h. Between African American students in City School District B and County School District B?

### *Research Design*

A quantitative, non-experimental approach was used as the methodology to address the research questions. This research study was designed to assess the changes in both City School Districts' and County School Districts' performance in reference to African American and Caucasian students' academic progress and achievement in mathematics after the enactment of NCLB. The researcher compared City School Districts' academic performance to County School Districts' academic performance, in addition to comparing African American students' academic performance to Caucasian students' academic

performance within each school district as well as between the pairs of school districts. The researcher used data from the GaDOE, GOSA, and the Georgia School Council Institute to compare the Mathematics Criterion Referenced Competency Test (CRCT) scores of students from Grades 3 through 8 for City School Districts and County School Districts from 2009 to 2014. The collected data were used to analyze mathematics achievement of the four systems and then to compare mathematics achievement for African American and Caucasian subgroups.

### *Sample Selection*

For the purpose of this study, the participants were African American students and Caucasian students who were classified as being enrolled in Grades 3 through 8 during the testing years of 2009 to 2014 and having scores included in the system score report. These participants attended 16 elementary schools, (five in the City School District A, three in City School District B, seven in the County School District A, and one in County School District B) and seven middle schools (two in the City School District A, one in City School District B, three in the County School District A, and one in County School District B). City School District A and County School District A were located in and around Town A in South Georgia and City School District B and County School District B were located in and around Town B in South Georgia. In 2015, Town A had a reported population of 55,724 residents with a median household income of \$29,336. The poverty rate for Town A in 2015 was 35% (United States Census Bureau, 2015). Almost 45 miles west of Town A, City School District B and County School



District B were located in the same town, Town B. In 2015, Town B had a reported population of 18,742 residents with a median household income of \$31,679. The poverty rate for Town B in 2015 was 27.9% (United States Census Bureau, 2015).

Together, the two pairs of school districts presented an interesting situation. Each of the four school districts was governed by its own Board of Education. City and County School Districts were chosen because both systems were contained within one county, with students who lived within the city limits of the town attending schools in the city school system, and all students outside the city limits attending the county schools. Students and their families shared a community but not a school system. The systems had separate boards of education, administrations, tax bases, and services. Beyond the geographic separations of the systems, there were many similarities. All families and students in City and County School Districts were part of the same wider community, shopped in the same stores, shared a community newspaper, shared a county government, and shared county services. The two towns and their surrounding counties had educational, governmental, and community situations that were very similar, and they were chosen for this study to provide comparative data.

The researcher collected Mathematics CRCT data for all participants for the 6 testing years from spring 2009 through spring 2014. These data enabled the researcher to examine the changes in achievement for African American students on the Mathematics CRCT from Grades 3 through 8 for City School

Districts and County School Districts. It also allowed the researcher to compare data for African American students from City School Districts to data for African American students from County School Districts as well as to compare data for African American students from both City School District A and County School District A to data for Caucasian students from both City School District A and County School District A, in addition to compare data for African American students from both City School District B and County School District B to data for Caucasian students from both City School District B and County School District B.

### *Instrumentation*

The Criterion Referenced Competency Test (CRCT) in Mathematics was the instrument used to provide data for this study (Georgia Department of Education, 2015d). Data on the percentage of African American and Caucasian students who met or exceeded expected scores during the years of 2009 through 2014 were gathered from the GaDOE, GOSA, and the Georgia School Council Institute. The Mathematics CRCT was administered every spring beginning in 2000, which was its first year of implementation. The CRCT was made up of selected-response questions only, and was developed to measure how well students obtained the skills and knowledge set forth by the Georgia Performance Standards (GPS). The assessment provided information on academic achievement at the following levels: student, class, school, system, and state. Results were used to identify individual student strengths and deficiencies in

reference to the GPS instruction, and to measure the quality of education that Georgia provided (Georgia Department of Education, 2015d).

There were three different performance levels for reporting students' test scores for the Criterion Referenced Competency Test: *exceeds* the standard, *meets* the standard, and *does not meet* the standard (Georgia Department of Education, 2015d). Students who achieved at a performance level of *exceeds* the standard had a score of 850 or greater. Students who scored from 800 to 849 were at a performance level of *meets* the standard, and those students who scored below 800 were classified at a performance level of *does not meet* the standard (Georgia Department of Education, 2015d).

The CRCT reported a scale score for mathematics (Georgia Department of Education, 2015d). The GaDOE (2012) described CRCT scoring as follows:

The scale score reported for each content area is derived by converting the number of correct responses on the test (raw score) to the CRCT scale. Since the scale scores are equivalent across test forms within the same content area and grade, students obtaining the same score have demonstrated the same level of performance with respect to GPS. Scores at or above 850 indicate a level of performance that *Exceeds the Standard* set for the test. Scores from 800 to 849 indicate a level of performance that *Meets the Standard* set for the test. Scores below 800 indicate a level of performance that *Does Not Meet the Standard* set for the test (i.e., the state's minimum level of proficiency). Students performing at this level may need additional instructional support. Scores on GPS-based CRCT

assessments are generally structured to range from 650 to 900 or above. Variations in test characteristics and student performance from one administration to the next may result in different upper limits for each grade and content area. However, scores above 900 generally indicate exceptional performance. The scale score values for meeting and exceeding standards (800 and 850, respectively) are the same for all content areas. However, the mean score, standard deviation, and standard error of measurement are unique to each content area and grade because scale scores are based on the standards set independently for each content area and grade. Standards can vary in difficulty across grades and content areas (Georgia Department of Education, 2012, p. 4).

The GaDOE (2012) defined mean score as the arithmetic average of a set of scores, standard deviation as the measure of variability of scores that represent the average difference between individual scores and the mean, and standard error of measure as the amount an examinee's observed score may vary from his or her "true" score, based on the reliability of the test.

### *Validity and Reliability*

Field (2009) suggested the following:

One way to try to ensure that measurement error is kept to a minimum is to determine properties of the measure that give us confidence that it is doing its job properly. The first property is validity, which is whether an instrument actually measures what it sets out to measure. The second is

reliability, which is whether an instrument can be interpreted consistently across different situations (Field, 2009, p. 11).

For the purpose of this study, validity referred to whether an instrument such as the CRCT truly measured what it was purposed to measure, while reliability of the CRCT could have been interpreted consistently across different situations. According to Creswell (2005), to use an existing instrument, such as the Mathematics CRCT, a description of the established validity and reliability must have been provided for previous scores that were retrieved. Validity and reliability for the CRCT was determined by the GaDOE.

According to Darnell (2012) and Travis (2008), a large number of selected Georgia educators and curriculum specialists reviewed all Mathematics CRCT items which were developed by professional mathematics specialists. The Mathematics CRCT assessment items were reviewed for quality, clarity, content, and alignment to the standards (Travis, 2008). After the review process, Mathematics CRCT field-test items were sent back to the developers for field-testing with students (Darnell, 2012). As defined in the Merriam Webster's online dictionary, field-test was the process of testing a procedure or product in realistic situations in which it would have been used (Field-test, n.d.). Once field-tested items were approved, the same selected mathematics educators used the "standards setting" process to determine the criteria for *meets* and *exceeds* on the Mathematics CRCT. Georgia's Technical Advisory Committee (TAC) was consulted quarterly for quality assurance that the Mathematics CRCT met the highest standards of technical quality and defensibility. Georgia's TAC was an

independent panel of experts in educational measurement. Georgia's educators and officials deemed the Mathematics CRCT instrument as valid and reliable (Travis, 2008).

#### *Data Collection and Analysis*

For the purpose of this study, the researcher received an Institutional Review Board (IRB) approval (see Appendix A) and collected Mathematics CRCT data for African American students and Caucasian students who were classified as being enrolled in Grades 3 through 8 during the 6 testing years from spring 2009 through spring 2014 and having scores included in the system score report. To collect the quantitative data, the Mathematics CRCT percentages of students in the designated categories were retrieved online from the GaDOE, GOSA, and the Georgia School Council Institute. Academic performance was determined by the percentage of students who performed at the *meets* or *exceeds* levels in Mathematics on the CRCT, year by year.

Research Question 1 addressed the trend of CRCT mathematics achievement of African American students in the four school districts from 2009 to 2014 after the enactment of No Child Left Behind. To answer this question, a trend analysis was conducted using Microsoft Excel. Microsoft Excel was a spreadsheet program used for statistical analysis. Line graphs were created through Excel to visually summarize the data and emphasize the differences in the scores of African American students from the City School Districts and African American students from the County School Districts.

To address Research Question 2, parts a-d, which sought to determine the degree to which an achievement gap existed in CRCT mathematics achievement between the groups identified in each sub question following the enactment of NCLB from 2009 to 2014, chi-square tests were conducted in SPSS. Chi-square was used to compare CRCT mathematics achievement for each school district (dependent variable) between African American students and Caucasian students (independent variable). The chi-square test was also used to answer Research Question 2, parts e-h, to compare Caucasian students' CRCT mathematics achievement between city and county districts (RQ2e-f) and compare African American students' CRCT mathematics achievement between city and county districts. Following the enactment of NCLB from 2009 to 2014, data from the trend analyses related to achievement gaps conducted for Research Question 1 and the statistical results calculated to answer Research Question 2 were then used to draw overall conclusions about how mathematics achievement was affected for students in Grades 3 to 8 during the years 2009 to 2014.

## Chapter IV

### RESULTS

In Chapter 4, an analysis of the results of the research questions presented in Chapter 3 is provided. The common public opinion was that the achievement gap between African American students and their Caucasian counterparts had not narrowed in the subject area of mathematics since the enactment of NCLB (Guisbond, Neill, & Schaeffer, 2012). As such, the purpose addressed in this study was whether legal national standards for schools, such as those that were set forth in No Child Left Behind, could have brought about improvement for all students, no matter the demographics of the schools they attended. This study used Mathematics CRCT data from four south Georgia school districts to examine the effect of NCLB on mathematics achievement for students in Grades 3 through 8 from 2009 to 2014.

The following questions were addressed:

1. What was the trend of CRCT mathematics achievement of African American students in School Districts A and School Districts B from 2009 to 2014 after the enactment of NCLB?

2. To what degree, if any, was there an achievement gap in CRCT mathematics achievement in the following comparisons following the enactment of NCLB from 2009 to 2014:



a. Between African American students and Caucasian students in City School District A?

b. Between African American students and Caucasian students in County School District A?

c. Between African American students and Caucasian students in City School District B?

d. Between African American students and Caucasian students in County School District B?

e. Between Caucasian students in City School District A and County School District A?

f. Between Caucasian students in City School District B and County School District B?

g. Between African American students in City School District A and County School District A?

h. Between African American students in City School District B and County School District B?

### *Data Analysis*

*Research Question 1.* The trend analyses for Research Question 1 were visually summarized in line graphs of Mathematics CRCT data and the differences in scores of African American students were then visible over the 6 years. Each graph represents one grade level for all four school districts and all 6 testing years. Figures 2 through 7 show those grade level comparisons. Below the figures is an analysis of the trends.

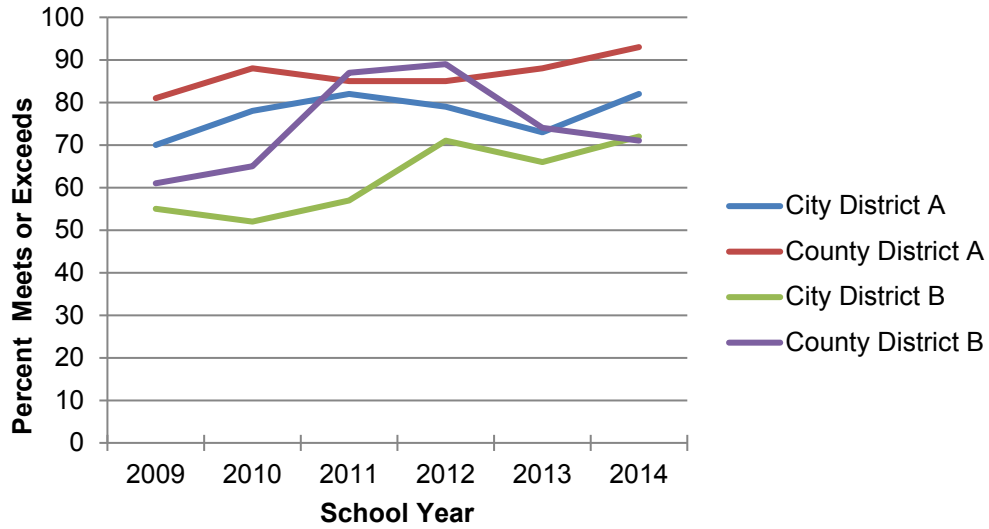


Figure 2. Grade 3 Mathematics CRCT scores for African American students:  
Percentage Meeting or Exceeding the standard score of 800

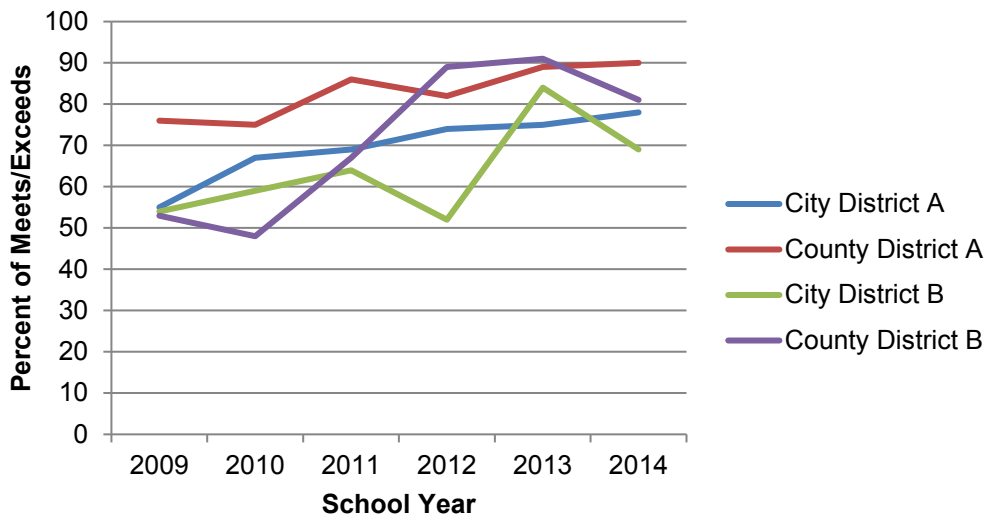


Figure 3. Grade 4 Mathematics CRCT scores for African American students:  
Percentage Meeting or Exceeding the standard score of 800

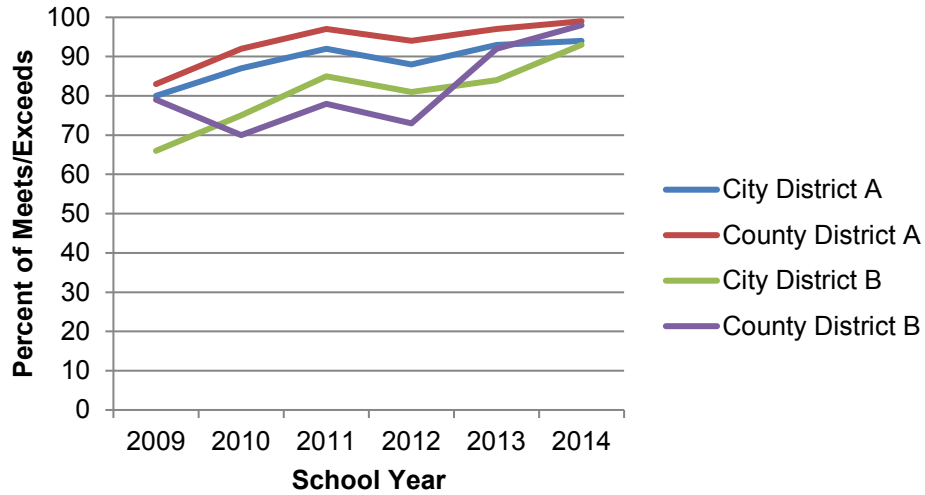


Figure 4. Grade 5 Mathematics CRCT scores for African American students:  
Percentage Meeting or Exceeding the standard score of 800

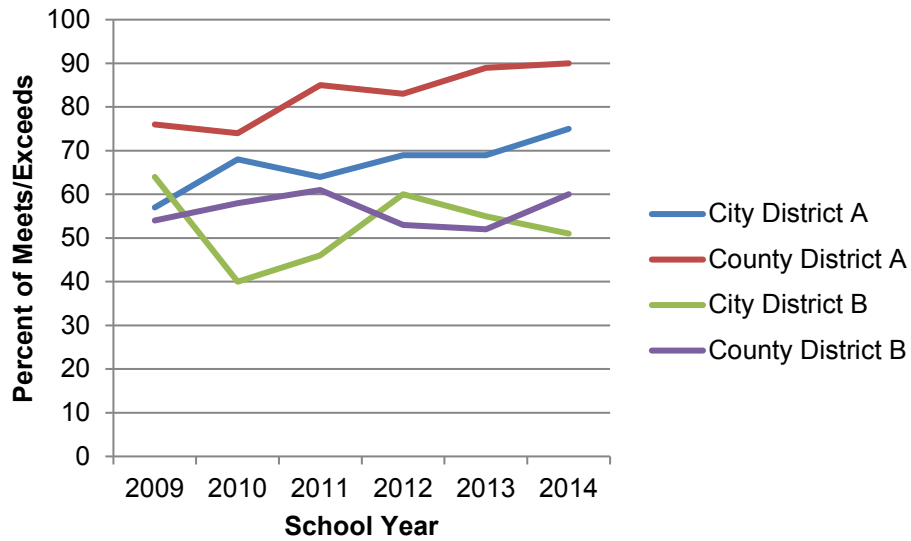


Figure 5. Grade 6 Mathematics CRCT scores for African American students:  
Percentage Meeting or Exceeding the standard score of 800

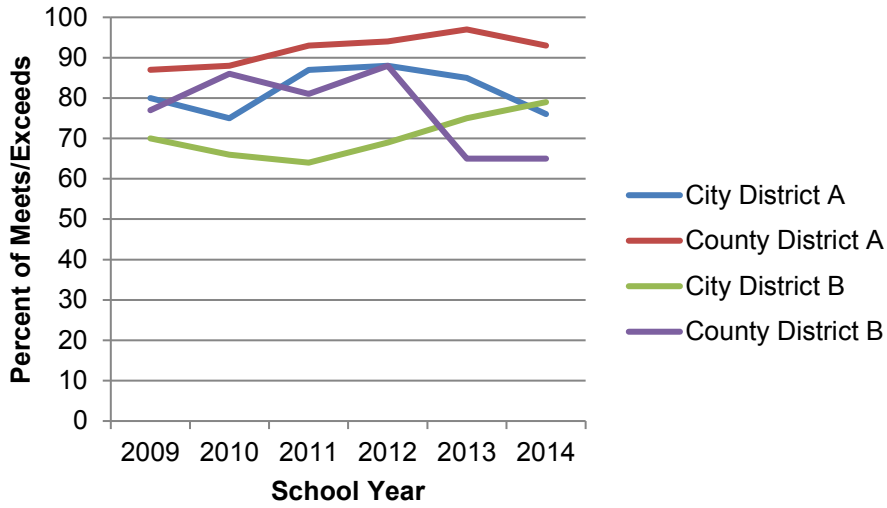


Figure 6. Grade 7 Mathematics CRCT scores for African American students:  
 Percentage Meeting or Exceeding the standard score of 800

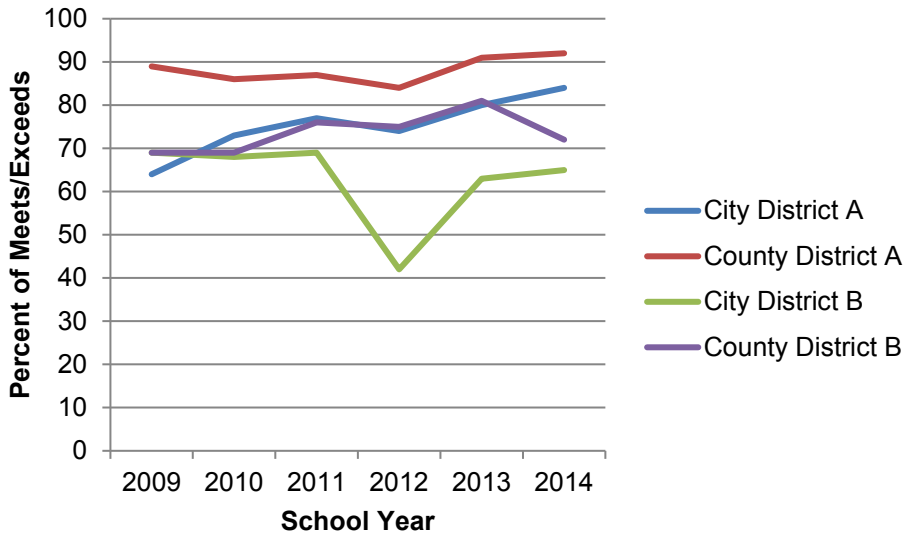


Figure 7. Grade 8 Mathematics CRCT scores for African American students:  
 Percentage Meeting or Exceeding the standard score of 800

Overall, City School District A, which was located in Town A, increased their percentage of African American students who met or exceeded the standard of 800 on the Mathematics CRCT from 2009 to 2014, with the exception of African American students in Grade 7. The increase ranged from 12% to 23% more African American students who met or exceeded the standard over that time period, while the percentage of Grade 7 African American students decreased by 4%. However, in County School District A, all grade levels increased in the percentage of African American students who met or exceeded the standard of 800 on the Mathematics CRCT from 2009 to 2014. County School District A had increases ranging from 3% to 14% for those six grade levels.

Located in Town B, 45 miles west of Town A, City School District B made gains in the percentage of African American students who met or exceeded the standard of 800 in all grade levels with the exception of Grades 6 and 8. Their gains ranged from 9% to 17%, while the percentage of Grade 6 African American students decreased by 13% and the percentage of Grade 8 students decreased by 4%. Lastly, County School District B made gains that ranged from 3% to 28% of African American students who met or exceeded the standard of 800. The gains were in all grade levels except for Grade 7; African American students in that grade had a decrease of 12%. In general, more African American students were meeting or exceeding the standard of 800 on the Mathematics CRCT from 2009 to 2014.

In order to consider trends in scores for African American students from 2009 through 2014, the gain/losses for each of the four districts in the study are presented in Table 1.

Table 1

*Gain/Loss Chart for African American CRCT Mathematics Scores between 2009 and 2014*

	City A	County A	City B	County B
Grade 3	+ 12%	+ 12%	+ 17%	+ 10%
Grade 4	+ 23%	+ 14%	+ 15%	+ 28%
Grade 5	+ 14%	+ 13%	+ 17%	+ 19%
Grade 6	+ 18%	+ 14%	- 13%	+ 6%
Grade 7	- 4%	+ 6%	+ 9%	- 12%
Grade 8	+ 20%	+ 3%	- 4%	+ 3%

According to data in Figures 2 through 7 and Table 1, increases were made across all four school districts in Grades 3 to 5. The increases made in elementary Grades 3 through 5 ranged from 10% to 28%. In Grades 6, 7, and 8, all districts with the exception of City School District B made gains in Grades 6 and 8. The gains made by these grades ranged from 3% to 20%. Although, in Grade 7, there were gains that ranged from 6% to 9% in County School District A and City School District B, there were also decreases of 4% and 12% for City School District A and County School District B, respectively. Some of the largest percentage increases occurred in Grades 4 and 5 (see Table 1), indicating that many more African American students (over  $\frac{1}{4}$  of the African American population in one case) were meeting and exceeding the required passing score. However, with minor exceptions, the trend of scores for African American students were positive.

The ultimate goal of NCLB was to ensure that 100% of all students met or exceeded the standard of 800 on all content sections of the CRCT by 2014. Although, in 2014, one of the four districts had 90% or more African American students passing the CRCT in mathematics at every grade level from 3 through 8, the pass rates for the other districts over the six grade levels ranged from a low of 51% to a high of 84%, with one exception: all districts had pass rates greater than 90% for Grade 5. However, the ideal of 100% passing was not achieved for African American students, and progress was uneven when individual district scores were examined.

*Research Question 2.* The chi-square test results for Research Question 2 are visually summarized in tables of Mathematics CRCT data and the differences in scores of African American and Caucasian students are then visible over the 6 years. Tables 2 through 7 represent one grade level at a time for all four school districts and all 6 testing years. They also show the chi-square statistics for comparing the percentage of African American and Caucasian students who met or exceeded the standard of 800. The tables are presented and then the statistical data are used to support the answers to Research Questions 2a through 2d. That discussion is followed by Tables 8 through 11, which present the percentage comparisons for one ethnic group at a time between the two neighboring school districts, and which also provide the chi-square statistical analysis of the comparisons. Those tables are followed by a discussion of the results as they support the answers to Research Questions 2e through 2h.

For Tables 2 through 7, a majority of the results were statistically significant. Attention should also be given to those  $p$  values where the differences between passing rates for African American and Caucasian student subgroups were not statistically significantly different, and those values do not have any asterisks marking statistical significance.



Table 2

*Comparison of Grade 3 African American and Caucasian Mathematics CRCT**Scores*

Grade 3		Ethnicity		df	N	X <sup>2</sup> Value	P
		African American	Caucasian				
<i>Year 2009</i>							
City District A	Meet/Exceed	70.2%	90.7%	1	591	19.354	.000***
County District A	Meet/Exceed	81.3%	92.1%	1	653	15.018	.000***
City District B	Meet/Exceed	55.3%	96.7%	1	222	34.189	.000***
County District B	Meet/Exceed	61.3%	87.7%	1	355	32.660	.000***
<i>Year 2010</i>							
City District A	Meet/Exceed	77.9%	92.0%	1	610	11.770	.001**
County District A	Meet/Exceed	86.7%	96.0%	1	641	14.134	.000***
City District B	Meet/Exceed	52.3%	80.3%	1	247	16.582	.000***
County District B	Meet/Exceed	65.2%	89.6%	1	353	30.791	.000***
<i>Year 2011</i>							
City District A	Meet/Exceed	81.9%	93.2%	1	566	9.001	.003**
County District A	Meet/Exceed	85.2%	92.7%	1	622	7.518	.006**
City District B	Meet/Exceed	56.5%	91.7%	1	222	30.608	.000***
County District B	Meet/Exceed	86.6%	94.3%	1	309	5.364	.021*
<i>Year 2012</i>							
City District A	Meet/Exceed	79.1%	92.3%	1	521	8.687	.003**
County District A	Meet/Exceed	84.9%	93.4%	1	591	9.674	.002**
City District B	Meet/Exceed	71.3%	94.6%	1	220	12.906	.000***
County District B	Meet/Exceed	88.5%	94.1%	1	272	2.557	.110
<i>Year 2013</i>							
City District A	Meet/Exceed	72.6%	88.4%	1	576	12.186	.000***
County District A	Meet/Exceed	87.7%	94.1%	1	673	7.498	.006**
City District B	Meet/Exceed	66.0%	87.7%	1	231	12.691	.000***
County District B	Meet/Exceed	74.0%	83.8%	1	304	4.140	.042*
<i>Year 2014</i>							
City District A	Meet/Exceed	82.1%	90.2%	1	505	3.890	.049*
County District A	Meet/Exceed	93.2%	92.9%	1	643	.014	.904
City District B	Meet/Exceed	72.2%	95.7%	1	236	20.317	.000***
County District B	Meet/Exceed	71.3%	80.7%	1	341	3.968	.046*

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

Table 3

*Comparison of Grade 4 African American and Caucasian Mathematics CRCT**Scores*

Grade 4		Ethnicity		<i>df</i>	<i>N</i>	<i>X</i> <sup>2</sup> Value	<i>P</i>
		African American	Caucasian				
<i>Year 2009</i>							
City District A	Meet/Exceed	55.2%	89.7%	1	539	36.237	.000***
County District A	Meet/Exceed	75.7%	89.9%	1	639	19.516	.000***
City District B	Meet/Exceed	54.2%	93.0%	1	239	33.321	.000***
County District B	Meet/Exceed	53.1%	83.7%	1	400	42.517	.000***
<i>Year 2010</i>							
City District A	Meet/Exceed	66.5%	93.1%	1	600	28.727	.000***
County District A	Meet/Exceed	75.2%	91.9%	1	665	31.871	.000***
City District B	Meet/Exceed	59.0%	85.9%	1	220	14.881	.000***
County District B	Meet/Exceed	48.2%	82.9%	1	360	46.421	.000***
<i>Year 2011</i>							
City District A	Meet/Exceed	68.9%	91.0%	1	566	20.333	.000***
County District A	Meet/Exceed	85.6%	97.1%	1	657	28.735	.000***
City District B	Meet/Exceed	63.4%	86.4%	1	241	11.939	.001**
County District B	Meet/Exceed	67.3%	90.2%	1	355	28.423	.000***
<i>Year 2012</i>							
City District A	Meet/Exceed	74.3%	95.7%	1	551	25.162	.000***
County District A	Meet/Exceed	81.6%	92.5%	1	646	15.348	.000***
City District B	Meet/Exceed	52.1%	90.7%	1	207	34.544	.000***
County District B	Meet/Exceed	88.4%	95.5%	1	286	4.927	.026*
<i>Year 2013</i>							
City District A	Meet/Exceed	75.2%	96.8%	1	517	21.410	.000***
County District A	Meet/Exceed	89.5%	93.0%	1	596	1.958	.162
City District B	Meet/Exceed	84.1%	96.4%	1	200	5.449	.020*
County District B	Meet/Exceed	91.5%	96.4%	1	289	3.121	.077
<i>Year 2014</i>							
City District A	Meet/Exceed	78.3%	88.3%	1	573	5.356	.021*
County District A	Meet/Exceed	89.5%	95.5%	1	679	7.956	.005**
City District B	Meet/Exceed	68.6%	84.9%	1	213	6.705	.010*
County District B	Meet/Exceed	81.2%	88.8%	1	307	3.356	.067

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001

Table 4

*Comparison of Grade 5 African American and Caucasian Mathematics CRCT**Scores*

Grade 5			Ethnicity		<i>df</i>	<i>N</i>	<i>X</i> <sup>2</sup> Value	<i>P</i>
		African American	Caucasian					
<i>Year 2009</i>								
City District A	Meet/Exceed	80.4%	93.1%	1	486	6.708	.010*	
County District A	Meet/Exceed	82.8%	94.2%	1	654	18.576	.000***	
City District B	Meet/Exceed	66.3%	90.5%	1	208	9.573	.002**	
County District B	Meet/Exceed	78.8%	89.7%	1	366	7.958	.005**	
<i>Year 2010</i>								
City District A	Meet/Exceed	86.7%	98.7%	1	506	9.245	.002**	
County District A	Meet/Exceed	92.0%	96.0%	1	636	3.645	.056	
City District B	Meet/Exceed	75.5%	98.6%	1	234	18.312	.000***	
County District B	Meet/Exceed	70.2%	87.8%	1	401	18.439	.000***	
<i>Year 2011</i>								
City District A	Meet/Exceed	91.8%	96.5%	1	549	2.337	.126	
County District A	Meet/Exceed	97.4%	97.8%	1	659	.093	.760	
City District B	Meet/Exceed	84.7%	100.0%	1	200	11.705	.001**	
County District B	Meet/Exceed	77.7%	88.4%	1	389	7.737	.005**	
<i>Year 2012</i>								
City District A	Meet/Exceed	87.8%	93.8%	1	532	2.783	.095	
County District A	Meet/Exceed	94.3%	98.6%	1	639	8.866	.003**	
City District B	Meet/Exceed	81.0%	98.4%	1	225	11.154	.001**	
County District B	Meet/Exceed	72.5%	89.0%	1	366	16.069	.000***	
<i>Year 2013</i>								
City District A	Meet/Exceed	92.6%	99.0%	1	511	5.972	.015*	
County District A	Meet/Exceed	96.8%	98.5%	1	638	1.875	.171	
City District B	Meet/Exceed	84.0%	100.0%	1	203	14.797	.000***	
County District B	Meet/Exceed	91.8%	95.4%	1	315	1.669	.196	
<i>Year 2014</i>								
City District A	Meet/Exceed	94.0%	96.8%	1	477	1.110	.292	
County District A	Meet/Exceed	99.3%	98.6%	1	580	.495	.482	
City District B	Meet/Exceed	92.8%	100.0%	1	178	4.019	.045*	
County District B	Meet/Exceed	98.3%	97.9%	1	308	.056	.813	

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001

Table 5

*Comparison of Grade 6 African American and Caucasian Mathematics CRCT**Scores*

Grade 6		Ethnicity		<i>df</i>	<i>N</i>	<i>X</i> <sup>2</sup> Value	<i>P</i>
		African American	Caucasian				
<i>Year 2009</i>							
City District A	Meet/Exceed	56.8%	89.0%	1	485	30.070	.000***
County District A	Meet/Exceed	76.1%	89.7%	1	681	20.761	.000***
City District B	Meet/Exceed	63.8%	97.6%	1	190	17.862	.000***
County District B	Meet/Exceed	54.3%	82.0%	1	351	30.956	.000***
<i>Year 2010</i>							
City District A	Meet/Exceed	67.9%	88.0%	1	476	13.449	.000***
County District A	Meet/Exceed	73.5%	91.3%	1	687	35.472	.000***
City District B	Meet/Exceed	39.9%	91.7%	1	211	39.826	.000***
County District B	Meet/Exceed	57.5%	82.1%	1	372	25.783	.000***
<i>Year 2011</i>							
City District A	Meet/Exceed	63.6%	87.8%	1	505	16.852	.000***
County District A	Meet/Exceed	85.2%	93.2%	1	666	9.448	.002**
City District B	Meet/Exceed	45.9%	95.5%	1	213	47.780	.000***
County District B	Meet/Exceed	61.1%	82.2%	1	389	20.669	.000***
<i>Year 2012</i>							
City District A	Meet/Exceed	69.3%	88.3%	1	566	14.201	.000***
County District A	Meet/Exceed	83.2%	92.1%	1	671	10.739	.001**
City District B	Meet/Exceed	59.7%	100.0%	1	181	29.411	.000***
County District B	Meet/Exceed	53.3%	74.1%	1	403	17.652	.000***
<i>Year 2013</i>							
City District A	Meet/Exceed	68.6%	92.6%	1	517	22.425	.000***
County District A	Meet/Exceed	88.5%	95.5%	1	650	10.111	.001**
City District B	Meet/Exceed	55.3%	93.8%	1	206	30.091	.000***
County District B	Meet/Exceed	52.4%	76.0%	1	405	23.359	.000***
<i>Year 2014</i>							
City District A	Meet/Exceed	75.1%	90.0%	1	518	10.410	.001**
County District A	Meet/Exceed	89.9%	94.1%	1	643	3.300	.069
City District B	Meet/Exceed	50.8%	90.5%	1	198	32.448	.000***
County District B	Meet/Exceed	60.3%	86.1%	1	359	30.570	.000***

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001

Table 6

*Comparison of Grade 7 African American and Caucasian Mathematics CRCT**Scores*

Grade 7		Ethnicity		<i>df</i>	<i>N</i>	<i>X</i> <sup>2</sup> Value	<i>P</i>
		African American	Caucasian				
<i>Year 2009</i>							
City District A	Meet/Exceed	80.4%	95.9%	1	478	10.573	.001**
County District A	Meet/Exceed	86.8%	93.4%	1	700	7.421	.006**
City District B	Meet/Exceed	70.2%	90.9%	1	175	7.600	.006**
County District B	Meet/Exceed	76.9%	91.4%	1	377	15.114	.000***
<i>Year 2010</i>							
City District A	Meet/Exceed	75.4%	88.3%	1	476	6.138	.013*
County District A	Meet/Exceed	88.1%	93.6%	1	694	5.662	.017*
City District B	Meet/Exceed	65.5%	96.1%	1	199	18.102	.000***
County District B	Meet/Exceed	86.2%	91.3%	1	348	2.256	.133
<i>Year 2011</i>							
City District A	Meet/Exceed	87.2%	96.1%	1	414	4.986	.026*
County District A	Meet/Exceed	93.4%	94.4%	1	706	.243	.622
City District B	Meet/Exceed	64.3%	92.2%	1	205	14.519	.000***
County District B	Meet/Exceed	81.3%	92.8%	1	363	10.827	.001**
<i>Year 2012</i>							
City District A	Meet/Exceed	88.0%	96.7%	1	501	6.139	.013*
County District A	Meet/Exceed	94.3%	97.2%	1	666	3.051	.081
City District B	Meet/Exceed	69.2%	98.6%	1	202	24.725	.000***
County District B	Meet/Exceed	88.0%	95.9%	1	368	8.104	.004**
<i>Year 2013</i>							
City District A	Meet/Exceed	85.3%	100.0%	1	525	14.130	.000***
County District A	Meet/Exceed	97.1%	97.1%	1	692	.000	1.000
City District B	Meet/Exceed	75.5%	100.0%	1	165	16.141	.000***
County District B	Meet/Exceed	65.4%	85.3%	1	419	22.625	.000***
<i>Year 2014</i>							
City District A	Meet/Exceed	76.3%	92.4%	1	502	11.784	.001**
County District A	Meet/Exceed	92.6%	97.4%	1	662	7.782	.005**
City District B	Meet/Exceed	79.2%	98.4%	1	194	12.810	.000***
County District B	Meet/Exceed	64.5%	86.8%	1	391	26.718	.000***

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001

Table 7

*Comparison of Grade 8 African American and Caucasian Mathematics CRCT**Scores*

Grade 8		Ethnicity		<i>df</i>	<i>N</i>	<i>X</i> <sup>2</sup> Value	<i>P</i>
		African American	Caucasian				
<i>Year 2009</i>							
City District A	Meet/Exceed	63.5%	84.3%	1	481	14.203	.000***
County District A	Meet/Exceed	88.8%	89.6%	1	708	.094	.759
City District B	Meet/Exceed	69.4%	92.6%	1	198	11.458	.001**
County District B	Meet/Exceed	68.4%	80.7%	1	402	7.452	.006**
<i>Year 2010</i>							
City District A	Meet/Exceed	73.1%	94.1%	1	434	17.204	.000***
County District A	Meet/Exceed	85.6%	93.6%	1	700	10.689	.001**
City District B	Meet/Exceed	68.3%	90.9%	1	170	8.725	.003**
County District B	Meet/Exceed	68.5%	84.5%	1	388	13.455	.000***
<i>Year 2011</i>							
City District A	Meet/Exceed	77.2%	89.2%	1	430	5.323	.021*
County District A	Meet/Exceed	86.6%	92.5%	1	668	5.224	.022*
City District B	Meet/Exceed	68.7%	98.1%	1	187	18.610	.000***
County District B	Meet/Exceed	75.8%	86.1%	1	348	5.998	.014*
<i>Year 2012</i>							
City District A	Meet/Exceed	73.5%	87.1%	1	444	7.523	.006**
County District A	Meet/Exceed	83.5%	91.9%	1	665	9.312	.002**
City District B	Meet/Exceed	42.4%	91.7%	1	192	41.011	.000***
County District B	Meet/Exceed	75.0%	90.0%	1	377	14.575	.000***
<i>Year 2013</i>							
City District A	Meet/Exceed	80.4%	96.5%	1	483	13.224	.000***
County District A	Meet/Exceed	91.2%	96.6%	1	664	7.844	.005**
City District B	Meet/Exceed	62.7%	97.4%	1	195	31.109	.000***
County District B	Meet/Exceed	81.3%	90.7%	1	385	6.998	.008**
<i>Year 2014</i>							
City District A	Meet/Exceed	84.3%	94.9%	1	511	6.290	.012**
County District A	Meet/Exceed	92.0%	96.0%	1	659	4.111	.043*
City District B	Meet/Exceed	65.3%	96.6%	1	177	21.027	.000***
County District B	Meet/Exceed	71.9%	86.4%	1	411	13.203	.000***

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001

Tables 2 through 7 provide statistical analyses for considering Research Question 2 parts a-d.

*Research Question 2a.* In City School District A, for every year from 2009 to 2014, the passing percentage for African American students was lower than the passing percentage for Caucasians for all grade levels (see Tables 2 through 7). The difference was statistically significant for all six of those years and for all six grade levels (a total of 36 comparisons) with the exception of the three comparisons for Grade 5 in years 2011, 2012, and 2014. In those 3 years for Grade 5, the passing percentages for African Americans were lower, but the differences were not statistically significant. For example, in Grade 5 in 2010, the passing rate for African American students in City School District A (86.7%) was significantly lower than the rate for Caucasian students in the district (98.7%),  $X^2(1, N = 506) = 9.245, p = .002$ , but in 2011, the Grade 5 gap was smaller (91.8% compared to 96.5%) and the difference was not statistically significant,  $X^2(1, N = 549) = 2.337, p = .126$ . Therefore, for 33 of the 36 comparisons of African Americans and Caucasians in City School District A shown in Tables 2 through 7, there was a statistically significant achievement gap in mathematics between African American students and Caucasian students in that school district, with African American students scoring lower than Caucasian students.

*Research Question 2b.* In County School District A, as in City School District A, for every year from 2009 to 2014, the passing percentage for African American students was lower than the passing percentage for Caucasians for all grade levels with the exception of Grade 3 in 2014, Grade 5 in 2014, and Grade

7 in 2013. African American students had a higher passing percentage than Caucasian students in County School District A for Grades 3 and 5 in 2014 and for Grade 7 in 2013, the passing percentages were the same for African American and Caucasian students in County School District A. The difference for this district was also statistically significant for all 6 of those years and for all six grade levels (a total of 36 comparisons), with a few exceptions that were slightly different from those for City School District A. The differences in passing percentages were not statistically significant in 11 out of the 36 comparisons (see Tables 2 through 7) as follows: Grade 3 in 2014; Grade 4 in 2013; Grade 5 in 2010, 2011, 2013, and 2014; Grade 6 in 2014; Grade 7 in 2011, 2012, and 2013; and Grade 8 in 2009. The Grade 7 scores in 2013 were an anomaly in that the passing rates for both African Americans and Caucasians were equal to the nearest tenth of a percent. The other African American passing percentages were lower for 8 out of the 10 remaining comparisons, but the differences were not significant. For 25 of the 36 comparisons of African Americans and Caucasians in County School District A shown in Tables 2 through 7, there was a statistically significant achievement gap in mathematics between African American students and Caucasian students in that school district, with African American students scoring significantly lower than Caucasian students.

*Research Question 2c.* In City School District B, for every year from 2009 to 2014, the passing percentage for African Americans was lower than the passing percentage for Caucasians for all grade levels. The difference for this district was statistically significant for all 6 of those years and for all six grade



levels (a total of 36 comparisons). There were 0 exceptions out of the 36 comparisons (see Tables 2 through 7). For all 36 comparisons for City School District B, there was a statistically significant achievement gap, with African American students scoring significantly lower than Caucasian students.

*Research Question 2d.* In County School District B, for every year from 2009 to 2014, the passing percentage for African American students was lower than the passing percentage for Caucasians for all grades with the exception of Grade 5 in 2014. The difference for this district was also statistically significant for all 6 of those years and for all six grade levels (a total of 36 comparisons); however, there were 6 exceptions out of the 36 comparisons (see Tables 2 through 7) as follows: Grade 3 in 2012; Grade 4 in 2013 and 2014; Grade 5 in 2013 and 2014; and Grade 7 in 2010. The second anomaly in the comparisons occurred for the Grade 5 comparison in 2014: the passing rate for African American students (98.3%) exceeded the passing rate for Caucasian students (97.9%) in County School District B, though the difference was not statistically significant,  $X^2(1, N = 307) = 3.356, p = .813$ . For 30 of the 36 comparisons of African Americans and Caucasians in County School District B shown in Tables 2 through 7, there was a statistically significant achievement gap in mathematics between African American students and Caucasian students in that school district, with African American students scoring significantly lower than Caucasian students.

In summary, there were 144 (4 districts x 6 grades x 6 years) possible comparisons of African American and Caucasian CRCT Mathematics passing

percentage rates for Grades 3 through 8 for the years 2009 through 2014. A chi-square comparison year by year for the six grade levels in the four districts showed statistically significantly lower passing rates for African American students when compared to Caucasian students in 124 of the 144 comparisons. In 20 cases where the differences were not statistically significant, the African American passing percentages were still lower in each case, with the four reported exceptions (County A for Grade 3 in 2014, County A for Grade 5 in 2014, County B for Grade 5 in 2014, and County A for Grade 7 in 2013). These statistics support the conclusion that a statistically significant achievement gap between African American and Caucasian students existed in all four systems, and that African American students scored significantly lower than Caucasian students.

Tables 8 through 11 provide data for answering questions related to comparisons of subgroups (Caucasian to Caucasian and African American to African American) in each City School District to their associated County School District. In studying Tables 8 through 11, attention should be given to those  $p$  values where the differences between passing percentage rates for a student subgroup in a City District is significantly different from that same subgroup in the associated County District. Those values are marked with asterisks.

Table 8

*Comparison of Mathematics CRCT Scores for Caucasian Students in Grades 3 through 8 in County School District A and City School District A*

Grade	Caucasian	School System		df	N	X <sup>2</sup> Value	p
		County District A	City District A				
<i>Year 2009</i>							
3	Meet/Exceed	92.1%	90.7%	1	601	.215	.643
4	Meet/Exceed	89.9%	89.7%	1	582	.005	.945
5	Meet/Exceed	94.2%	93.1%	1	592	.157	.692
6	Meet/Exceed	89.7%	89.0%	1	575	.030	.863
7	Meet/Exceed	93.4%	95.9%	1	607	.699	.403
8	Meet/Exceed	89.6%	84.3%	1	637	2.195	.138
<i>Year 2010</i>							
3	Meet/Exceed	96.0%	92.0%	1	609	3.138	.076
4	Meet/Exceed	91.9%	93.1%	1	689	.151	.698
5	Meet/Exceed	96.0%	98.7%	1	575	1.399	.237
6	Meet/Exceed	91.3%	88.0%	1	600	.961	.327
7	Meet/Exceed	93.6%	88.3%	1	595	2.889	.089
8	Meet/Exceed	93.6%	94.1%	1	618	.031	.861
<i>Year 2011</i>							
3	Meet/Exceed	92.7%	93.2%	1	598	.037	.847
4	Meet/Exceed	97.1%	91.0%	1	611	8.151	.004**
5	Meet/Exceed	97.8%	96.5%	1	591	.545	.460
6	Meet/Exceed	93.2%	87.8%	1	591	2.732	.098
7	Meet/Exceed	94.4%	96.1%	1	616	.370	.543
8	Meet/Exceed	92.5%	89.2%	1	578	.943	.332
<i>Year 2012</i>							
3	Meet/Exceed	93.4%	92.3%	1	543	.133	.716
4	Meet/Exceed	92.5%	95.7%	1	610	1.481	.224
5	Meet/Exceed	98.6%	93.8%	1	595	8.851	.003**
6	Meet/Exceed	92.1%	88.3%	1	598	1.440	.230
7	Meet/Exceed	97.2%	96.7%	1	599	.070	.791
8	Meet/Exceed	91.9%	87.1%	1	600	2.264	.132
<i>Year 2013</i>							
3	Meet/Exceed	94.1%	88.4%	1	623	4.704	.030*
4	Meet/Exceed	93.0%	96.8%	1	537	1.829	.176
5	Meet/Exceed	98.5%	99.0%	1	584	.156	.693
6	Meet/Exceed	95.5%	92.6%	1	587	1.497	.221
7	Meet/Exceed	97.1%	100.0%	1	603	2.490	.115
8	Meet/Exceed	96.6%	96.5%	1	579	.000	.985
<i>Year 2014</i>							
3	Meet/Exceed	92.9%	90.2%	1	583	.902	.342
4	Meet/Exceed	95.5%	88.3%	1	610	8.011	.005**
5	Meet/Exceed	98.6%	96.8%	1	523	1.515	.218
6	Meet/Exceed	94.1%	90.0%	1	574	2.238	.135
7	Meet/Exceed	97.4%	92.4%	1	592	5.972	.015*
8	Meet/Exceed	96.0%	94.9%	1	576	.184	.668

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

Table 9

*Comparison of Mathematics CRCT Scores for Caucasian Students in Grades 3 through 8 in County School District B and City School District B*

Grade	Caucasian	School System		df	N	X <sup>2</sup> Value	p
		County District B	City District B				
<i>Year 2009</i>							
3	Meet/Exceed	87.7%	96.7%	1	305	4.224	.040*
4	Meet/Exceed	83.7%	93.0%	1	341	3.913	.048*
5	Meet/Exceed	89.7%	90.5%	1	295	.022	.881
6	Meet/Exceed	82.0%	97.6%	1	263	6.383	.012*
7	Meet/Exceed	91.4%	90.9%	1	300	.012	.914
8	Meet/Exceed	80.7%	92.6%	1	323	4.461	.035*
<i>Year 2010</i>							
3	Meet/Exceed	89.6%	80.3%	1	312	4.379	.036*
4	Meet/Exceed	82.9%	85.9%	1	310	.335	.563
5	Meet/Exceed	87.8%	98.6%	1	341	7.323	.007**
6	Meet/Exceed	82.1%	91.7%	1	300	2.676	.102
7	Meet/Exceed	91.3%	96.1%	1	269	1.320	.251
8	Meet/Exceed	84.5%	90.9%	1	302	1.242	.265
<i>Year 2011</i>							
3	Meet/Exceed	94.3%	91.7%	1	296	.716	.398
4	Meet/Exceed	90.2%	86.4%	1	311	.808	.369
5	Meet/Exceed	88.4%	100.00%	1	328	8.797	.003**
6	Meet/Exceed	82.2%	95.5%	1	325	7.406	.007**
7	Meet/Exceed	92.8%	92.2%	1	302	.028	.866
8	Meet/Exceed	86.1%	98.1%	1	269	6.013	.014*
<i>Year 2012</i>							
3	Meet/Exceed	94.1%	94.6%	1	241	.027	.869
4	Meet/Exceed	95.5%	90.7%	1	286	2.481	.115
5	Meet/Exceed	89.0%	98.4%	1	308	5.252	.022*
6	Meet/Exceed	74.1%	100.00%	1	318	17.22	.000***
7	Meet/Exceed	95.9%	98.6%	1	315	1.225	.268
8	Meet/Exceed	90.0%	91.7%	1	321	.148	.700
<i>Year 2013</i>							
3	Meet/Exceed	83.8%	87.7%	1	285	.664	.415
4	Meet/Exceed	96.4%	96.4%	1	250	.000	.987
5	Meet/Exceed	95.4%	100.0%	1	302	3.985	.046*
6	Meet/Exceed	76.0%	93.8%	1	327	10.23	.001**
7	Meet/Exceed	85.3%	100.0%	1	321	9.179	.002**
8	Meet/Exceed	90.7%	97.4%	1	323	3.744	.053
<i>Year 2014</i>							
3	Meet/Exceed	80.7%	95.7%	1	304	11.43	.001**
4	Meet/Exceed	88.8%	84.9%	1	279	.767	.381
5	Meet/Exceed	97.7%	100.0%	1	244	1.128	.288
6	Meet/Exceed	86.1%	90.5%	1	312	.980	.322
7	Meet/Exceed	86.8%	98.4%	1	314	7.147	.008**
8	Meet/Exceed	86.4%	96.6%	1	317	4.823	.028*

\*p < .05; \*\*p < .01; \*\*\*p < .001

Table 10

*Comparison of Mathematics CRCT Scores for African American Students in Grades 3 through 8 in County School District A and City School District A*

Grade	African American	School System County District A	City District A	<i>df</i>	<i>N</i>	<i>X</i> <sup>2</sup> Value	<i>P</i>
<i>Year 2009</i>							
3	Meet/Exceed	81.3%	70.2%	1	643	7.453	.006**
4	Meet/Exceed	75.7%	55.2%	1	593	19.051	.000***
5	Meet/Exceed	82.8%	80.4%	1	548	.380	.538
6	Meet/Exceed	76.1%	56.8%	1	591	20.346	.000***
7	Meet/Exceed	86.8%	80.4%	1	571	3.304	.069
8	Meet/Exceed	88.8%	63.5%	1	552	35.008	.000***
<i>Year 2010</i>							
3	Meet/Exceed	87.6%	77.9%	1	642	6.642	.010*
4	Meet/Exceed	75.2%	66.5%	1	656	4.125	.042*
5	Meet/Exceed	92.0%	86.7%	1	567	2.795	.095
6	Meet/Exceed	73.5%	67.9%	1	563	1.754	.185
7	Meet/Exceed	88.1%	75.4%	1	575	11.86	.001**
8	Meet/Exceed	85.6%	73.1%	1	516	10.10	.001**
<i>Year 2011</i>							
3	Meet/Exceed	85.2%	81.9%	1	590	.817	.366
4	Meet/Exceed	85.6%	68.9%	1	612	15.74	.000***
5	Meet/Exceed	97.4%	91.8%	1	617	5.733	.017*
6	Meet/Exceed	85.2%	63.6%	1	580	24.34	.000***
7	Meet/Exceed	93.4%	87.2%	1	504	4.448	.035*
8	Meet/Exceed	86.6%	77.2%	1	520	6.164	.013*
<i>Year 2012</i>							
3	Meet/Exceed	84.9%	79.1%	1	569	2.268	.132
4	Meet/Exceed	81.6%	74.3%	1	587	3.329	.068
5	Meet/Exceed	94.3%	87.8%	1	595	8.851	.003**
6	Meet/Exceed	83.2%	69.3%	1	639	12.16	.000***
7	Meet/Exceed	94.3%	88.0%	1	568	4.988	.028*
8	Meet/Exceed	83.5%	73.5%	1	509	6.131	.013*
<i>Year 2013</i>							
3	Meet/Exceed	87.7%	72.6%	1	626	15.08	.000***
4	Meet/Exceed	89.5%	75.2%	1	576	13.66	.000***
5	Meet/Exceed	96.8%	92.6%	1	565	3.466	.063
6	Meet/Exceed	88.5%	68.6%	1	580	23.73	.000***
7	Meet/Exceed	97.1%	85.3%	1	614	17.27	.000***
8	Meet/Exceed	91.2%	80.4%	1	568	10.32	.001**
<i>Year 2014</i>							
3	Meet/Exceed	93.2%	82.1%	1	569	11.31	.001**
4	Meet/Exceed	89.5%	78.3%	1	642	10.46	.001**
5	Meet/Exceed	99.3%	94.0%	1	534	7.120	.008**
6	Meet/Exceed	89.9%	75.1%	1	587	16.15	.000***
7	Meet/Exceed	92.6%	76.3%	1	572	19.88	.000***
8	Meet/Exceed	92.0%	84.3%	1	594	5.956	.015*

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001

Table 11

*Comparison of Mathematics CRCT Scores for African American Students in  
Grades 3 through 8 in County School District B and City School District B*

Grade	African American	School System		df	N	X <sup>2</sup> Value	p
		County District B	City District B				
<i>Year 2009</i>							
3	Meet/Exceed	61.3%	55.3%	1	272	.963	.326
4	Meet/Exceed	53.1%	54.2%	1	298	.035	.852
5	Meet/Exceed	78.8%	66.3%	1	279	5.133	.023*
6	Meet/Exceed	54.3%	63.8%	1	278	2.584	.108
7	Meet/Exceed	76.9%	70.2%	1	252	1.417	.234
8	Meet/Exceed	68.4%	69.4%	1	277	.034	.854
<i>Year 2010</i>							
3	Meet/Exceed	65.2%	52.3%	1	288	4.659	.031*
4	Meet/Exceed	48.2%	59.0%	1	270	3.057	.080
5	Meet/Exceed	70.2%	75.5%	1	294	1.011	.315
6	Meet/Exceed	57.5%	39.9%	1	283	8.610	.003**
7	Meet/Exceed	86.2%	65.5%	1	278	15.76	.000***
8	Meet/Exceed	68.5%	68.3%	1	256	.001	.972
<i>Year 2011</i>							
3	Meet/Exceed	86.6%	56.5%	1	235	24.06	.000***
4	Meet/Exceed	67.3%	63.4%	1	285	.438	.508
5	Meet/Exceed	77.7%	84.7%	1	261	2.121	.145
6	Meet/Exceed	61.1%	45.9%	1	277	6.387	.011*
7	Meet/Exceed	81.3%	64.3%	1	266	9.144	.002**
8	Meet/Exceed	75.8%	68.7%	1	266	1.670	.196
<i>Year 2012</i>							
3	Meet/Exceed	88.5%	71.3%	1	251	9.541	.002**
4	Meet/Exceed	88.4%	52.1%	1	207	30.03	.000***
5	Meet/Exceed	72.5%	81.0%	1	283	2.841	.092
6	Meet/Exceed	53.3%	59.7%	1	266	1.108	.292
7	Meet/Exceed	88.0%	69.2%	1	255	13.27	.000***
8	Meet/Exceed	75.0%	42.4%	1	248	26.83	.000***
<i>Year 2013</i>							
3	Meet/Exceed	74.0%	66.0%	1	250	1.802	.180
4	Meet/Exceed	91.5%	84.1%	1	239	2.730	.098
5	Meet/Exceed	91.8%	84.0%	1	216	2.911	.088
6	Meet/Exceed	52.4%	55.3%	1	284	.236	.627
7	Meet/Exceed	65.4%	75.5%	1	263	3.081	.079
8	Meet/Exceed	81.3%	62.7%	1	257	11.12	.001**
<i>Year 2014</i>							
3	Meet/Exceed	71.3%	72.2%	1	273	.027	.868
4	Meet/Exceed	81.2%	68.6%	1	241	4.837	.028*
5	Meet/Exceed	98.3%	92.8%	1	242	4.199	.040*
6	Meet/Exceed	60.3%	50.8%	1	245	2.249	.134
7	Meet/Exceed	64.5%	79.2%	1	271	7.178	.007**
8	Meet/Exceed	71.9%	65.3%	1	271	1.374	.241

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

Tables 8 through 11 provide statistical analyses for considering Research Question 2 parts e-h.

*Research Question 2e.* Question 2e was asked in order to determine whether the mathematics achievement of Caucasian students was different in City School District A and County School District A. There were 36 comparisons during the 6 years across 6 grade levels. From 2009 to 2014, the passing percentage for Caucasian students in City School District A was lower than the passing percentage for Caucasians students in County School District A for most grade levels (see Table 8) with the following 10 exceptions: Grade 3 in year 2011; Grade 4 in years 2010, 2012, and 2013; Grade 5 in years 2010 and 2013; Grade 7 in years 2009, 2011, and 2013; and Grade 8 in year 2010. The difference was statistically significant for only five comparisons for all 6 years and for all six grade levels (a total of 36 comparisons). The five significant comparisons were Grade 3 in year 2013; Grade 4 in years 2011 and 2014; Grade 5 in year 2012; and Grade 7 in year 2014. During those grades and years, the passing percentage for Caucasians in City School District A was significantly lower than that of County School District A. For example, in Grade 3, in 2013, the passing percentage rate for Caucasian students in City School District A (88.4%) was lower than the passing percentage rate for Caucasian students in County School District A (94.1%),  $X^2(1, N = 623) = 4.704, p = .030$ . Similar chi-square values were computed for other significant differences. Only in the 5 of the 36 comparisons was there a statistically significant achievement gap in mathematics between Caucasians students in City School District A and

Caucasians students in County School District A. Overall, Caucasian students' Mathematics CRCT scores in City School District A and County School District A were not significantly different.

*Research Question 2f.* Question 2f was asked in order to determine whether the mathematics achievement of Caucasian students was different in City School District B and County School District B. The passing percentage rates for City and County School Districts B were much different from that of City and County School Districts A. Almost every year from 2009 to 2014, the passing percentage for Caucasian students in City School District B was higher than the passing percentage for Caucasians students in County School District B for most grade levels in the 36 comparison (see Table 9) with the following eight exceptions: Grade 3 in years 2010 and 2011; Grade 4 in years 2011, 2012, 2013, and 2014; and Grade 7 in years 2009 and 2011. The difference for these two districts was statistically significant for almost half of the comparisons for all 6 years at all six grade levels (17 of 36 comparisons). The differences in passing percentages were not statistically significant in 19 out of the 36 comparisons. The Grade 4 scores in 2013 were an anomaly in that the passing rates for Caucasians in both City School and County School Districts B were equal to the nearest tenth of a percent. Although there were 19 comparisons that did not show a statistically significant achievement gap, there were 17 comparisons that did show a statistically significant achievement gap between Caucasian students in City School District B and County School District B. Overall, Caucasian



students in City School District B, in almost half of the comparisons, had significantly higher scores than Caucasian students in County School District B.

*Research Question 2g.* Question 2g was asked in order to determine whether the mathematics achievement of African American students was different in City School District A and County School District A. In every year from 2009 to 2014, the passing percentage for African American students in City School District A was lower than the passing percentage for African American students in County School District A for all grade levels (see Table 10) with zero exceptions. The difference between these two districts was statistically significant during those years and for the six grade levels (a total of 36 comparisons) for 28 out of the 36 comparisons (see Table 10), with eight exceptions as follows: Grade 3 in 2011 and 2012; Grade 4 in 2012; Grade 5 in 2009, 2010, and 2013; Grade 6 in 2010, and Grade 7 in 2009. Therefore, for the other 28 comparisons, there was a statistically significant achievement gap in mathematics between African Americans in City School District A and African Americans in County School District A. Overall, African American students in City School District A had a significantly lower mathematics passing percentage rate than African American students in County School District A.

*Research Question 2h.* Question 2h was asked in order to determine whether the mathematics achievement of African American students was different in City School District B and County School District B. Almost every year from 2009 to 2014, the passing percentage for African American students in City School District B was lower than the passing percentage for African

American students in County School District B for most grade levels (see Table 11) with the following 12 exceptions: Grade 3 in 2014; Grade 4 in 2009 and 2010; Grade 5 in 2010, 2011 and 2012; Grade 6 in 2009, 2012, and 2013; Grade 7 in 2013 and 2014; and Grade 8 in 2009. The difference between passing percentage rates in these two districts was not statistically significant for more than half of the comparisons for all 6 years and for all six grade levels (a total of 36 comparisons). The differences in passing percentages were statistically significant in 15 out of the 36 comparisons (see Table 11) as follows: Grade 3 in 2010, 2011, and 2012; Grade 4 in 2012 and 2014; Grade 5 in 2009 and 2014; Grade 6 in 2010 and 2011; Grade 7 in 2010, 2011, 2012 and 2014; and Grade 8 in 2012 and 2013. Although there were 15 comparisons that showed a statistically significant achievement gap, there were 21 comparisons that did not show a statistically significant achievement gap between African American students in City School District B and County School District B. Overall, African American students in City School District B and County School District B had statistically significantly different results in 15 out of the 36 comparisons. In all of those cases, with the exception of Grade 7 in 2014, African American students in the City School District B scored significantly lower than African American students in County School District B.

In conclusion, Research Questions 2e-h asked about determining whether county schools and city schools in the same geographic area had inequities in mathematics achievement over the period of the study for the two subgroups in this research. A chi-square comparison year by year for the six grade levels in

City School District A and County School District A showed overall higher achievement for Caucasian students in County School District A as compared to Caucasian students in City School District A. School Districts A had a statistically significant achievement gap for 5 out of the 36 comparisons. For Caucasian students in City School District B and County School District B, mathematics achievement was overall higher for City School District B students. Year by year chi-square comparisons for the six grade levels in City School District B and County School District B showed a statistically significantly achievement gap between Caucasian students for 17 out of the 36 comparisons. The third chi-square comparison year by year for African American students in City School District A and County School District A showed a statistically significant achievement gap for 28 out of the 36 comparisons. Mathematics achievement for African American students in County School District A was higher than that of African American students in City School District A for all 36 comparisons. Lastly, the results of the fourth and final chi-square comparison year by year for the six grade levels in City School District B and County School District B showed a statistically significant achievement gap between African American students for 15 out of the 36 comparisons. Overall, mathematics achievement for African American students in County School District B was higher than mathematics achievement for African American students in City School District B.

Considering comparisons between subgroups of students in City and County Districts A, Caucasian students in City School District A had significantly

lower passing percentage rates than those in County School District A in only 5 out of 36 comparisons, while African American students in City School District A had significantly lower passing rates than African American students in County School District A in 28 out of 36 comparisons. That disparity was not revealed in comparisons of subgroups in City and County Districts B, where Caucasian students in City School District B had significantly higher passing percentage rates in 17 out of 36 comparisons with County District B, with the exception of Grade 3 in 2010, and African American students in City School District B had significantly lower passing percentage rates in 15 out of 36 comparisons with County District B, with the exception of Grade 7 in 2014. In looking at the overall results for comparisons of the two city and county districts, the findings were not similar. In City and County Districts A, passing percentages for African American students in City District A were consistently lower than those for African American students in County District A; however, passing rates for Caucasian students in the two districts were much closer. That same situation did not exist for City and County Districts B, where differences in performance for Caucasian students were almost equal to those for African American students.

## Chapter V

### CONCLUSIONS

In Chapter 5, a brief summary of the current research presented in the previous Chapters 1, 2, 3, and 4 is provided. Additionally, this chapter includes a discussion of the results. Limitations, applications, and recommendations of the study as well as suggestions for future research are also included.

#### *Overview of the Study*

The idea behind No Child Left Behind was to increase academic success and narrow the achievement gap by implementing yearly assessment goals for subgroups of students. Results of the assessments flagged variances in student achievement by race and class, highlighted discriminations, and triggered emphasis on needs of students who were ignored in many learning environments (Darling-Hammond, 2007). The underlying question addressed in this study was whether legal national standards for schools, such as those that were set forth in NCLB, could have brought about improvement for all students, and particularly for African American students, no matter the demographics of the schools they attended. The overall question posed was whether application of consistent expectations for academic progress would result in academic growth for all? Would states, school districts, and individual schools be motivated to provide whatever was necessary to see that all students met the required standards? In

other words, was it possible for a national law to create conditions for educational progress?

The purpose of this study was to examine the changes in achievement for African American students from Grades 3 through 8 for two county school districts and two city school districts over the years 2009 to 2014 to determine the trend of mathematics achievement of African American students and to examine achievement gaps between African American students and Caucasian students over that time period. These analyses then provided data for considering the effect of NCLB on mathematics achievement. Wilson (2010) suggested that the unequal educational opportunities that existed between African American students and Caucasian students dated back to the early 1800s, and although many efforts were made throughout the years, there is much research to corroborate that the inequality in education was still an issue.

The following questions were addressed:

1. What was the trend of CRCT mathematics achievement of African American students in School Districts A and School Districts B from 2009 to 2014 after the enactment of NCLB?

2. To what degree, if any, was there an achievement gap in CRCT mathematics achievement in the following comparisons following the enactment of NCLB from 2009 to 2014:

- a. Between African American students and Caucasian students in City School District A?

b. Between African American students and Caucasian students in County School District A?

c. Between African American students and Caucasian students in City School District B?

d. Between African American students and Caucasian students in County School District B?

e. Between Caucasian students in City School District A and County School District A?

f. Between Caucasian students in City School District B and County School District B?

g. Between African American students in City School District A and County School District A?

h. Between African American students in City School District B and County School District B?

There was a limitation of sample size within the study. The sample size was relatively small, with four school districts and 23 schools selected for the study. This limited sample may have affected the generalizability of the study to other districts. There was also the limitation of the standardized assessment used for this study, which was the Criterion Referenced Competency Test (CRCT). The CRCT was implemented in the spring of 2000. However, the CRCT program was retired after the 2013-2014 Summer Retest administration. Therefore, data from years past 2014 cannot be compared.

The following assumptions were used as a guide in this study:

1. Data for all school years identified in the dissertation were available for retrieval from the GaDOE, GOSA, and Georgia School Council Institute publicly accessible databases.

2. All data that were obtained from the GaDOE, GOSA, and Georgia School Council Institute publicly accessible databases possessed data integrity and had not been corrupted due to the archival or web retrieval procedures utilized.

3. Changes in the 2009 through 2014 Mathematics CRCT scores of the third through eighth grade students used in the proposed study were at least in part attributable to the effect of the enactment of NCLB.

4. The target school districts fully complied with NCLB.

The following four theories supported the framework and design of this study: theory of standards and school accountability, critical race theory, social theory, and theory of change. This study illustrates a connection of the four theories in that the theory of standards and school accountability, critical race theory, and social theory act through the theory of change to impact student achievement. In other words, student achievement, as measured by the CRCT, could have been impacted by race, socioeconomics, and potentially by NCLB.

The federal government expended significant funding with NCLB to address the identified educational disparities, and it is of significant interest to determine whether the actions and expenditures made a difference for all students. The findings for this study will provide all stakeholders with an insight into the effectiveness of NCLB in the area of mathematics that might have



accounted for academic achievement for African American students. The information in this study should further assist in the understanding of instructional practices that were favorable to the academic achievement. If growth in mathematics achievement for African American students was observed, the information from this study could be used to help improve instructional practices in schools. This study should also raise awareness of NCLB and the effects of its reauthorization at all levels.

### *Review of Literature*

According to Johnson and Kritsonis (2006), one of the biggest issues that American Schools face is the educational disparity that exists for African American students. This inequality has been well documented for several decades (Johnson & Kritsonis, 2006). During the 1800s, formal education for African Americans, particularly in the South, was nonexistent (Wilson, 2010). At that time, formal education was mostly considered to be occupational training. Even after President Abraham Lincoln signed the Emancipation Proclamation, education for African Americans was still limited to segregated learning institutions that received little to no financial support (Wilson, 2010). However, since the end of the Civil War, there had been many efforts made toward eliminating these academic disparities. The efforts began with civil rights activists putting into place lawful and partisan obstacles to discrimination. The efforts transformed into NAACP attorneys launching class action grievances in the interest African American students (McBride, 2006). Ultimately, the efforts led to government taking on a greater role in education (Martin, 2012).

As early as 1950, Congress began creating legislation that supported educational opportunities and results for economically disadvantaged students of all races who may have lived in subsidized housing (Nelson & Weinbaum, 2009). One of the earlier and most referenced legislations was signed into law in 1965 by President Lyndon B. Johnson as the Elementary and Secondary Education Act (ESEA). Although, ESEA went through several amendments and reauthorizations as the years went by and the presidents changed, one of the more recent, most referenced was the No Child Left Behind Act (NCLB) that was signed into law by President George W. Bush in 2001.

The No Child Left Behind Act marked an essential shift from the conventional government part in instruction (Wong & Sunderman, 2007). NCLB was a noteworthy development of government power over education. It defined an underachieving school and set out the best course of action to fix it. NCLB also brought new governmental issues to the forefront. Although NCLB had national bipartisan support, its creation was not a coordinated effort of the federal government collaborating with state and local authorities (Wong & Sunderman, 2007).

President Bush proposed NCLB as an answer to the national standards and assessment movement launched by the Reagan administration's 1983 release of *A Nation at Risk*. Because the National Commission on Excellence in Education found that the curriculum in some schools had been watered down, there were low expectations for students, instruction time was not being used wisely, and teacher training programs were ineffective, *A Nation at Risk* was

published (Jorgensen & Hoffmann, 2003). With the enactment of NCLB, states were mandated to develop assessment systems that would track all students' academic achievement on the standards selected by each state (Nelson & Weinbaum, 2009).

High-stakes assessments had a long history in the United States, dating back to as early as 1845. It began with Horace Mann urging students in the Boston Public Schools to demonstrate their comprehension of the state standards through written exams instead of the oral exams which had been previously administered (Gershon, 2015). Rather than use assessment results negatively against students, it was Mann's goal to create assessments that would evaluate students' present achievement levels for the purpose of moving them up to higher levels. However, since then, high-stakes assessments have changed from multiple points of view (Holmes, 2010). Although the presence of high-stakes assessments had been around for almost two centuries, the testing reform that came along with NCLB imposed a fear of test scores that were not categorized as proficient (Long, 2014). To comply with NCLB, in the spring of 2000, Georgia implemented the Criterion Referenced Competency Test (CRCT) as the measure of achievement for accountability (Georgia Department of Education, 2015d). The CRCT was a standards-based assessment that was created to evaluate the way learners obtained the skills and knowledge outlined in the state required standards (Great Schools Staff, 2016).

Over the past century, education in mathematics had been a revolving door for reforms, including many debates over the implementation of effective

teaching and learning (Ellis & Berry, 2005; National Council of Teachers of Mathematics, 2014). According to Klein (2002), former United States Education Secretary Richard Riley, referred to the debates as “math wars.” The math wars were described as a long-drawn-out battle between content and pedagogy, with strong arguments made on both sides about the possible limitations when beginning with either (Klein, 2002).

Although math reform began in the earliest part of the 20<sup>th</sup> century with one of the most prominent education leaders, William Heard Kilpatrick, it was not until the early 1980s that national attention was focused on math and science education in the United States (Ellis & Berry, 2005; Klein, 2002). An account of the poor quality of education was documented in two well-known reports, *An Agenda for Action (1980)* and *A Nation at Risk (1983)*. *An Agenda for Action* was released by the National Council of Teachers of Mathematics (NCTM) to require a new focus in mathematics, which in 1989 became national standards. The report placed problem solving at the forefront of school mathematics in the 1980s, along with new pedagogy (Klein, 2002; National Council of Teachers of Mathematics, 2014). *A Nation at Risk* was released by President Ronald Reagan’s National Commission of Excellence in Education (Ellis & Berry, 2005; Klein, 2002). Although, a great deal of work had been done to improve mathematics education and some gains were made, there was still more to do in this area in terms of student achievement, particularly for African American students (National Council of Teachers of Mathematics, 2014).

The educational definition for achievement gap was the inequality in academic performance between groups of students, particularly African American and Caucasian students as well as economically disadvantaged and economically advantaged students. These inequalities were not only observed through grades, course selection, dropout rates, and college-completion rates, but also through high-stakes assessments (Editorial Projects in Education Research Center, 2011a). According to Grillo (2012), race and class were strong indicators of students' academic achievement, and the underachieving public schools were typically found in poor neighborhoods, while the thriving schools were found in affluent neighborhoods. Because most disadvantaged African American students lived in separated economically disadvantaged neighborhoods, isolated from middle and upper-class neighborhoods, they often attended the underachieving schools (Rothstein, 2014).

### *Methodology*

A quantitative, non-experimental approach was used for this study. This research study was designed to assess the changes in both City School Districts' and County School Districts' performance in reference to African American and Caucasian students' academic progress and achievement in mathematics after the enactment of NCLB. There were comparisons conducted between City School Districts' academic performance and County School Districts' academic performance, in addition to comparisons between African American students' academic performance and Caucasian students' academic performance within each school district as well as between the pairs of school districts. Data were

collected from the GaDOE, GOSA, and the Georgia School Council Institute to compare the Mathematics Criterion Referenced Competency Test (CRCT) scores of students from Grades 3 through 8 for City School Districts and County School Districts from 2009 to 2014. The data were also used to analyze mathematics achievement of the four districts and then to compare mathematics achievement for African American and Caucasian subgroups. Trends were analyzed by drawing inferences from graphs and charts of passing percentages for comparison groups. Chi-square analysis was used to compare passing percentages in order to determine whether differences between various groups were statistically significant.

For the purpose of this study, the participants were African American students and Caucasian students who were classified as being enrolled in Grades 3 through 8 during the testing years of 2009 to 2014 and having scores included in the system score report. These participants attended 16 elementary schools, (five in the City School District A, three in City School District B, seven in the County School District A, and one in County School District B) and seven middle schools (two in the City School District A, one in City School District B, three in the County School District A, and one in County School District B). City School District A and County School District A were located in and around Town A in South Georgia and City School District B and County School District B were located in and around Town B in south Georgia.

The Criterion Referenced Competency Test (CRCT) in Mathematics was the instrument used to provide data for this study (Georgia Department of

Education, 2015d). Data on the percentage of African American and Caucasian students who met or exceeded expected scores during the years of 2009 through 2014 were gathered from the GaDOE, GOSA, and the Georgia School Council Institute. The Mathematics CRCT was administered every spring beginning in 2000, which was its first year of implementation. The CRCT was made up of selected-response questions only, and was developed to measure how well students obtained the skills and knowledge set forth by the Georgia Performance Standards (GPS). The assessment provided information on academic achievement at the following levels: student, class, school, system, and state. Results were used to identify individual student strengths and deficiencies in reference to the GPS instruction, and to measure the quality of education that Georgia provided (Georgia Department of Education, 2015d).

There were three different performance levels for reporting students' test scores for the Criterion Referenced Competency Test: *exceeds* the standard, *meets* the standard, and *does not meet* the standard (Georgia Department of Education, 2015d). Students who achieved at a performance level of *exceeds* the standard had a score of 850 or greater. Students who scored from 800 to 849 were at a performance level of *meets* the standard, and those students who scored below 800 were classified at a performance level of *does not meet* the standard (Georgia Department of Education, 2015d).

### *Summary of the Results*

*Research Question 1.* The trend analyses for Mathematics CRCT data and the differences in scores of African American students showed that

increases were made across all four school districts in Grades 3 to 5. The increases made in elementary Grades 3 through 5 ranged from 10% to 28%. In Grades 6, 7, and 8, all districts with the exception of City School District B made gains in Grades 6 and 8. The gains made by these grades ranged from 3% to 20%. Although, in Grade 7, there were gains that ranged from 6% to 9% in County School District A and City School District B, there were also decreases of 4% and 12% for City School District A and County School District B, respectively. Some of the largest percentage increases occurred in Grades 4 and 5 (see Table 1), indicating that many more African American students (over  $\frac{1}{4}$  of the African American population in one case) were meeting and exceeding the required passing score. However, with minor exceptions, the trend of scores for African American students was positive.

The ultimate goal of NCLB was to ensure that 100% of all students met or exceeded the standard of 800 on all content sections of the CRCT by 2014. Although, in 2014, one of the four districts had 90% or more African American students passing the CRCT in mathematics at every grade level from 3 through 8, the pass rates for the other districts over the six grade levels ranged from a low of 51% to a high of 84%, with one exception: all districts had pass rates greater than 90% for Grade 5. However, the ideal of 100% passing was not achieved for African American students, and progress was uneven when individual district scores were examined.

*Research Question 2a-d.* Research Questions 2a-d asked about determining whether African American and Caucasian students in the same



school districts had inequities in mathematics achievement over the period of the study. The chi-square test results for Research Questions 2a-d for Mathematics CRCT data and the differences in scores of African American and Caucasian students showed that there were 144 (4 districts x 6 grades x 6 years) possible comparisons of African American and Caucasian CRCT Mathematics passing percentage rates for Grades 3 through 8 for the years 2009 through 2014. A chi-square comparison year by year for the six grade levels in the four districts showed statistically significantly lower passing rates for African American students when compared to Caucasian students in 124 of the 144 comparisons. In 20 cases where the differences were not statistically significant, the African American passing percentages were still lower in each case, with the four reported exceptions: County A for Grade 3 in 2014, County A for Grade 5 in 2014, County B for Grade 5 in 2014, and County A for Grade 7 in 2013. These statistics support the conclusion that a statistically significant achievement gap between African American and Caucasian students existed in all four systems, and that African American students scored significantly lower than Caucasian students.

*Research Question 2e-h.* Research Questions 2e-h asked about determining whether city schools and county schools in the same geographic area had inequities in mathematics achievement over the period of the study for the two subgroups in this research. Although passing rates for Caucasian students in City District A were lower than those in County District A for 27 of 36 comparisons, the rates were statistically significantly lower in only 5 of those

comparisons. Based on those findings, mathematics achievement for Caucasian students were similar for students in City District A and County District A.

For Caucasian students in City School District B and County School District B, mathematics achievement was overall higher for City School District B students. Year by year chi-square comparisons for the six grade levels in City School District B and County School District B showed a statistically significant achievement gap between Caucasian students for 17 out of the 36 comparisons; Caucasian students in County District B had statistically significantly lower passing rates in over half of the comparisons for the six grade levels over the 6 years of the study.

The third chi-square comparison year by year for City School District A and County School District A showed a statistically significant achievement gap between African American students for 28 out of the 36 comparisons. Mathematics achievement for African American students in City School District A was lower than that of African American students in County School District A for all 36 comparisons.

Lastly, the results of the fourth and final chi-square comparison year by year for the six grade levels in City School District B and County School District B showed a statistically significant achievement gap between African American students for 15 out of the 36 comparisons. Though passing rates for African American students in City School District B were generally lower year by year than those of African American students in County School District B, the

differences were not significant in as many comparisons as for City and County Districts A.

Considering comparisons between subgroups of students in City and County Districts A, Caucasian students in City School District A had significantly lower passing percentage rates than those in County School District A in only 5 out of 36 comparisons, while African American students in City School District A had significantly lower passing rates than African American students in County School District A in 28 out of 36 comparisons. That disparity was not revealed in comparisons of subgroups in City and County Districts B, where Caucasian students in City School District B and African American students in City School District B had similar disparities. Caucasian students in City District B had significantly higher passing percentage rates in 17 out of 36 comparisons with County District B, with the exception of Grade 3 in 2010, and African American students in City District B had significantly lower passing percentage rates in 15 out of 36 comparisons with County District B, with the exception of Grade 7 in 2014. These statistics lead to the conclusion that City District B had similar disparities in mathematics achievement for both Caucasian and African American students in comparison to students in County District B, while Caucasian and African American students in City District A were more likely to have lower mathematics achievement than the students in County District A. Greater disparities in mathematics achievement between City and County students existed in the comparisons for District A for African American students (28 out of 36) than for Caucasian students (5 out of 36).

## *Discussion of the Results*

*Relationship of the current study and prior research.* One of the foremost goals of NCLB was to increase academic success and to narrow the achievement gap by putting into place yearly assessment goals for subgroups of students, keeping in mind “100 percent proficiency” (Darling-Hammond, 2007, p. 2) by 2014. Previous and current research identified an achievement gap between African American and Caucasian students (Benson, 2010; Camera, 2016; Center on Education Policy, 2010; DiCarlo, 2015; Miksic, 2014; Rabinovitz, 2016).

The National Assessment of Education Progress (NAEP) offered insight into the academic disparity of national assessment scores in reading and math (Miksic, 2014). Dating back to the early 1970s, NAEP results had indicated performance levels for African American students lower than that of their Caucasian peers. Between 1970 and 1980, the academic gap did decrease slightly. Nevertheless, in the 1990s, the gap did not change for reading, but increased nationally for mathematics (Miksic, 2014).

According to the Center on Education Policy (2010), the performance of African American students in Grades 4, 8, and 9-12 increased on state assessments after the passing of NCLB in 2002. Between 2002 and 2008, the majority of states reported increases on standardized assessments for African American students. Although African American students in most states increased their performance levels on state exams, African American students as a collective were still performing at low levels (Center on Education Policy, 2010).

According to the trends and analyses of gaps in CRCT Mathematics scores that were used in this study, mathematics achievement for African American students increased in all four school districts for Grades 3 to 5 as well as for three out of the four school districts for Grades 6 to 8 during 2009 to 2014. Although gains were made in almost every grade in all four school districts, the NCLB goal of 100% by 2014 was not met. Results of chi-square tests showed that a statistically significant achievement gap existed between African American and Caucasian students in all four systems from 2009 to 2014.

According to Editorial Projects in Education Research (2011), achievement gaps were usually caused by socioeconomic factors. Of all children under the age of 18 residing with families in the United States, over 15 million were living below the poverty level (Editorial Projects in Education Research, 2011). Southern states, such as Tennessee, North Carolina, West Virginia, and Georgia all ranked sixth in the nation as having the largest percentage of poverty (Grillo, 2012). Georgia had about 26% of their children who were living in poverty. Grillo (2012) suggested that race and class were strong indicators of students' academic achievement, and the lowest performing public schools had a tendency to be located in the poorest areas, while higher performing schools were found in affluent neighborhoods.

Because most disadvantaged African American students lived in separated economically disadvantaged communities, isolated from middle and upper class communities, they often attended segregated schools (Rothstein, 2014). Grouping these disadvantaged African American children in racially and

economically homogeneous schools brought about further suppression.

According to Rothstein (2014), the academic achievement of the poorest African American children could not have been greatly improved by school reform alone; the improvement of their economic conditions should have been addressed. The impoverished home lives that many African American students experienced had been passed down through many generations. This factor could have also impacted student achievement (Rothstein, 2014).

According to the GaDOE (2015) and Georgia School Council Institute (2014), in 2009, 70% of the student population in City School District A received free or reduced-price lunch, while 41% of the student population in County School District A received free or reduced-price lunch. In 2014, those numbers increased to 100% of the student population in City School District A receiving free or reduced-price lunch, while 50% of the student population in County School District A were receiving free or reduced-price lunch (Georgia Department of Education, 2015; Georgia School Council Institute, 2014).

Additionally, there was a shift in the free lunch poverty indicator information for City and County School Districts B over the course of this study. In 2009, 68% of the student population in City School District B received free or reduced-price lunch, while 58% of the student population in County School District B received free or reduced-price lunch. However, in 2014, those numbers changed to the following, 46% of the student population in City School District B received free or reduced-price lunch, while 75% of the student population in County School District B received free or reduced-price lunch (Georgia Department of

Education, 2015; Georgia School Council Institute, 2014). The changes in this socioeconomic indicator may denote a population shift that could have affected student achievement in these two districts.

Do African American students who are economically disadvantaged tend to score lower than African American students who have more advantages? In 2014, with 50% of County School District A being comprised of students who were described as being poor, at least 90% of their African American students were in the categories of *meets* or *exceeds* the standard of 800 on the Mathematics CRCT (Georgia Department of Education, 2015; Georgia School Council Institute, 2014). Alternatively, 75% of the students in County School District B were economically disadvantaged and at least 60% of their African American students met or exceeded on the Mathematics CRCT. As for the City Districts, 100% of City School District A students were economically disadvantaged in 2014 and within the same year, at least 75% of their African American students scored at least proficient on the Mathematics CRCT. City School District B had 46% of their student population being classified as economically disadvantaged and at least 51% of their African American students were proficient on the Mathematics CRCT (Georgia Department of Education, 2015; Georgia School Council Institute, 2014). These results do not provide support for a clear and equally applicable conclusion related to socioeconomic factors in these four districts.

*Implications for practice.* The results of this study indicate that, although student achievement had increased for African American and Caucasian

students over the time addressed in this study, these students did not make gains at the same rate. It can be argued that teachers may have used instructional practices that focused on increasing overall achievement, but not on filling in the gaps. Although participants in this study improved in their mathematics achievement, an achievement gap still remained between the two groups of students. In order to close the achievement gaps between African American and Caucasian students and economically disadvantaged and economically advantaged students, teachers will have to address the gaps with these students. Teachers will have to step out of their comfort zones to provide these students with out of the box learning experiences.

*Limitations.* This study was limited in that it included only four school districts in South Georgia; consequently, it could not be determined whether NCLB impacted other districts in Georgia or other states. The study was also limited in that it focused only on African American and Caucasian students in Grades 3 through 8; therefore, it cannot be determined if NCLB impacted other grades levels or subgroups in similar or different ways. Lastly, this study was limited in that states were given flexibility in regard to the selection of standards and assessments, making it more difficult to generalize student achievement from state to state.

*Applications and recommendations.* The NCLB law, which was implemented from worry that the United States educational system was no more globally focused, drastically expanded the government's responsibility in holding schools accountable for the educational achievement of every child (Klein, 2015).



Furthermore, it focused on guaranteeing that states and schools would help specific groups of children to be academically successful by moving away from schools reporting average scores for all students. Instead, scores were reported by the percentage of students who met a standard passing score set by the state. In addition to overall passing percentages, states were required to disaggregate scores and to assess passing percentages for subgroups of learners.

The findings for this study provide all stakeholders, including parents, teachers, principals, district office staff, and policy makers, an insight into the effectiveness of NCLB in the area of mathematics that might have accounted for the academic achievement for African American students. This information should further assist in the understanding of instructional practices needed to promote academic achievement. This study should raise awareness of NCLB and the effects of its reauthorizations at all levels.

*Recommendations for future research.* The results of this study indicate that mathematics achievement did improve after the enactment of NCLB; however, achievement gaps still existed as of 2014. There were components of NCLB that seemed to be working, while other components of the law were not as effective. Perhaps a program evaluation for specific components of NCLB could be done. Because this study was limited to mathematics achievement for African American and Caucasian students in Grades 3 through 8 from 2009 to 2014, it may be interesting to see the results of a study using different subject areas, subgroups, grade levels, and/or years. Considering NCLB is not limited to the

four south Georgia school districts that were selected for the purpose of this study, further research could be done in other school districts in Georgia as well as other states. Lastly, the Criterion Referenced Competency Test (CRCT) was retired after the 2013-2014 Summer Retest Administration and replaced with the Georgia Milestones Assessment System (GMAS). It would be beneficial to conduct a study on student achievement using this new assessment.

### *Conclusion*

Willingham (2012) suggested that students from economically disadvantaged backgrounds tend to face many obstacles to academic success. As one may expect, parents of poorer students do not have resources to provide opportunities for adequate or additional learning experiences, which makes it difficult for these students to reach the same academic levels as their more advantaged counterparts. According to research from the past decade, economically disadvantaged students are subject to chronic stress, which also negatively impacts test scores (Willingham, 2012). However, in 2011, Lacour and Tissington stated the following:

Although many poor students score below average on assessment measures, instructional techniques and strategies implemented at the classroom, school, district, and government levels can help close the achievement gap by providing students with necessary assistance in order to achieve high performance in academics (p. 527).

Since the end of the Civil War, major changes geared toward eliminating the academic disparities that existed between African American and Caucasian

students in the United States had been made (McBride, 2006). As early as 1950, Congress approved legislation to provide additional support to systems that served the neediest students (Nelson & Weinbaum, 2009). Federal aid was distributed to neighborhood schools depending upon each individual state's population of students in Grades K through 12 whose families' salaries were below \$2000. The aid was used to provide learning institutions with federal funding to advance the educational opportunities and outcomes for the poorest students. In 2001, after many modifications, this legislation became known as No Child Left Behind (Nelson & Weinbaum, 2009). Under NCLB, the federal government did not try to obtain funding that would be distributed equally (Ravitch, 2011). Instead, with this law, congress implemented standardized assessments as a school improvement measure. This school improvement measure of standardized assessments mandated states to test primary and middle school students who were in Grades 3 through 8 (Ravitch, 2011).

The goal of NCLB was to ensure that 100% of all students met or exceeded the standard of 800 on all content sections of the CRCT by 2014. The trend analyses in this study show that it may be more difficult to improve the percentage of African American students meeting or exceeding the standard of 800 on the Mathematics CRCT in the Middle Grades 6 to 8 when compared to the elementary grades 3 to 5. The goal of NCLB was probably considered by most to be idealistic, but data support the conclusion that progress was made. Could the differences in the percentage pass rates be a reflection of the differences in economic statuses? In 2014, the results for City School District B

and County School District B were not favorable to that part of the NCLB goal requiring 100% proficiency for all students in all grade levels. City School District B pass rates ranged from 51% to 93%, while County School District B pass rates ranged from 60% to 98% (Georgia Department of Education, 2015; Georgia School Council Institute, 2014).

According to the trends and analyses of gaps in CRCT Mathematics scores, mathematics achievement for African American students increased in all four school districts for Grades 3 to 5 as well as for three out of the four school districts for Grades 6 to 8 during 2009 to 2014. Although gains were made in almost every grade in all four school districts, the NCLB goal of 100% by 2014 was not met. Results of chi-square tests supported the conclusion that achievement gaps still existed in varying degrees between African American and Caucasian students in all four systems from 2009 to 2014. Mathematics achievement did improve after the enactment of NCLB; however, achievement gaps still existed.

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APPENDIX

Institutional Review Board Approval

**Institutional Review Board (IRB)  
for the Protection of Human Research Participants**

**Graduate Student Research Response Form**

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**Project Title:** A Study of the CRCT Achievement of African American Students in GA from 2009-14 after the Enactment of NCLB  
**Name:** Ms. Tiffanie Warren-Williams      **Faculty Advisor:** Dr. Ellice Martin  
**Department:** Curriculum, Leadership, & Technology      **Please indicate the academic purpose of the proposed research:**  
**E-mail:** [tswarren@valdosta.edu](mailto:tswarren@valdosta.edu)       Doctoral Dissertation  
 Master’s Thesis  
**Telephone:** 229-444-0600       Other:

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1.    YES    NO    **Will you utilize *existing identifiable private* information about living individuals?** “Existing” information is data that were previously collected for some other purpose, either by the researcher or, more commonly, by another party. “Identifiable” means that the identities of the individuals can be ascertained by the researcher by name, code number, pattern of answers, or in some other way, regardless of whether or not the researcher needs to know the identities of the individuals for the proposed research project. “Private” information includes information about behavior that occurs in a context in which an individual can reasonably expect that no observation or recording is taking place or information provided for specific purposes that the individual can reasonably expect will not be made public (e.g., a medical record or student record).
- Note: If you are using data that: (1) are publicly available; (2) were collected from individuals anonymously (i.e., no identifying information was included when the data were first collected); (3) will be de-identified before being given to the researcher, (i.e., the owner of the data will strip identifying information so that the researcher cannot ascertain the identities of individuals); or (4) do not include any private information about the individuals, regardless of whether or not the identities of the individuals can be ascertained, your response to Question 1 should be NO.*
2.    YES    NO    **Will you *interact* with individuals to obtain data?** “Interaction” includes communication or interpersonal contact between the researcher and the research participant, such as testing, surveying, interviewing, or conducting a focus group. It does not include observation of public behavior when the researcher does not participate in the activities being observed.
3.    YES    NO    **Will you *intervene* with individuals to obtain data?** “Intervention” includes manipulation of the individual or his/her environment for research purposes, as well as using physical procedures (e.g., measuring body composition, using a medical device, collecting a specimen) to gather data for research purposes.



**In response to your recently submitted IRB Screening form your proposed research **is not** subject to oversight by the Institutional Review Board.**

*Please contact Tina Wright, Research Compliance & Integrity Specialist, with any additional questions and/or concerns.*

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*Elizabeth W. Olphie*                      *12/09/2016*  
Elizabeth W. Olphie, IRB Administrator      Date

**Thank you for submitting an IRB application.**  
**Please direct questions to [irb@valdosta.edu](mailto:irb@valdosta.edu) or 229-259-5045.**