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An Evaluation of Student Achievement Before and After Training in Response to Instruction in a
Rural School District

A dissertation

presented to

the faculty of the Department of Educational Leadership

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Doctor of Education in Educational Leadership

by

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May 2014

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Keywords: student achievement, professional development, response to intervention

ABSTRACT

An Evaluation of Student Achievement Before and After Training in Response to Instruction in a
Rural School District

by

Caroline T. Davis

The purpose of this quantitative study was to provide research in examining the difference in student achievement in reading and math through the quantitative data collection of North Carolina EOG scores for students in third through fifth grade from one high poverty and high performing North Carolina public school district before and after implementation of RtI. The population of this study included all students in the public school system who participated in EOG testing during the 2009-2012 school years in grades 3-5. Data collection was carried out using the North Carolina Department of Public Instruction Testing and Accountability website to acquire North Carolina End of Grade scores for cohort grouped students for school years: 2007-2008, 2008-2009, 2009-2010, 2010-2011, 2011-2012. Each research question had a corresponding null hypothesis. A chi-square analysis was conducted on each of the 6 research questions. All data were analyzed at the .05 level of significance. Findings indicated little difference in student achievement in reading and math EOG scores for students in third through fifth grade before and after district implementation of RtI.

DEDICATION

This dissertation is dedicated to my family and the wonderful students, teachers, mentors, and friends who have guided me throughout my life and career.

ACKNOWLEDGMENTS

It is with great thanks and appreciation that I acknowledge all those who supported me in my educational journey. First I would like to thank Dr. Foley for her persistence and dedication in assisting me throughout this process. To all my professors who I have had in this program that without a doubt challenged me to think and grow as an educator, I am eternally grateful. To my colleagues who supported me throughout this journey, I thank you. Finally, I want to thank my family and friends for their love, support, and guidance throughout my journey in life.

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CHAPTER 1

INTRODUCTION

More than ever before states, school districts, and school leaders are held accountable for student achievement. As a result schools are under ever increasing pressure to assure that all students learn. In an effort to increase achievement for all students, educational researchers identify successful correlates of effective schools, and suggest numerous theories and strategies for school improvement (Marzano, 2005; Reeves, 2006; Schmoker, 2006). Consequently, many characteristics are successful in fostering student achievement; however, a professional learning - centered culture repeatedly materializes as the central, holistic framework around which school leaders must address concerns if they are to positively impact school performance and improve student learning in the future (DuFour, 2004).

According to the North Carolina Department of Public Instruction (NCDPI, 2007) North Carolina schools are encouraged to adopt and develop a Response to Instruction (NC RtI) plan to support a fluid model of response to interventions (RtI) of varying intensity to meet the needs of all students. More than an alternative to traditional special education criteria for students with high incidence disabilities, RtI has gained credibility in recent years as a useful model for providing data-based decision making for any students demonstrating a need for additional interventions toward improving their academic performance. Taking into account the statements of purpose for No Child Left Behind (2001), *Reading First*, and the Individuals with Disabilities in Education Act (2004), RtI provides a school-wide model of integrated instruction, assessment, and data-based decision making to improve student achievement (Mellard & Johnson, 2008).

Despite having an existing framework in place for school improvement, Total Quality Management, and having two schools recognized as a No Child Left Behind – Blue Ribbon

Schools in 2009 and 2010, the administration and staff of the school district in the study agreed to apply for, and later received, a North Carolina Quality Educators through Staff Development and Training (NC QUEST) grant to fund the professional development needed to implement RtI in the district. According to NC QUEST (2010) Problem Solving Model Leadership Initiative (PSMLI) the project objectives included:

1. Deliver standardized research-based professional development in problem-solving, including Response to Intervention (RtI); scientifically based reading and mathematics instruction; and standards-aligned instruction and assessment.
2. Use the Problem Solving Model to determine instructional practices that will meet the needs of at risk students.
3. Develop school based Problem Solving Model leadership teams for replication and sustainability.
4. Increase student achievement and success rates for graduation.

North Carolina NC QUEST is operated under Title II-A, “Improving Teacher Quality State Grants.” Title II-A is aimed at increasing academic achievement of all students by helping schools and school districts improve teacher and principal quality and ensure that all teachers are highly qualified. The US Department of Education directly allocated over \$1.3 million to North Carolina’s state agencies for higher education (SAHEs) to make awards, through a statewide grant process, to eligible Institutes of Higher Education (IHE)-Local Education Agency (LEA) partnerships for quality professional development (NC Quest, n.d.).

The school district agreed to partner with a local Institution of Higher Education to execute the Problem Solving Model Leadership Initiative (PSMLI) beginning in the 2009-2010 school year. This study was viewed as a measure to examine the difference in student

achievement in reading and math through the quantitative data collection of North Carolina EOG scores for students in third through fifth grade from one high poverty and high performing NC public school district before and after the implementation of RtI. According to Marzano (2005) a school's learning centered culture consistently emerges as a proven framework for studying school performance.

Statement of the Problem

The purpose of this study was to provide research in examining the difference in student achievement in reading and math through the quantitative data collection of North Carolina EOG scores for students in third through fifth grade from one high poverty and high performing North Carolina public school district before and after implementation of RtI. Due to the increased demand for school accountability and the subsequent response to address the issue of improving achievement for all students, North Carolina schools are encouraged to adopt and develop Response to Instruction (NC RtI) plans to support a fluid model of response to interventions of varying intensity to meet the needs of all students. School systems are either engaging this challenge on their own or with the support of initiatives such as NC QUEST. Because this is a new initiative, most North Carolina schools have not yet investigated the difference in student achievement in reading and math before and after implementation of RtI. As demands for outcome accountability, with an emphasis on individual student learning, become more pronounced, it is crucial to determine whether RtI will have a statistically measurable influence on student achievement.

Research Questions

1. For students in grade 3, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North

Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2009, 2010, 2011, 2012)?

2. For students in grade 3, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2010, 2011, 2012)?
3. For students in grade 4, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2009, 2010, 2011, 2012)?
4. For students in grade 4, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2010, 2011, 2012)?
5. For students in grade 5, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response

- to Intervention professional development for teachers) by year (2009, 2010, 2011, 2012)?
6. For students in grade 5, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2010, 2011, 2012)?

Significance of the Study

In response to demands for accountability at the federal and state levels, and in an effort to increase achievement of all students, North Carolina schools are encouraged to adopt and develop Response to Instruction plans to support a fluid model of response to interventions of varying intensity to meet the needs of all students. Batsche, Kavale, and Kavaleski (2005) defined Response to Instruction as the practice of providing (1) high-quality instruction and intervention matched to student needs and (2) using learning rate over time and level of performance to (3) make important educational decisions. A growing body of educational research shows how high performing schools are shifting their focus from effective teaching practices to a culture that focuses on student learning enhanced by assessment literacy. Not only is there a need for reliable assessments aligned to a rigorous curriculum but also training in how to use the information given by the assessments (Stiggins, 2004).

In the current study my aim was to provide research in examining the difference in student achievement in reading and math through the quantitative data collection of North Carolina EOG scores for students in third through fifth grade from one high poverty and high performing North Carolina public school district before and after implementation of RtI.

Knowledge gained from the study will contribute to the state and district's awareness of the effectiveness or lack of effectiveness of RtI programs utilized within North Carolina public schools. Furthermore, the study may serve as a guide for further research in the evaluation of targeted initiatives in measuring the success of a Response to Intervention Program.

Assumptions

For the purposes of this study the following assumptions were considered:

1. It was assumed the North Carolina End of Grade (NC EOG) administrators conducted assessments according to protocols outlined in the assessment guidelines.
2. It was assumed the NC EOG data were reported accurate and reliably represented the student assessment records of the district studied.

Limitations

Limitations related to this study included the following:

1. Results of the study included a descriptive and comparative analysis of sample data collected from students in only one school district in North Carolina.
2. Using convenience sampling, the district selected for the study was chosen because of the availability of assessment data from four elementary schools implementing Response to Intervention (RtI).
3. It is important to note the researcher was unable to control for years of teaching experience, teaching practices, building leadership, school climate, student to teacher ratio, and other related factors for schools included in the study
4. Findings within the study may or may not be transferable to other North Carolina public school districts.
5. Moreover, results of the study may not predict the impact of RtI on student achievement

in future studies or in other states.

Delimitations

The following delimitations were made for the purpose of the study:

1. Research was limited to students classified as grade 3 through grade 8 in 2006-2007 through 2011-2012 from one school district in North Carolina and the same grade levels were studied over time.
2. Student achievement in reading and math was measured using the North Carolina End of Grade test (NC EOG) measures for 2006-2007 through 2011-2012.
3. Students from one school district in grades 3 through 8 were purposively selected as the sample, or population of interest for the present study.
4. Variables addressed in this study included all students, gender, economically disadvantaged status, academically gifted status, and learning-disabled status.

Definitions of Terms

Blue Ribbon School

The No Child Left Behind-Blue Ribbon Schools Program honors public and private K-12 schools that are either academically superior in their states or that demonstrate dramatic gains in student achievement. The program requires schools to meet either of two assessment criteria. It recognizes schools that have at least 40% of their students from disadvantaged backgrounds that dramatically improve student performance in accordance with state assessment systems; and it rewards schools that score in the top 10% on state assessments (United States Department of Education [USDE], 2012).

Convenience Sample

A convenience sample is a group of cases that are selected because they are available and easy to access (Witte & Witte, 2010).

Economically Disadvantaged Status

Economically disadvantaged status is a terminology used to describe those students who are reported as eligible for free or reduced-price meals under the National School Lunch and Child Nutrition Program, or other public assistance (NCDPI, n.d.)

Individuals with Disabilities in Education Act (IDEA)

As reauthorized in 2004, IDEA is a law ensuring services to children with disabilities throughout the nation. IDEA governs how states and public agencies provide early intervention, special education, and related services to more than 6.5 million eligible infants, toddlers, children, and youth with disabilities (United States Department of Education [USDE], 2012).

No Child Left Behind Act of 2001

No Child Left Behind Act of 2001 is also known as Public Law 107-110 and often abbreviated in print as *NCLB*. It is a controversial United States federal law (Act of Congress) that reauthorized a number of federal programs aiming to improve the performance of U.S. primary and secondary schools by increasing the standards of accountability for states, school districts, and schools, as well as providing parents more flexibility in choosing which schools their children will attend. Additionally, it promoted an increased focus on reading and reauthorized the Elementary and Secondary Education Act of 1965 (ESEA). The Act was passed in the House of Representatives on May 23, 2001, United States Senate on June 14, 2001, and signed into law on January 8, 2002 (United States Department of Education [USDE], 2012).

North Carolina Response to Instruction

North Carolina Responsiveness to Instruction (NC RtI) is a multi-tiered framework that promotes school improvement through engaging, high quality instruction. NC RtI employs a team approach to guide educational practices, using a problem-solving model based on data to address student needs and maximize growth for all (NCDPI, 2007).

Response to Intervention (RtI)

RtI is “The practice of providing (1) high-quality instruction/intervention matched to student needs and (2) using learning rate over time and level of performance to (3) make important educational decisions” (Batsche et al., 2005).

Student Achievement

This term refers to a measure determined by student scores in reading and math on the North Carolina End of Grade Test (NC EOG) and other standardized tests (NCDPI, 2012).

Overview of the Study

This study was organized into five chapters. Chapter 1 contains the introduction to the study, significance of the study, statement of the problem, research questions, delimitations and limitations, definition of terms, and an overview of the study. Chapter 2 provides a review of relevant literature. Chapter 3 is an explanation of the methodology used to conduct the study. Chapter 4 details the findings of the data analyses. Chapter 5 is comprised of the summary of findings, conclusions, and recommendations for further research in response to this study.

CHAPTER 2

REVIEW OF THE LITERATURE

Many look to education as the key source to develop the skills and talents our future generations need to perform successfully in an increasingly competitive global workforce. A shift from a focus on teaching to a focus on learning characterizes the current reform movement that emphasizes the formal mission of the education community is to ensure not simply that students are taught, but to ensure that students learn (DuFour, 2004). Fuchs and Fuchs (2007) explained that prior to the new reform movement, the primary means for identifying students who struggled with learning focused on a discrepancy between IQ and student achievement and, furthermore, identification with this approach typically did not occur until fifth grade. According to Fuchs (2003) monitoring student progress at an early age is essential to a learning centered approach.

Various attempts have been made to improve the early intervention process. According to Brown-Chidsey and Steege (2005) there are two U.S. education programs that now require early intervening services: No Child Left Behind (NCLB) of 2001 and the newly revised Individuals with Disabilities Act (IDEA) of 2004. NCLB was one of the educational programs attempting to enforce early interventions. It was one of the first federal laws to place importance on evidence based practice and the use of instructional practices that have been validated through research. NCLB requires three tiers of intervention for teaching students: primary, secondary, and tertiary. These tiered interventions were a form of response to intervention to promote early intervening services to children. The 2004 reauthorization of the Individuals with Disabilities Act (IDEA) followed up on NCLB by incorporating the language of Response to Intervention (RTI) into the legislation and integrating it with educational policy (Brown-Chidsey & Steege,

2005). IDEA stressed the importance of evidence-based practices, evaluations of progress, and data-based decision making.

As an evidence based initiative, Response to Intervention (RtI) is promoted as a prevention model featuring multiple tiers of reading interventions and supports that are introduced to students in the earliest stages of reading development. While focusing on the individual needs of students, RtI is a program that seeks to redefine how learning disabilities are identified and addressed within the public school system. Justice (2006) stated,

It is at once an educational policy (endorsed in the current amendments of the Individuals with Disabilities in Education Improvement Act of 2004; U.S. Department of Education, 2005) and an educational practice that is grounded in the accumulated empirical research literature. In short, RtI models integrate research, practice, and policy. (p. 285)

Two elementary schools in the current study were honored as a No Child Left Behind – National Blue Ribbon Schools in 2009 and 2010. Home to just over 500 students in kindergarten through fifth grade, the schools offer special education, instructional classes and resource services, speech therapy, Reading Recovery and enrichment opportunities. With regard to the general student population, over 80% are classified as low income as defined by their free and reduced meal eligibility. Despite the two national recognitions as high performing, high poverty schools the district administration agreed to apply for and later received a NC QUEST Grant with a focus on delivering standardized research based professional development in problem solving, including Response to Intervention (RtI), scientifically based reading instruction, and standards aligned instruction and assessment.

History of Response To Intervention

Enacted in 1975, the initial purpose of Public Law 94-142 was to provide a free and appropriate education for students with disabilities who were eligible for special education services according to an Individualized Education Plan (IEP). At that time, the aptitude and achievement method was used as the primary measure in identifying students as Learning Disabled (LD). According to Batsche et al. (2005) a child find provision was added to find, identify, and refer for assessment all children at risk of having a learning disability.

Confirming the nation's commitment to support alternative education for students with disabilities, the law was reauthorized as the Individuals with Disabilities in Education Act (IDEA) in 1997. Wood (1998) explained that in a 1982 report by Heller, Holtzman, and Messick for the National Research Council (NRC) was compiled to study the overrepresentation of minority children and males in special education programs for mentally retarded students. Findings indicated that students benefiting from special education services did not represent inequity. Central to the issue of inequity were the validity of the referral, assessment procedures and quality of special education instruction. In addition, Batsche et al. (2005) suggested there was an expectation to shift the focus from accountability based procedures to accountability targeting student performance outcomes. Local school districts were also given more flexibility in assessment practices and use of funds through IDEA 1997.

Debate surrounding the subsequent reauthorization of IDEA in 2004 led to alternative means to identify students as LD. Under the new law, local education agencies were encouraged to implement scientific, research-based interventions as a component of the LD evaluation procedure (Klotz & Nealis, 2005). IDEA 2004 placed emphasis on prevention and intervention methods by providing incentives for whole school models, early reading programs, positive

behavioral interventions and supports, and early intervening services that were proven by research to reduce the need to label children in order to address their learning and behavioral needs. Furthermore, IDEA 2004 included language that prevented states from precluding Response to Intervention if a Local Education Agency (LEA) chose to adopt the program (Batsche et al., 2005).

At the LD Summit of August 2001 researchers pointed to Response to Intervention (RtI) as the leading alternative LD identification method (Gresham, 2002). RtI provides (1) high-quality instruction and intervention focused to meet student needs, (2) uses learning rate over time and level of performance in order to, (3) determine important educational decisions (Batsche et al. 2005). Designed to promote early identification of students who may be at risk for learning disabilities, RtI may be one component schools use to diagnose specific learning disabilities (National Research Center on Learning Disabilities [NRCLD], 2008). Scientific evidence related to RtI suggests common current approaches to the identification of reading disabilities are (1) insufficiently sensitive and specific, leading to high rates of false negatives, (2) lack an empirical basis, such as the use of discrepancy approaches, and (3) fail to promote proactive early interventions that might mitigate children's early reading difficulties (Vellutino et al. 1996).

Multiple Tiered Models of RtI

A three-tiered approach is used in most RtI models. Within the First Tier, all children, from preschool forward, receive exemplary reading and math instruction that is grounded in evidence-based practices on how children learn to read. Second Tier interventions provide additional support to grades K-53 students who demonstrate limited reading growth. Periodic assessment of supplemental interventions is made to guide specific strategies, targets, and

techniques of the interventions. When a student fails to achieve expected reading levels by third grade, an in-depth assessment is administered to determine the presence of a Reading Disability (RD). Special education placement is considered the Third Tier of support in RtI (Fletcher, Coulter, Reeschly, & Vaughn, 2004; Fuchs, Mock, Morgan, & Young, 2003; Vaughn, Linan-Thompson, & Hickman, 2003). Fundamental to RtI is the notion that when students fail to respond to effective interventions, that failure may indicate a need for specialized interventions enabling them to achieve a standard of learning and a greater chance for success both in school and in life (Fuchs, 2003).

In addition to the three-tiered model, RtI often uses a four-stage problem solving process designed to address reading difficulties among students (Canter, 2004; Coleman, Buysse, & Neitzel, 2006; McCook, 2006; Miller, 2006; O'Conner, 2007). Problem identification, problem analysis, plan implementation, and problem evaluation are the four stages of the process designed to address student-reading difficulties. An intentional effort is made on the part of trained educators to (1) identify students' strengths and weaknesses, (2) deliver research-based reading interventions, (3) use a frequent schedule to collect data, and (4) evaluate how well the plan works (Canter, 2004). It is important for the general education teacher to document and maintain accurate records for assistance delivered to students in Tier One.

Denton (2006) estimated that 80%-85% of students assessed in Tier One meet performance benchmarks without supplemental interventions. Grimes and Kurns (2003) reported a most effective way to increase student achievement in reading is through the provision of a core curriculum. Grounded in scientifically based research, a core reading program comprises the primary instruction in Tier One (Vaughn & Roberts, 2007).

According to Fuchs and Fuchs (2006) students who are unsuccessful in Tier One's

universal screening are administered Curriculum-Based Measures (CBM) assessments for 5 weeks. One type of CBM assessment is the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Oral Reading Fluency measures. During the assessment process, school problem-solving teams review class reports to determine if problems exist among other students at their school (Fuchs & Fuchs, 1997). Vaughn and Fuchs (2003) explained that assessment of the classroom instructional environment serves to assess the quality of the general education program to determine if acceptable levels of learning outcomes are being met. Once classroom progress is deemed acceptable, the team looks at individual student gains and performance (Vaughn & Fuchs, 2003). If individual students fail to meet acceptable CBM outcomes, the team carefully reviews all criteria to rule out mitigating circumstances such as vision and hearing issues, mental retardation, or autism. When one or more of these disabilities are identified, students are moved to Tier Three. If not, the next step is to enter students into the supplemental intervention phase known as Tier Two.

Tier Two Intervention Phase

Vaughn and Chard (2006) indicated Tier Two interventions are designed to enhance and stabilize Tier One efforts and prevent the need for Tier Three interventions. It is estimated that from 15%-20% of students not meeting adequate outcomes and who require additional modifications to the core reading instructional program qualify for Tier Two interventions (Simmons, Kame'enui, & Good, 2002). Programs and strategies in Tier Two are designed to supplement, enhance, and support the core classroom curriculum (Vaughn & Chard, 2006). Typically, two approaches may be used to identify and deliver supplemental reading interventions in Tier Two.

First, in the universal screening approach, school teams review student screening

benchmarks and classroom data (Wright, 2007). Qualifying students receive a group intervention preceded by a standard protocol formed from the same research-based treatment used for all students with similar problems (Wright, 2007). Universal screening approach proponents envision Tier Two being comprised of a small number of students who did not meet screening benchmarks provided in Tier One (Gresham, VanDerHeyden, & Witt, 2005; Vaughn, 2003).

A second method, the problem-solving approach, calls for teachers to refer students not progressing with Tier One reading interventions to a school problem solving team (Canter, 2004; Wright, 2007). As prescribed, the school team uses an identified problem-solving process to determine reasons for the problem and set improvement goals (Wright, 2007). Additional interventions may be identified by the school team and passed along to the teacher for implementation (Marston, 2002).

Documenting student progress paves the way for school teams to connect interventions to the assessment process and determine whether students are responding appropriately to instruction (Mellard, 2004). Vaughn (2003) stressed the importance of continuous progress monitoring in Tier Two to assist with determining future direction for students, such as continuing in Tier Two, returning to Tier One, or referral to Tier Three. It is important for the general education program to provide Tier Two assessments and interventions to anyone in the school who qualifies , with the understanding that the goal is to remediate student deficiencies in the general education setting (Fletcher, 2006).

When using Curriculum-Based Measures (CBM) in Tier Two, it is recommended that schools monitor results from at least two supplemental interventions students receive in the general classroom setting for a period of 6 to 8 weeks (Fuchs, 2003; Fuchs & Fuchs, 1997). It is

important to note that while students' performance may not meet classroom standards, they may demonstrate adequate growth through the assessments. For students who perform below classroom benchmark standards, but demonstrate adequate performance levels on CBM measures, disability is not considered (Fuchs, 2003). When interventions are unsuccessful, based on CBM outcomes, students are referred to Tier Three.

Tier Three Intervention Phase

Tier Three is reserved for students who demonstrate significant deficiencies in reading or possess reading disabilities after receiving interventions in Tiers One and Two (Chard & Vaughn, 2006). Approximately 5%-7% of students who fail to attain successful outcomes from in-class and Tier Two intervention efforts enter Tier Three (Kovaleski, 2003; Vaughn, 2003; Vaughn & Fuchs, 2003). Denton (2006) reported Tier Three efforts are coupled with a standardized reading intervention program, emphasizing the foundational components of reading success (phonemic awareness, phonics, oral reading fluency, vocabulary, and reading comprehension) which is implemented in addition to regular classroom instruction. Furthermore, Tier Three students require explicit and intensive strategic daily small group reading instruction with an emphasis on the individual literacy and reading needs of each student (Chard & Vaughn, 2006; Denton, 2006).

According to Fuchs and Vaughn (2003) Tier Three is characterized by the intensity of instruction and potential referral for special education services. As students progress through the tiers and demonstrate the need for intensive levels of continued intervention, the conclusion is made that if corrective interventions cannot produce adequate growth for the individual, some intrinsic deficit or disability exists, making it unlikely the student will learn in the regular instructional environment (Fuchs & Vaughn, 2003). It is the role of the school intervention team

to determine if students who consistently display inadequate progress in response to intensive instruction qualify for special education services (Kovalseki, 2003).

Denton (2006) indicated it is up to individual school districts to decide the relationship of Tier Three to their special education program. Tier Three supports are only made available through the special education program in many schools and students are usually required to go through the full case study evaluation process for special education placement (Wright, 2007). In addition to response to intervention data, the need for formal evaluations continues to be considered by researchers (Fletcher, 2006; Fuchs & Fuchs, 2006). Subsequent evaluations may be streamlined, due to the vast amount of data already available from the continuous progress monitoring, through the intervention tiers (Fletcher, 2006).

While continuing to determine the success of an intervention, if special education services need to be offered to continue the intervention plan or if a more restrictive placement is needed, Curriculum-Based Assessment would continue to be part of Tier Three (Gresham, 2002). Vaughn and Fuchs (2003) indicated the use of CBM assessments is appropriate at this Tier to determine further educational decisions for students. In addition, bringing qualifying students' growth and performance levels within range of the class mean should be a Tier Three goal (Vaughn & Fuchs, 2003).

Tier Four Intervention Phase

Most RtI programs consist only of three tiers; however, some programs use a fourth tier (Coleman, Buysse, & Neitzel, 2006; McCook, 2006; Miller, 2006). Tier Four represents 12% or less of the students in a school receiving special education services. McCook (2006) indicated that while special education eligibility is considered in both Tiers Three and Four, decisions based on evaluations and special education services occur in Tier Four.

According to Miller (2006) many states and school districts have determined to implement a Response to Intervention process. North Carolina Schools are encouraged to adopt and develop Response to Instruction (NC RtI) plans to support a fluid model of response to interventions of varying intensity to meet the needs of all students. A study released by the National Joint Committee on Learning Disabilities (2005) reported a variety of response to intervention approaches have been implemented in research and field-testing in school districts across the United States.

Leadership Essential to Implement a Response to Intervention Model

School personnel play an important role in implementing Response to Intervention. Strong leadership is crucial in meeting this challenge and the success of the program relies on the strength of leadership. Leaders need to have budgetary power and the ability to bring special education, Title I, reading specialists, and general educators together to share professional development, time, space, money, and curricular resources.

Showers (1990) indicated principals leading a new initiative need to (1) organize and meet with study groups, (2) organize a staff development council to coordinate activities, (3) arrange time for collaborative study, (4) become knowledgeable about school improvement and staff development initiatives, (5) participate in training and implementation of a new initiatives, (6) monitor the school climate, (7) provide feedback, and (8) involve the faculty in decision making concerning future areas for study and improvement.. Denton, Parker, and Hansbrouck (2003) suggested teachers need consistent monitoring and support in order to sustain the RtI initiative and ensure viability of the program. Covey (1991) offered that schools improve when principals, teachers, and students create a vision for the school and everyone is empowered in the decision making process.

For principals communication with organizational stakeholders is crucial to ensure everyone is aware when goals are met. Savary (1992) reported that Total Quality Schools conform to a win-win strategy where everyone is motivated to do their best in order to meet the needs of the organization. Furthermore, Deming (1991) asserted that Quality School transformation includes the need for school leaders to (1) adopt new ways of helping students improve, (2) build relationships, (3) offer professional development that focuses on student improvement initiatives, and (4) monitor the implementation plan. In order to initiate and sustain the RtI initiative, principals need to ensure teachers understand the need for change, the research orchestrating the initiative, and the choice of materials prescribed by IDEA 2004 (Kame'enui, Simmons, & Coyne, 2000). Furthermore, Denton et al. (2003) indicated teachers need strong support from their principal, who needs to consistently monitor the implementation of the model to ensure the fidelity of the program.

Marzano, Waters, and McNulty (2005) found that understanding the significance of the change order, for the stakeholder group involved in the initiative, affords principals the opportunity to select the appropriate leadership practices needed for implementation. In addition, Marzano (2003) stated, "When leaders concentrate on the wrong school practices or miscalculate the magnitude or order of the change they are attempting to implement; they can negatively impact student achievement" (p.5). Moreover, Denton et al. (2003) offered that teachers need consistent monitoring and support, and principals need to monitor the overall effectiveness of school practices and their impact on student learning.

Professional Development and the Motivation-Hygiene Theory

Herzberg and his colleagues (Herzberg, Mausner, and Snyderman) developed the Motivation-Hygiene theory as they analyzed the foundations of job motivation based on a large

scale literature review and a survey of engineers and accountants (Hoy, 2008). A system with dual continuums of satisfiers and dissatisfiers was developed to understand employee motivation and satisfaction. This system challenged the traditional view of work satisfaction because it delineated different attributes for satisfaction than for dissatisfaction. Former models associated the presence of certain attributes to satisfaction and the absence of those attributes to dissatisfaction. The researchers named their dual continuums motivation and hygiene (Hoy, 2008). Satisfied workers attribute satisfaction to the actual work (motivators). Dissatisfied workers attribute satisfaction to hygiene factors and include the work and organizational environment. The dual continuums of the motivation-hygiene theory are found in the literature on professional development.

Herzberg and his colleagues found that job satisfaction is viewed as an outgrowth of motivators: achievement, recognition, the work itself, responsibility, and advancement (Hoy, 2008). The literature on professional development for principals and teachers highlights the importance of developing leaders by using case study inquiry. The case study method can serve as a motivator by the recognition of the work itself. An example is reflected in a study conducted by Smith (2010) where it was found that case narratives or dilemma-based stories help shape educators' professional identities, knowledge, and practice (Smith, 2010). Participants were able to explore the diverse contextual influences upon their professional practice as a means to their ongoing learning and leadership formation. One member of the study found this form of storytelling an empowering professional learning process:

Case stories pull us to the center of what we know and what we don't. They invite us all to reach back and revisit those moments that mattered to us, even when we didn't fully understand why. I used to think we pass through

experiences, acquiring knowledge and skills along the way. Now I see more clearly that the experiences in fact pass through us, transforming our sight and deepening our understanding. So that the aesthetic aspect of the casework is not so much found in the form of a story but in the gradual forming of ourselves (Smith, 2010, p.104).

Leadership identity can be understood as a storied identity (Connelly, 1999) that is formed in how educators tell stories of their practice along with when, where, and to whom these narratives are shared (Clandinin, 2007). Herzberg's motivation theory involves what people actually do on the job and should be engineered into the jobs employees do in order to develop intrinsic motivation within the workforce. The case study method highlights the motivation of growth and job interest that can be found in this type of professional development. When motivators are present in a job or learning opportunity, the individual's basic needs will be satisfied and positive feelings as well as improved performance will result.

Dunbar and Monson (2011) tout the benefits of an external partnership that can promote the development of a principal's capacity for complex problem solving. In 2002 philanthropists Charles and Jane Cahn approached Teachers College, Columbia University, to design a part-time, year-long fellowship experience for sitting New York City public school principals who had already demonstrated effective leadership (defined as improving student achievement in significant ways). They recognized a need to honor and support high-caliber, experienced school leaders and believed that investing in leaders who have demonstrated an ability to continuously improve their schools would be the soundest way to make a dramatic difference in the school system (Dunbar, 2011). Using a rigorous selection process that is based on consistently high or dramatically improved performance of their students gives the outstanding principals

participating in the fellows program a strong sense of achievement. The status, opportunity for advancement, recognition, and personal sense of achievement that participating in the Cahn Fellows Program brings to a principal reflects Herzberg's theory of motivation.

Dana, Tricarico, and Quinn (2009) highlight the motivation continuum with a study that placed the administrator as action researcher. An elementary school principal participant remarked that she was constantly looking for ways to improve her practice (Dana, 2009). It was this desire to learn more that brought her to inquiry as a method of professional development. The participant stated, "I was interested in completing the whole program and bettering myself so I could better my school" (Dana, 2009, p.239). The responsibility, stimulating work, and sense of personal achievement and growth that was experienced as the participant chose the inquiry method of professional development clearly demonstrates Herzberg's motivation continuum.

Herzberg and his colleagues found that job dissatisfaction results from a different set of factors, all of which characterize the context in which the work is performed barring personal life (Hoy, 2008). Personal life is a hygiene and is not part of the internal work environment, but rather the external work environment. The hygiene factors are: company policy and administrative practice, supervision (technical quality), interpersonal relations (especially with supervision), physical working conditions, job security, benefits, and salary. These dissatisfiers, or hygiene factors, when suitably provided, can serve to remove dissatisfaction and improve performance up to a point, but they cannot be trusted to generate really positive job feelings or high levels of productivity that are actually possible. To achieve positive outcomes, management must focus on motivation (Hoy, 2008).

Saban illustrated the importance of interpersonal relations, a hygiene, by stating, "success

in leadership, success in business, and success in life has been, is now, and will continue to be a function of how well people work and play together” (2009). Principals most value from mentors the opportunity for reflective conversations, emotional and moral support, and the affirmation that they are doing a good job (Saban, 2009). However, it is important to note that those working relationships can be problematic. Relationships can be as taxing and toxic as they can be replenishing (Saban, 2009). Mentoring as a method for principal and teacher professional development cannot be successful if poor interpersonal relationships are the basis of the training environment. Herzberg maintains that poor quality of interpersonal relations and working conditions can lead to dissatisfaction with work.

Research conducted by Bakioglu, Hacifazlioglu, and Ozcan highlighted the impact of the quality of supervision (2010). If the professional development environment is micromanaged due to the hierarchical school leadership roles of participants then feelings of inadequacy, inability to express oneself, inability to influence anyone, feelings of being shut out, increase in cynicism, feelings that anyone has either to dominate or be dominated, and feeling that those on top are not interested in these factors can cause dissatisfaction at work (Bakioglu, 2010). Herzberg’s theory of motivation would suggest that by providing effective, supportive, and nonintrusive supervision of principal and teacher professional development the dissatisfaction felt by participants may be removed. As districts seek effective training experiences for teachers and administrators Herzberg’s hygiene quality of supervision must be considered when planning occurs if dissatisfaction with work is to be corrected.

Salazar (2007) conducted a seven-state study of professional development needs of rural high school principals and found that educational reform to policy and administration places serious stress on the principal to lead the successful charge of change. The many challenges of

No Child Left Behind legislation amplifies the stress a rural principal faces due to geographical isolation. For example, NCLB requires principals to attract and retain highly qualified teachers. The requirement to find and retain this type of teacher can result in undue stress being placed on rural principals and lead to job dissatisfaction. Formal leadership in schools is complex and the demands of educational reform and renewal have evolved pushing 21st century principals to seek effective professional development to meet the challenges of increased expectations (Salazar, 2007).

In summary, Herzberg's motivation-hygiene theory includes a two-dimensional paradigm of factors affecting people's attitudes about work (1959). Satisfiers (motivators) describe a person's relationship with what he or she does and can be related to the task being performed. Dissatisfiers (hygienes) have to do with a person's relationship to the context or environment in which he or she performs the job. The satisfiers are connected to what a person does while the dissatisfiers connect to the situation in which the person operates (Herzberg, 1959). The impact the theory has on professional development for teachers and principals is large. District leaders need to understand that once the initial hygiene factors have been met, teachers and principals are free to discover the higher order needs necessary to build superior productivity, self-esteem, and creativity. District leaders should consider Herzberg's Motivation-Hygiene theory when organizing principal professional development.

Self/Collective Efficacy Theory and Professional Development

Efficacy is the belief about one's own ability (self-efficacy) or the ability of one's colleagues as a whole (collective efficacy) to perform a task or achieve a goal (Bandura, 1997). It is the belief about ability, not the actual ability. Bandura (1997) asserts:

People make causal contributions to their own functioning through mechanisms of

personal agency. Among the mechanisms of agency, none is more central or pervasive than peoples' beliefs about their capabilities to exercise control over their own level of functioning and over events that affect their lives. (p. 118)

Substantial proof has now been gathered about the meaningful contributions made by the positive efficacy beliefs of people in many different education system roles and how they affect such important personal and organizational outcomes, such as job search success, increased task performance, improved attendance, and increased academic achievement (Leithwood, 2007). McCormick (2001) postulates that leadership self-efficacy (or confidence) is the key cognitive variable controlling leader functioning in a dynamic environment: "Every major review of the leadership literature lists self-confidence as an essential characteristic for effective leadership" (p. 23).

Research touts the important role that a school principal plays in the life and health of a school community. Teachers, tests, and textbooks cannot produce results without a highly effective principal to lead a school (McEwan, 2003). Therefore, it is essential that professional development offerings to principals and teachers enhance a sense of positive efficacy. Bandura presented four direct sources of self and collective efficacy beliefs: mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal (Bandura, 1997).

Mastery experiences, or individual past successes and failures with a task, have strong effects on feelings of self-efficacy for accomplishing similar future tasks. The professional development literature demonstrates the construct of master experiences as one that can be found in case narratives or dilemma-based stories that help shape educators' professional identities, knowledge, and practice. An example is reflected in a study conducted by Smith (2010) where it was found that case inquiry participants were able to explore the diverse contextual influences

upon their professional practice as a means to their ongoing learning and leadership formation. One participant in the study found this form of storytelling an empowering professional learning process:

Case stories pull us to the center of what we know and what we don't know. They invite us to reach back and revisit those moments that mattered to us, even when we didn't fully understand why. I used to think we pass through experiences, acquiring knowledge and skills along the way. Now I see more clearly that the experiences in fact pass through us, transforming our sight and deepening our understanding. So that the aesthetic aspect of the casework is not so much found in the form of a story but in the gradual forming of ourselves (Smith, 2010, p.104).

Participating in collaborative inquiry encourages reflective thinking of practice and allows participants to see varied points of view related to their practice (Drago-Severson, 2007). Administrators and teachers can employ this process to develop deeper insights into their practice as leaders of school improvement efforts.

Another facet of Bandura's mastery experiences can be found in the professional development literature on mentoring. Principals and teachers need to have the ability to determine both the strengths and weaknesses of their leadership skills and to reflect on these qualities and then make modifications as needed (Searby, 2010). "A healthy mentoring relationship is a prime example of adults engaging in a learning endeavor together, where responsibilities are mutually defined and shared" (Searby, 2010). Mentoring helps accelerate learning, reduce isolation, and increase the confidence and skill of teachers and school leaders (Robinson, 2009). Case study inquiry and mentoring as professional development provides an

avenue to explore past mastery experiences and thereby increase self and collective efficacy.

The second direct source of self and collective efficacy beliefs proposed by Bandura is that of vicarious experiences. Vicarious experiences may come about through the visualization of successful performance. Such experiences may also be a product of observing a skilled model. Grissom and Harrington (2010) assert that under a mentorship model, a more experienced principal mentor, who provides supportive supervision, guides new principals as they learn to manage the day-to-day challenges of the job. Mentors give professional advice, help their less experienced protégés solve complex work problems, advocate on their behalf, and serve as role models as they process situations and experiences (Grissom, 2010).

Searby (2010) maintains that mentoring as a form of professional development for principals and protégés is valuable. The benefits from mentoring impact both the mentor and mentee. One research participant stated that, “while she knew she still had much to learn from her mentor, she was simultaneously “teaching” her mentor by bringing to the surface ideas and concepts that her mentor might not have previously considered” (p. 18). The reciprocity of learning within this type of professional development enables the mentor to reconnect with new and innovative practices in the field through the mentee, and the organization holds on to the next generation of leaders, develops new leaders, and to advances the existing leadership within the organization (Searby, 2010). Dunbar and Monson (2011) recommend leadership development and problem-based learning for principals that requires professional development to move beyond the schoolhouse. Using a cohort fellowship of principals as a method of professional development allows participants to witness and study other people successfully complete a task thereby increasing the efficacy of all. Providing an avenue for principals to interact with leaders from a variety of sectors outside of education including business, the arts,

foundations, and media and engage in conversations about ethics, human development, innovation, and the challenges leaders face is critical to building positive self and collective efficacy.

The third direct source of self and collective efficacy beliefs proposed by Bandura is that of verbal persuasion. Verbal persuasion includes encouragement and feedback from a credible, trusted, and respected colleague. Bandura (1977) maintains that performance feedback that focuses on “achieved progress underscores personal capabilities whereas feedback that focuses on shortfalls highlights personal shortcomings” (p.199). Research supports the development and use of coaching skills for the mentor. Using verbal persuasion skills within the mentor to mentee relationship helps to facilitate the desired change through a positive relationship of ongoing support and challenge (Robinson, 2009). The skills and principles of coaching include a focus on taking individuals from where they were to where they want to be. Verbal persuasion serves as a tool for building individual learning capacity and for developing competency and self-awareness. “Mentoring combined with coaching provides the orientation, skill development, practice, and continuous support that results in a sustainable leadership development strategy and aligns with the principles of effective staff development” (Robinson, 2009). Verbal persuasion is an important aspect of Bandura’s theory of self and collective efficacy and needs to be incorporated into professional development experiences for teachers and principals.

The final direct source of self and collective efficacy beliefs proposed by Bandura is that of emotional arousal or affective state. An individual’s self-efficacy is based in part on interpretation of his or her emotional state during task preparation and performance. The professional development literature demonstrates the construct of affective state as needing to foster collaboration, build trust, and establish a teamwork philosophy to grow and be innovative.

“Leaders must enable others to act. They must make it possible for others to change and grow. In order for this to happen, leaders must develop relationships based on trust and confidence. People will take risks, make changes, and move forward when the relationship is solid” (Saban, 2009). When teachers and principals are calm and composed, rather than nervous and worried, when preparing for and performing a task a higher state of positive efficacy is achieved.

Beginning principals need to be given the opportunity to receive special consideration and support from their peers. Bakioglu et al. (2010) found that many new principals expressed a sense of isolation in the beginning of his or her career. One principal in the study stated, “It is the loneliness of being the final arbiter upon whose word all sinks or swims” (Bakioglu, 2010). For many new principals the first few years are typically full of frustration and anxiety (Bakioglu, 2010). It cannot be disputed that how leaders feel and think will influence what they do. Grissom and Harrington (2010) suggest that principal networks can provide support mechanisms that may reduce burnout, such as giving principals access to other professionals from whom they can seek advice. Relationships are important and providing time and access to this type of professional development for teachers and principals is critical. The emotional state of professional development participants can have an impact on the formation of mentor/mentee/networking relationships. According to Higgins et al. (2007), “Over time, the frequency with which an individual enacts (positive or negative) behaviors along with the potential mentor’s or developer’s reactions to such behaviors have implications for whether and how the relationship develops” (p.355). Ragains and Kram (2007) also emphasize that “both protégés’ and mentors’ self-awareness, empathy, and social skills will affect what actually transpires in their developmental relationships, thus having a direct impact on the quality of the relationships” (p.665).

The last aspect of Bandura's theory can have a far reaching impact on productivity and well-being of teachers and principals. School system's seeking to provide effective learning environments for teachers and principals must consider the benefits of a mentoring relationship. Hansford and Ehrich's (2005) work, a meta-analysis of research studies in the mentoring of school principals, provides a comprehensive list of positive outcomes for the principal mentees. This list includes support, empathy, counseling, sharing ideas, problem solving, professional development, and improved confidence (Hansford, 2005). Leaders' beliefs in their capacities affect how much stress and depression they experience in threatening and difficult situations (Leithwood, 2007). Investing in the positive emotional state of teachers and principals by using networking and mentoring relationships as a form of development can increase self and collective efficacy.

The implications of viewing the literature on professional development for principals through the lens of Bandura's theory of efficacy are paramount to the success of school leaders. According to this socio-psychological theory, self-efficacy beliefs have direct effects on one's choice of activities and settings and so can affect coping efforts once those activities begin (Leithwood, 2007). Such beliefs regulate how much effort people lay out and how long they persist in the face of failure and difficulty. Strong efficacy beliefs will equate to greater persistence at challenging tasks. District leaders should consider investing in professional development opportunities for teachers and principals that would build a positive sense of efficacy. Mentoring and networking offer occasions for building a strong sense of positive efficacy by providing venues that allow for mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal to occur.

Teacher Burnout

Teachers are working longer hours without significant pay to meet the demands of the expanding job roles in today's classroom (Buchanan, 2009; Day, Elliot, & Kington, 2005; Galton, 2008). This intensification of teacher workload is rapidly becoming the focus of research in explaining teacher turnover, burnout, and job dissatisfaction (Ballet & Kelchtermans, 2008; Day, 2008; Goodson, Hargreaves, & Moore, 2006). However, many teachers are continuing to work longer hours due to job commitment, passion and risk of being incompetent in their profession (Day, 2008; Fernet, Guay, & Vallerand, 2008; Kelchtermans, 2005; Wong, 2006). This problem impacts teachers and students alike. When teachers are overworked without support or resources, stress can occur, and teacher burnout is likely which creates an ineffective teacher. An effective teacher is one who can manage their time and provide instruction to all students (Wong, 2009). But when teachers are overworked by working longer hours, work-life conflict occurs, which can result in job dissatisfaction and a loss of passion for teaching (Ehrhart, Klein, & Major, 2002).

North Carolina Response to Instruction

In response to the 2004 reauthorization of the federal Individuals with Disabilities in Education Improvement Act (IDEA, 2004), North Carolina schools are encouraged to adopt and develop a Response to Instruction (NC RtI) plan to support a fluid model of response to interventions (RtI) of varying intensity to meet the needs of all students. An overview of the process is outlined in the North Carolina Response to Instruction Plan (NCDPI, 2007b).

1. Three tier model of school supports: Within an RtI framework, resources are allocated in direct proportion to student needs. This framework is typically depicted as a three-tier model that utilizes increasingly more intense instruction and

interventions. Tier 1 is the foundation and consists of scientific, research-based core instructional and behavioral methodologies, practices, and supports designed for all students in the general curriculum. At Tier 2, supplemental instruction and interventions are provided in addition to core instruction to those students for whom data suggest additional instructional support is warranted. Tier 3 consists of intensive instructional interventions provided in addition to core instruction with the goal of increasing an individual student's rate of progress.

2. Problem solving method of decision making: Across the tiers, the problem solving method is used to match instructional resources to educational need. The problem solving method is as follows:
 - a. Define the problem b determining the discrepancy between what is expected and what is occurring.
 - b. Analyze the problem using data to determine why the discrepancy is occurring.
 - c. Establish a student performance goal, develop an intervention plan to address the goal and delineate how the student's progress will be monitored and implementation integrity will be ensured.
 - d. Use progress monitoring data to evaluate the effectiveness of the intervention plan.
3. Integrated data collection that informs instruction: Within an RTI model, progressively more intensive interventions and supports are coupled with more frequent progress monitoring of student achievement in order to guide the educational planning. At Tier 1, data are collected and used as a general screening process for all students, and to

determine effectiveness of the interventional practices. At Tier 2, data are collected to determine the effectiveness of the intervention and determine if an instructional change is needed. At Tier 3, data are collected for the same reasons as Tier 2, but on a more frequent basis so that educational decisions can be made in a timelier manner. Data systems used for screening and progress monitoring within an RtI model should be consistent across all three tiers and be scientifically based (NCDPI, 2007).

Support for Response to Intervention

In regard to two separate models of prevention at Tier Two: problem-solving and standard protocol, Fuchs and Fuchs (2006) recommended a standard treatment protocol, as apposed to a problem solving protocol, for children with academic difficulties, especially reading in the primary grades. Fuchs and Fuchs (2006) stated, “With a standard treatment protocol, the nature of the preventive intervention is public, clear, and represents instruction that benefits most students” (p.3). Targeting academic difficulties with the problem solving model requires intervention teams to do the following: maintain extensive records related to the design of the intervention, convince stakeholders that an individually tailored intervention is viable, and defend that a student’s nonresponsiveness to the intervention is not caused by poor instruction.

A 2006 Position Paper of the Learning Disabilities Association of America (LDA) supported an RtI model involving research-based interventions, consistent progress monitoring of student performance during the intervention implementation, use of data to vary the type and intensity of interventions, and family involvement throughout the process. Furthermore, LDA supports the implementation of the first two tiers of RtI to assure students with Specific Learning Disabilities (SLD) participate in programs providing effective instruction. While LDA supports RtI as a promising early intervention process that seeks to offer academic support to all students

during the initial stages of learning problems, LDA does not support RtI as the sole means of determining learning disabilities. Their primary concern is that using RtI to supplant the use of Multi-Disciplinary Evaluation (MDE) teams and their use of cognitive, language, and perceptual tests, overrides years of clinical practice and empirical research on learning disabilities. Justice (2006), citing research by Vellutino et al. stated the following:

RtI is grounded in scientific evidence suggesting that current approaches to the Identification of reading disabilities (1) are insufficiently sensitive and specific, leading to high rates of false positives and false negatives; (2) lack an empirical basis (such as the use of discrepancy approaches); and (3) fail to promote proactive early interventions that might mitigate children's early reading difficulties. (as cited in Justice, 2006,p. 285).

Opposition to Response to Intervention

Opponents expressed concern with how schools will conceptualize and implement the many components of RtI found in research. While a response to intervention approach primarily focuses on improving reading skills, Mastopieri (2003) expressed concern that other characteristics of learning disabilities, such as slow processing of information, may be overlooked. As growing evidence from research suggests children with learning disabilities process information differently, it is important to gather data concerning a student's working memory, processing speed, auditory processing ability, and executive function in order to determine a suitable intervention (Semrud-Clikemen, 2003).

McEneaney, Lose, and Schwartz (2006) stated, "RtI approaches do not go far enough in acknowledging chronic problems in our efforts to respond to severe reading difficulties" (p. 118). Instead of supporting the literacy learning of students, researchers expressed concern that RtI undermines student learning by not putting enough emphasis on the individual character of

responsive reading, and instead, continues to emphasize identification of disabled readers. Moreover McEneaney et al. (2006) expressed skepticism that RtI is an appropriate model to use with learners demonstrating serious reading difficulties.

In referring to the Three Tier RtI model as a fad, Allington (2006) pointed to a lack of research that supports the use of this intervention design. Of further concern was that state and federal agencies' recommendations to mandate RtI for statewide use were premature. Furthermore, Allington (2006) expressed concerns that the Three Tier RtI model would not be consistently implemented by state and local education agencies due to lack of consistent interpretation for its use.

In response, Allington (2006) offered an alternative Three Tier model aimed at providing quality classroom reading instruction personalized to individual student needs at Tier 1. Instruction in Tier 2, aimed at complimenting classroom reading instruction would offer personalized reading instruction, in a small group setting, to struggling readers for 30 minutes a day. In Tier 3, Allington (2006) advised schools to offer additional daily reading instruction for students failing to make adequate progress in reading after receiving Tier 1 and Tier 2 interventions. In Allington's model Tier 3 interventions, in the model, would be provided as part of an extended school day and support accelerated progress through the existing classroom reading program.

Mastropieri (2003) outlined three important concerns schools should address during the implementation phase of RtI. First, it is unclear whether general education teachers will embrace teaching specific reading skills found in evidence-based reading practices. Second, it is uncertain how a general education teacher can simultaneously provide Tier 1 and Tier 2 interventions in the classroom. Finally, schools will have to insure the integrity of instruction and require

documentation to be maintained.

The International Reading Association (IRA) stresses the need for a clear definition of scientifically based reading research related to RtI. This is important in order to validate methods to use in successfully implementing RtI. Moreover, the IRA urged the Office of Special Education Rehabilitative Services (OSERS) to describe the relationship between special education and regular education for children in the prereferral stages. Finally, it was important to clearly identify high quality classroom instructional programs, what types of interventions and delivery methods should be used, and how to measure if interventions were successful.

Gerber (2003) asserted that evaluating the integrity of instruction is not the only variable that impacts learning outcomes. It is also important to evaluate how teachers' instructional behavior may account for differences in student outcomes. In addition, little is known about how additional training and professional development will impact costs in the following areas: (1) classroom preparation, (2) curriculum and instruction enhancements, (3) development of assessment procedures, and (4) provisions for increasingly intensive interventions.

Effective Intervention Programs

Success for All

Designed by Slavin of Johns Hopkins University, Success for All is a comprehensive school reform program and is described in detail below.

Success for All is a program designed for students in prekindergarten to grade 6 that organizes resources in an attempt to ensure that all children will be successful in reading from the beginning of their time in school, and will never begin the process of falling behind. The emphasis of the program is on prevention and early, intensive intervention designed to detect and resolve reading problems as early as possible, before they become

serious. The main elements of the program are as follows: a school wide curriculum where students are regrouped across age lines so that each reading class contains students all at one reading level; the use of specially trained tutors in grades 1-3 to work one-on-one with students who fail to keep up with classmates in reading; preschool and kindergarten programs that emphasize language development, readiness, and self concept; quarterly assessments for students in grades 1-6 to determine if they are making adequate progress in reading; a family support team that works in each school to help support parents in ensuring the success of their children; a program facilitator who works with teachers to help them implement the reading program, manages the 8-week assessments, assists the family support team, and helps the staff as a whole to make sure that every child is showing adequate progress; and finally, Success for All provides extensive training to help all teachers use the program effectively. (Borman et al. 2005, p. 19-20).

A key to the program is its focus on intensive early intervention designed to limit the need for special education services by at-risk students (Slavin, 2004). According to Slavin (2004), “This is done by emphasizing use of research-based strategies from preschool or kindergarten forward; extensive professional development to help teachers use effective strategies for instruction, classroom management, accommodation of individual differences and so on; and careful monitoring of student progress and use of flexible grouping strategies to ensure that all children are appropriately challenged and supported” (p. 62). As a research-based model for providing early interventions designed to limit special education referrals, Success for All espouses similar goals as RtI.

Slavin and Madden (1999) used the Woodcock Reading Mastery Test, the Durrell

Analysis of Reading Difficulty, and the Gray Oral Reading Test to measure achievement for students participating in Success for All programs compared to control groups. They reported significant gains in reading achievement for Success for All students compared to those in the control group receiving the traditional curriculum. However, citing failures of the program in Baltimore, Miami-Dade county, Memphis, and Texas; Pogrow (2002) criticized Success for All and questioned the founders political connections related to promoting the program.

Reading Recovery

Initially designed and studied by New Zealand educator Marie Clay, Reading Recovery (RR) is a one-on-one tutoring pullout program designed to reduce reading failure by first grade students. Students are selected for the program based on classroom performance on standardized tests and other literacy assessments. Teachers trained in RR conduct one-on-one tutoring sessions. Initially brought to the United States in 1984, Reading Recovery training is sponsored by Ohio State University and disseminated through RR centers in Ohio, Georgia, Illinois, and Texas. To participate, a school must have access to a trained and certified RR teacher leader and allocate extra teaching spots to account for full or part-time RR teachers. “Reading Recovery is based on the idea that intensive, high quality intervention in the first grade is a cost-effective strategy for preventing long-term difficulties and reading failure” (Otuya & Krupka, 1999, p. 19).

Thomas (1992) shared that Reading Recovery instruction encompasses the following characteristics: (1) teachers focus on student strengths, rather than deficits; (2) students are introduced to strategies targeted at helping them become independent readers; (3) students learn to read by composing and writing their own messages; (4) teacher instruction is based on detailed analysis of student behavior and knowledge; (5) students learn to predict, confirm and

understand what they read; and (6) teachers select student reading material from leveled books of increasing difficulty. A RR tutoring session begins with the student reading two familiar stories, while the teacher records a running record to track oral reading fluency. Next, the teacher and student participate in activities using letters of the alphabet. Then the student dictates a sentence or short story to the teacher, who reads the story to the student. As a follow-up, the teacher cuts up the text, mixes the words on the table and challenges the student to arrange the words in their correct order. Finally, the student reads a new book with the teacher. Observations and running records from the session form the foundation for the next session.

Reading Recovery, however, is not void of critics. While acknowledging the success of the program, Snow, Burns, and Griffin (1998) suggested a 30-hour training requirement, one-on-one instruction, and the need to purchase extensive resources may be cost prohibitive for many schools. In a longitudinal study, based on oral reading of text, Wasik and Slavin (1993) reported significant gains in first and second grades, but were not able to determine significant gains in third grade due to increasing standard deviations.

Research Related to RtI and Achievement for All Students

In response to recent federal education policies, new education reform initiatives such as Response to Intervention (RtI) seek to provide evidence-based and valid instructional reading practices to improve learning outcomes for all students (Brown-Chidsey & Steege, 2005). NCLB and North Carolina's Read to Achieve legislation calls for all children to read competently by the end of grade 3 (Ukrainetz, 2006; H. 950, 2011). Furthermore, Bradley, Danielson, and Doolittle (2007) reported IDEA 2004 regulations provide that schools ensure the existence of a learning disability of a child is not due to lack of appropriate instruction.

Reading in the early grades has been at the center of intervention studies. When

examining outcomes for three interventions (Peer Assisted Learning Strategies [PALS], adapted PALS, and one-to-one tutoring for 35 minutes per day three times per week); McMaster, Fuchs, Fuchs, and Compton (2003) found no statistically significant differences in reading among the three groups. When using such interventions in intensive one-to-one instruction, Torgesen et al. (2001) reported essentially the same outcomes produced by two reading programs. In a study of four different Texas schools with different reading programs, different lengths of instruction, and different small group sizes, Foorman and Torgesen (2001) reported all schools maintained satisfactory performance levels in early reading.

Marchand-Martella, Ruby, and Martella (2007) studied 327 students from one elementary school that teaches phonemic awareness, phonics, decoding skills, vocabulary, and comprehension strategies at all three tiers of intervention. As their core instruction, all students received Reading Mastery Plus (Engleman, 2005) in Tier One. Additional supports to the core program were provided to students in Tier Two, and Tier Three students received individualized support. Statistically significant improvements were demonstrated for students in kindergarten, first, and second grade determined by t-test analysis of the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) pretest and posttest measures. Third grade students demonstrated statistically significant effects for an increase in their grade level reading materials. Finally, findings indicated significant gains, compared to other student groups, for students receiving special education services.

Harn, Chard, Kame'enui, and MacConnell (2005) studied use of evidence-based reading interventions with a small sample of students receiving Tier Two and Tier Three interventions. Seventeen students from five different schools received instruction in Reading Mastery (Engleman, 2005), a program designed to incorporate practice and review with scripted lessons

and correction procedures; and Read Naturally (Ihnot, Mastoff, Gavin, & Hendrickson, 2001), a system designed to develop fluency in connected text. Study participants received Tier One and Tier Two supports during first grade that were aligned with the school's core reading program. At the start of second grade, oral reading fluency measures indicated participants were significantly at risk of learning to read connected text. Reading Mastery was administered to participants in September, with the Read Naturally program being added in February. Intervention was provided in small groups according to student skill level. End of school year results from oral reading fluency measures revealed those participants' average cumulative total words per minute for reading connected text increased by at least 50%.

Research Related to RtI and Achievement for Gender

Hyde and Linn (2006) proposed a Gender Similarities Hypothesis that contends, "Males and females are very similar on most, but not all, psychological variables" (p.599). Based on a meta-analysis review of research, their study summarized more than 5000 individual studies and represented testing done on approximately 7 million people. Using the d statistic, measuring the distance between male and female means in standard deviation units, effects for psychological gender differences in areas such as, leadership effectiveness, $d = -0.02$; negotiator competitiveness, $d = 0.07$; and for mathematics problem-solving, $d = 0.08$; were small or near zero 78% of the time (Hyde & Linn, 2006).

Most relevant here is the meta-analysis of research on gender differences in mathematics performance, which was based on 100 studies and the testing of more than 3 million people. Patterns emerged as a function of the age of test takers and the cognitive level of the test. Girls outperformed boys on computation in elementary school and middle school ($d = -0.20$). There was no gender difference in high school. There was no gender difference in deeper

understanding of mathematical concepts at any age. For complex problem solving, a skill that is highly relevant for science, technology, engineering, and mathematics careers, there was no gender difference in elementary or middle school; although a small difference favoring boys emerged in high school ($d = 0.29$). Consistent with these findings of gender similarities in mathematics performance, in 2001 women earned 48% of the bachelor's degrees in mathematics in the United States, demonstrating that substantial numbers of women do have the ability to engage mathematics successfully at the advanced levels required of a mathematics major (Hyde & Linn, 2006, p. 599). With effect sizes ranging from 0.40 to 0.60, Hyde and Linn (2006) found significant gender differences in activity level and physical aggression, with males being more aggressive, across several meta-analyses.

Using the Analysis-Synthesis portion of the Wookcock-Johnson Tests of Cognitive Ability, Sprigler and Alsup (2003) studied 120 boys and 119 girls in first through fifth grades in South Dakota. Study participants had been referred to the gifted and talented program, and all were included in the study whether they qualified or not. Researcher reported no significant achievement differences related to gender. Sadker and Sadker (1997) reported that girls begin school ahead of boys in standardized evaluations and begin to fall behind as they progress through the years.

Girls start out ahead of boys in speaking, reading, and counting. In the early grades, their academic performance is equal to that of boys in math and science. However, as they progress through school, their achievement test scores show significant decline. The scores of boys, on the other hand, continue to rise and eventually reach and surpass those of their female counterparts, particularly in the areas of math and science. Girls are more likely to be invisible members of classrooms. They receive fewer academic contacts, less praise and constructive feedback, fewer

complex and abstract questions, and less instruction on how to do things for themselves (Sadker & Sadker, 1997).

In contrast, Pollack (1998) reported boys received lower grades than girls, were more likely to be labeled as learning disabled, were medicated for attention problems, received special education services, had adjustment problems or conduct disorders, were diagnosed with emotional problems, showed more signs of serious depression, and were more likely to be retained. While closing the gap in math and science achievement, girls continued to significantly outperform boys in reading achievement. Pollack (1998) stated,

It is in the classroom that we see some of the most destructive effects of society's misunderstanding of boys. Thrust into competition with their peers, some boys invest so much energy into keeping up their emotional guard and disguising their deepest and most vulnerable feelings, they often have little or no energy left to apply themselves to their schoolwork. (p.15)

Through the National Center for Education Statistics (NCES), student data are collected by the U.S. Department of Education to measure student achievement. An ongoing nationally representative indicator for measuring academic performance among U.S. students in major academic subjects has been documented and recorded periodically since 1969 as part of the National Assessment of Educational Progress (NAEP). Student achievement in 11 subject areas of: reading, mathematics, science, U.S. history, geography, civics, economics, writing, world history, foreign language, and the arts are compiled by NAEP and results reported in the form of The Nation's Report Card. As part of the report, overall achievement scores are compared for the subgroups of grade, state, gender, ethnicity, and eligibility for free and reduced price lunch. Conclusions made from the 2005 study revealed that males outperformed females in all three

grades tested in science (NAEP, 2005).

Hyde and Linn (2006) stated the following:

Another look at the data leads to different conclusion. For fourth-graders, the average science scores was 152.53 ($M = 152.53$, $SD = 32$) for boys and 148.66 ($M = 148.66$, $SD = 30$) for girls. That is, the difference was less than 4 points on a scale that ranged from 0 to 300. As reported by NAEP, this gender difference is statistically significant, given the large sample size (roughly 100,000 students per grade). However, the effect size, d , for this gender difference is 0.12, reflecting a small difference. Increasingly large samples can detect increasingly small differences, but an assessment of the effect size, d , gives a more accurate reflection of the importance of the difference. Emphasizing statistical significance, while ignoring the magnitude of the effect, risks exaggerating the importance of the differences. (p. 600)

In 2007 the report indicated patterns of reading achievement between male and female students varied by grade. Since the 2005 report, scores for males and females increased for grade 4 but not grade 8. For example, female students scored 7 points higher than male students in grade 4 and females outperformed male students by 10 points in grade 8. However, these numbers have not changed significantly over the past 15 years.

A version of the NAEP was administered nine times between 1992 and 2005. During that time period, there were no statistically significant differences in performance by gender. Females consistently scored slightly higher than males, with average 2005 reading scaled scores ranging from 5 to 11 points higher at fourth grade and 9 to 15 points higher in eighth grade. Boys averaged a mean score for fourth grade reading of 214, while girls averaged a score of 220. In eighth grade reading, girls outscored boys 266 to 255 in overall mean scores (NAEP, 2007).

In its 2004 report titled, Trends in Educational Equality of Girls and Women, the National Center for Education Statistics (NCES) found that in school and college females are now doing as well as or better than males on many indicators of educational attainment. Findings indicated males and females have similar access to key indicators believed to contribute to school readiness and success including: frequency of early reading activities provided in the home and participation rates in other activities that may prepare them for school. Despite a level playing field, in terms of opportunities for reading developmental activities, the report indicated girls ages 3-5 are more likely than boys to read at an early age and they demonstrated more advanced fine motor skills. Boys, on the other hand, demonstrate more signs of developmental difficulties in the areas of attention, physical activity, and language development. Girls were perceived as adjusting better in school. Females consistently outperformed males in reading and writing, while males performed at a higher level in math and science. Female high school graduates were at least as likely as their male peers to have taken advanced math courses and more likely to use computers at home and school. Finally, female high school seniors expressed higher educational aspirations than males and were more likely to enroll in college (NCES, 2004).

The phenomenon of gender similarities has implications for schooling. Emphasis on gender differences in the popular literature reinforces stereotypes that girls lack mathematical and scientific aptitude. However, gender is a poor indicator of whether one will major in mathematics or the biological sciences as an undergraduate. A better predictor would be actual mathematics achievement scores in middle school or high school. A cultural overemphasis on gender differences may mask critical predictive variables and lead to decision-making

that is empirically unsupported. To help teachers succeed, we may need to address variability in aggression and activity level for all learners. To neutralize traditional stereotypes about girls' lack of ability and interest in mathematics and science, we need to increase awareness of gender similarities. Such awareness will help mentors and advisers avoid discouraging girls from entering these fields. Continued monitoring of the relative progress of boys and girls is essential so that neither group falls behind. (Hyde & Linn, 2006, p. 600).

Research Related to RtI and Achievement for Economically Disadvantaged Students

Borman et al. (2005) reported first-year achievement outcomes of a national randomized evaluation of Success for All, a comprehensive reading reform model. In addition, Borman et al. cited Borman, Hewes, Overman, and Brown by stating, "Of 33 comprehensive school reform programs reviewed in a recent meta-analysis, it was one of only 3 that exhibited positive and statistically significant achievement effects across a large number of rigorous quasi-experimental studies" (p. 1). Included in the study were students from schools with the main longitudinal sample consisting of kindergarten and first grade students in the fall of 2002, and also included kindergarten and first grade students in the fall of 2001 from six pilot schools. In all, 2,593 students in 21 K-2 Success for All treatment schools and 2,444 students in 20 control schools formed the final analytical sample. Of the students included in the sample, 76% qualify for free lunch.

Borman et al. (2005) explained that pretests were individually administered to kindergarten and first grade students in the fall 2001 (pilot sample) or fall 2002 (main sample) using the Peabody Picture Vocabulary Test (PPVT). In spring 2002 (pilot sample) and spring

2003 (main sample) students were individually posttested on the four subtests of the Revised Woodcock Reading Mastery Tests (WMTR): Letter Identification, Word Identification, Word Attack, and Passage Comprehension. Test administrators were hired, trained, and supervised by the National Opinion Research Center.

No statistically significant differences between experimental and control groups were found in regard to pretests or demographic characteristics. Hierarchical linear model analyses revealed a statistically significant school-level effect of assignment to Success for All of nearly one quarter of a standard deviation—or more than 2 months of additional learning—on individual Word Attack test scores but there were no school-level differences on the three other posttest measures assessed. These results are similar to those of earlier matched experiments and correspond with the Success for All program theory (Borman et al. 2005, p. 1).

A 2005 study by Vadasy, Sanders, and Peyton, used a quasi-experimental design to measure the relative effectiveness of reading practice or word-level instruction in supplemental tutoring to determine how text matters. Participants included first grade students whose score on the WRAT-R Reading were at or below the lowest 25th percentile on the subtest.

Paraprofessional tutors delivered the interventions.

Students selected to receive the interventions were divided into three groups. Two intervention groups received varying emphasis of the Sound Partners program, with different emphasis regarding decoding instruction and text reading. Students receiving the first intervention were designated as the Reading Practice group and received phonics instruction using Sound Partners and also spent 10 to 15 minutes in oral reading using decodable texts. For the second intervention, a Word Study group was formed in which students received 30 minutes of Sound Partners instruction with no oral reading practice during the session. Finally, the

comparison group received no additional instruction beyond the standard curriculum.

Regarding all measures, except reading fluency, intervention groups significantly outperformed the comparison group. Average scores were at or near grade level for reading accuracy and reading comprehension for both intervention groups. One aspect not reported in the study was the percentage of students at or near grade level. Findings indicated the average fluency rate was below the grade-level benchmark for all groups. Furthermore, there was no significant difference in student performance between the two intervention groups on any measure except reading fluency rate and accuracy.

Average effect sizes were significantly different from zero for both treatment groups. However, this was not true for effects on all measures. When comparing the 48 Reading Practice Group to the comparison group, effect sizes ranged from 0.17 to 0.99 (average=0.63, SE=0.11). Effect sizes for the Word Study group ranged from 0.13 to 1.33 (average=0.62, SE=0.11).

Mathes et al. (2005) used a randomized experiment design to examine the effects of theoretically different instruction and student characteristics on the skills of struggling readers. Using the Texas Primary Reading Inventory and the Woodcock- Johnson (W-J) III Word Identification, students finishing kindergarten or starting first grade were screened and identified for intervention. Participants included two groups of first grade students from high performing urban schools with diverse ethnic and socioeconomic backgrounds. Teachers delivered the interventions to the study participants.

Students selected to receive interventions were divided into two groups. In order to prevent errors and assure consistent use of decodable stories and daily lesson plans, teachers were asked to follow a predetermined sequence of instruction with the Proactive Reading (PR) group. For the Responsive Reading group, menus were provided for teachers to follow; however,

teachers were not required to follow a prescribed scope and sequence. After observing student errors, teachers designed daily lesson plans to target deficiencies among students. Leveled libraries were used to involve more authentic literature in text practice.

In both interventions, emphasis was placed on using knowledge gained from alphabetic and phonemic awareness skills to enhance reading fluency and comprehension. In addition, teachers modeled effective strategies, used guided practice, and offered scaffolding and support during student practice. A total of 117 intervention hours were provided to students, who met in groups of three, for 40 minutes daily.

Participants in the comparison group received an enhanced classroom instruction (EC) intervention. Teachers participated in a 1-day seminar to learn how to use data to provide differentiated instruction. In addition, progress-monitoring data were provided for teachers at 3-week intervals throughout the study. Finally, random selection was used to identify the group of typically achieving students who received only the standard classroom instruction.

Although no additional grade level achievement was reported, all groups performed close to grade level norms for the year-end standardized results. When analyzing year-end scores, the intervention group recorded significantly higher scores on the WJ-III Word Identification and Spelling, as compared to the enhanced classroom group. Likewise, the Proactive Reading Group significantly outperformed the typically achieving, Responsive, and enhanced classroom groups on the WJ-III Word Attack.

More rapid gains were found for reading related skills, recorded every 2 months, for the Proactive and Responsive Reading groups versus the typically achieving and enhanced classroom groups. However, the Proactive Group showed more rapid gains than the Responsive Group in phonological awareness and outdistanced the enhanced classroom and typically

achieving groups in word reading fluency and nonword reading fluency. Furthermore, scores for the two intervention groups remained below the typically achieving group at the final growth measurement point.

When comparing the Proactive Reading Group with the enhanced classroom group, effect sizes ranged from 0.00 to 0.63 (average=0.34; SE=0.06). Next, effect sizes ranged from 0.17 to 0.53 (average=0.30; SE=0.06) for the Responsive Reading group compared with the enhanced classroom group. Finally, the average effect size for both intervention groups differed significantly from zero, while this was not true for effects on all measures.

Jenkins, Peyton, Sanders, and Vadasy (2004) reported the combined treatment groups scored higher than the control group in a study measuring the effects of decodable reading texts in supplemental first grade tutoring of at-risk students. Participants in the randomized experiment included first-grade students scoring at or below the 25th percentile on the WRAT-R Reading subtest. Phonics and word study content portions of the Sound Partners program were used as the intervention. Primarily, this intervention focuses on learning sound-letter relationships, decoding text, spelling, reading nondecodable words, and text reading. Interventions were delivered to two separate groups, while the comparison group did not receive the intervention.

Students in the first intervention group received the more decodable (MD) text condition, where they practiced with story books in which most words could be read using the phonics concepts they had previously learned. Meanwhile, participants in the second intervention group received instruction in the less decodable (LD) text condition, in which books had fewer words to read using phonics skills. Participants in both groups received one-on-one instruction for 30 minutes per day, four days per week and totaling 50 hours of intervention. As discussed above, the comparison group received no additional instruction beyond their standard curriculum.

Results from Bryant's Diagnostic Test of Basic Decoding Skills, WRMT-R Word Attack, WRAT-R Reading, WRMT-R Word Identification, TWORE Sight Word, Text Word list, WRAT-R Spelling, WRMT-R Passage Comprehension, and reading fluency for highly decodable passages revealed both treatment groups outperformed the control group. No significant differences existed for any measure between the two treatment groups. While 84.6% of participants in the more decodable group performed at grade level by scoring within one standard error of measurement of the 50th percentile on the WRMT-R Word Identification, and 87.2% performed at the same level on the Word Attack tests. When analyzing scores for the less decodable group, 77.5% of participants performed at grade-level by scoring within one standard error of measurement of the 50th percentile for Word ID and 90% for Word Attack.

Average effect size for both treatment groups was significantly different from zero; however, effects on some measures were not met. Compared to the control group, the more decodable group effect sizes ranged from 0.35 to 0.99 (average=0.65, SE=0.07). When comparing the less decodable group to the control group, effect sizes ranged from 0.41 to 1.11 (average=0.61, SE=0.07).

Miller (2003) used a quasi-experimental design to study the effect of using classroom assistants to provide tutorial assistance to struggling first-grade readers, using the Partners in Reading program. Participants for the study included two first grade cohorts from a Title I elementary school that were in the lowest third on an assessment of developmental spelling, word list reading, and teacher rankings of student reading ability. Interventions were delivered by paraprofessional tutors who used strategies prescribed by Partners in Reading (PIR) to help students set reading goals, model reading strategies for students to practice, provide positive feedback, and monitor progress. As part of the intervention, students read texts they had

previously read and mastered, were introduced to a new book at their respective reading level and participated in word-sort activities. Participants received four intervention sessions per week at 40 minutes per session. Approximately 67 hours of intervention were provided; however, the exact number of hours was not reported. In contrast, the comparison group received only the standard classroom curriculum and instruction.

Effect sizes ranged from 0.71 to 1.09 (average=0.85, SE=0.14) in an across cohort comparison between the PIR group and the control group. Range of effect sizes varied from 0.88 to 1.10 (average=0.97, SE=0.14) when comparing the RR group to the control group. With regard to all outcome measures, average effect sizes and effects were significantly different from zero for both the PIR and RR groups.

Findings indicated both cohorts who received Reading Recovery (RR) or PIR significantly outperformed the comparison group on word recognition and developmental spelling at the end of first grade. Likewise, RR and PIR participants scored significantly higher on the word recognition subtest, delivered at the end of second grade, than students in the comparison group. With regard to comprehension, PIR students significantly outperformed the comparison group, while RR students did not. Finally, PIR students failed to achieve scores at or above the level of achievement reported for typically achieving students.

Using a standard protocol approach, Vaughn, Linan-Thompson, and Hickman (2003) studied 45-second grade students, identified as at-risk because they were reading below grade level in English, and they were ranked in the second quartile or below as compared to their peers in reading. A Test of Oral Reading Fluency (TORF) was administered prior to treatment and at three 10-week intervals. Between tests, students received 35 minutes of daily supplemental reading interventions from trained reading tutors. Findings indicated equal numbers of students

(n=11) met exit criteria at each 10-week interval. Within the general education classroom, two thirds of the exited students made continuous progress without supplemental support.

Researchers concluded the results demonstrated how distinct groups of students require varying durations of intervals.

Vadasy, Sanders, Peyton, and Jenkins (2002) reported mixed findings in their quasi-experimental study designed to measure the effect of reading interventions to at risk first and second grade students. Students scoring 90 or below on the WRAT-R Reading subtest were eligible for the intervention treatments. Paraprofessional tutors provided one-on-one interventions 4 days per week for 30 minutes per session for 18 weeks. Sound Partners, emphasizing sound-letter relationships, segmenting, decoding, spelling, sight words, and fluency, was selected to use for the first grade intervention, while the second grade intervention used Thinking Partners lessons, which were matched to 48 grade-level books, and students were taught to use comprehension strategies as they read aloud. One group received only first-grade intervention (SP), a second group received only second grade intervention (TP), and the third group received both first and second grade interventions (SP+TP). Students in the control group received regular classroom instruction with no additional interventions.

Findings indicated significant gains, that averaged 17 standard score points, at the end of first grade for the SP+TP groups. SP students scored significantly higher than SP+TP students on Word Attack and Word Identification subtests at the end of second grade. In addition, the SP+TP students made no significant gains from first grade, while the SP students appeared to maintain their first grade gains through second grade. No differences were found, at the end of second grade, between students who only received TP and the control group. For the SP group compared to the control group (all first grade students), effects ranged from 0.05 to 2.06 (average=1.18,

SE=0.14), and for the SP+TP group compared with the control group (all second graders), effects ranged from 0.07 to 0.92 (average=0.40, SE=0.09). Finally, average scores for first and second graders in the SP, TP, and SP+TP group on Word Attack, Word ID, and Spelling all were at or near grade level at posttest.

Using a randomized experiment design, Torgesen et al. (1999) studied group and individual responses to instruction for young children with phonological processing disabilities. A two-tiered screening process was used to identify participants for the study. At the beginning of kindergarten, the Vocabulary subtest of the Stanford-Binet was administered to students. In addition, students were assessed on letter-name knowledge as a measure of phonological awareness. Participants varied in ethnicity and socioeconomic background. Both teachers and instructional aides were used to deliver interventions.

Interventions were provided for three intervention groups, using four 20-minute one-on-one tutoring sessions each week for 2 ½ years, equaling a total of 173 intervention hours. Participants received the embedded phonics (EP) intervention, which involved phonics training in the context of reading stories and writing text. Furthermore, students participated in reading sentences, sound-letter training with a list of sight words, writing sentences using these words, and games designed to teach them word reading.

Linguistic research indicated that typically children have mastered to phonemic system of the home language by age 5. In addition, practice was emphasized in decoding and spelling words. Moreover, the regular classroom support condition (RCS) focused on providing additional support and tutoring in activities and skills found in the students' classroom reading programs. Finally, the comparison group received no additional interventions beyond the standard curriculum and instruction. While outperforming all groups on Word Attack and Non-

word List, the PASP group also scored significantly higher on Word Identification and Real Word List than the control and RCS groups, and recorded significantly higher scores than the control group on the measure of developmental spelling (Torgesen et al., 1999).

Using a quasi-experimental design, Santa and Hoiem (1999) assessed an early steps program for early intervention of reading problems measured from a sample of 43 first-grade students, representing the lowest 20% in each class, from four schools in Montana. Consisting of reading familiar books, word study, sentence writing, and introduction of a new book, the intervention was provided for 30 minutes per day, each school day for a total of 87 ½ hours. A comparison group received daily intervention involving guided reading of a level-appropriate text followed by repeated reading of a level-appropriate text for 30 minutes in a small group of 2-4 students at a similar reading level. Authors concluded Early Steps instruction was more effective for at-risk students than for the comparison group or students not classified as at-risk.

Morris, Tyner, and Perney (2000) replicated the study using a significantly different population of students in a different region of the country. Subjects for the study consisted primarily of African-American students from lower and working class families in an urban area of Tennessee. Students in the intervention group received the same Early Steps treatment for 30 minutes each school day for a range of 40 to 53 ½ hours of intervention treatment. Of the five comparison groups, at-risk students at three comparison schools received additional small group reading instruction and at-risk students in the two remaining schools received Direct Instruction in reading groups. Santa and Hoiem's finding that Early Steps is effective was successfully replicated in this study.

A study by Vadasy, Jenkins, Antil, Wayne, and O'Conner (1997) measured the effectiveness of a community-based early reading intervention for at-risk first graders by using a

randomized experimental design. Participants were selected by teacher rankings after the first 2 weeks of school. Of the 65 students screened, the 40 lowest scoring students were randomly assigned to the intervention and control groups. Interventions included letter naming and sound-letter instruction, sound categorization, rhyming games, onset-rhyme tasks, phonogram exercises, spelling, free writing, and reading primary books. One-on-one intervention was provided for 30 minutes, 4 days per week, for a total of 50 instructional hours of intervention. Researchers found the intervention group scored significantly higher than the control group on the Yopp- Singer Segmentation Test and the WRAT-R (Wide Range Achievement Test-Revised) Spelling subtest. Differences on other measures were not significant.

Vellutino et al. (1996) studied 183 kindergarten students, composed of 118 poor readers and 65 children identified as normal readers. Researchers asserted that two thirds of students identified as poor readers who received 30 minutes of daily tutoring for 15 weeks using standard protocol treatment caught up to their normal-reading classmates after one semester of tutoring. Therefore, results of the study support the assertion that students' performance in reading is impacted by the instruction they receive.

It is important for school districts to assess the effect of programs designed to improve student achievement in order to make informed decisions that assure financial and human resources are well spent. A driving force in education is the federal No Child Left Behind Act of 2001, which mandates that school districts adopt curriculum grounded in scientific research to close the achievement gap in reading among students. Response to Intervention (RtI) is an evidence-based model designed to provide support for struggling students to assure they achieve criterion benchmarks in reading. Accordingly, North Carolina school districts are encouraged to adopt Response to Intervention (RtI) plans.

Many school districts have implemented RtI programs but have not yet assessed the influence of these programs on student achievement. Oral Reading Fluency (ORF) is a measure of a student's reading fluency when reading aloud, determined by the student's speed and accuracy (Shinn, 1989). Marston (1989) noted that this type of assessment also has the advantage of giving the examiner the opportunity to observe the student's mastery of the qualitative features of reading. As demands for outcome accountability become more pronounced, it is essential to determine whether RtI programs have a statistically measurable influence on student achievement. Using reading and math End-Of Grade test data, a statistical analysis can be completed to provide insight and additional information to assess whether RtI programs are having an impact on student achievement in selected North Carolina Schools.

CHAPTER 3

METHODS

The purpose of this quantitative study was to provide research in examining the difference in student achievement in reading and math through the quantitative data collection of North Carolina EOG scores for students in third through fifth grade from one high poverty and high performing North Carolina public school district before and after implementation of RtI. This chapter is a description of the methodology used to collect and analyze the data used to test the six research questions.

This study was quantitative in design. The researcher gathered a Student Data Extract from the testing website for the district. These data included the assessment type (Reading EOG and Math EOG) and the number of student scores that fell into each level. Because only students in grades 3 through 5 were included in this study, only those data were used. The Student Data Extract contained no information that could identify a student or a school. IBM-SPSS version 18/0 was used to conduct the analyses with the alpha level of 0.05.

Research Questions and Null Hypothesis

The following research questions guided this study.

Research Question 1: For students in grade 3, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2009, 2010, 2011, 2012)?

H_{01} : For students in grade 3, there is no significant difference in the proportions of

students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2009.

H_{o12}: For students in grade 3, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010.

H_{o13}: For students in grade 3, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011.

H_{o14}: For students in grade 3, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for

teachers) for students in 2012.

Research Question 2: For students in grade 3, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2010, 2011, 2012)?

H_{01_1} : For students in grade 3, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010.

H_{01_2} : For students in grade 3, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011.

H_{01_3} : For students in grade 3, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and

postintervention (after Response to Intervention (after Response to Intervention professional development for teachers) for students in 2012.

Research Question 3: For students in grade 4, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2009, 2010, 2011, 2012)?

H₀₁₁: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2009.

H₀₁₂: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010.

H₀₁₃: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention

(before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011.

H_{o14}: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2012.

Research Question 4: For students in grade 4, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2010, 2011, 2012)?

H_{o11}: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010.

H_{o12}: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on

the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011.

H_{013} : For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2012.

Research Question 5: For students in grade 5, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2009, 2010, 2011, 2012)?

H_{011} : For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2009.

H_{012} : For students in grade 5, there is no significant difference in the proportions of

students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010.

H_{o13} : For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011.

H_{o14} : For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2012.

Research Question 6: For students in grade 5, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2010, 2011, 2012)?

H₀1: For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010.

H₀1₂: For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011.

H₀1₃: For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2012.

Instrumentation

Students in North Carolina are required to participate in the North Carolina Reading and Math End of Grade (EOG) testing program. These instruments test the proficiency of North Carolina students on the adopted curriculum. The North Carolina Department of Public Instruction (NCDPI) Division of Instructional Services and NCDPI Division of Accountability Services/Testing examines North Carolina's EOG test questions. Each question is field tested prior to inclusion in the adopted testing program. To ensure validity and reliability the classical measurement model and the three parameter logistic item response theory (RIT) model (including p-value, biserial correlation, foil counts, slope, threshold, asymptote, and Mantel-Haenszel bias statistics) are used (North Carolina Department of Public Instruction, n.d.). These tests are administered in strict observance of standardized testing procedures.

Population

The population of this study included all students in the Madison County Public School System who participated in EOG testing during the 2009-2012 school years in grades 3-5.

Data Collection

Data collection was carried out using the North Carolina Department of Public Instruction Testing and Accountability website to acquire North Carolina End of Grade scores for cohort grouped students for school years: 2007-2008, 2008-2009, 2009-2010, 2010-2011, 2011-2012. Standardized test scores of specific students are confidential; therefore, no identifying information about any student was recorded. In order to ensure confidentiality no identifying information was collected concerning students and schools. The data were obtained from the NCDPI website by the researcher. The NCDPI Division of Accountability

Services/Testing Section is responsible for maintaining the data warehouse for all student performance information.

Data Analysis

A chi-square analysis was conducted on each of the hypotheses. The results of these analyses are included in Chapter 4. The chi-square analysis is appropriate when variables have two or more categories. The variable of interest in this study is the level of proficiency of which there are three levels: Level 1 & Level 2, Level 3, Level 4. The chi-square analyses assessed whether there were significant differences between the levels of proficiency for each hypotheses (Green & Salkind, 2003).

Summary

Chapter 3 reported reports the methodology and procedures for conducting the study. After a concise introduction, a description of the research design, selection of the data sources, data collection procedures, research questions and corresponding null hypotheses, and the consequent data analysis procedures were defined.

CHAPTER 4

FINDINGS

Examining the difference in student achievement in reading and math through the quantitative data collection of North Carolina End of Grade (EOG) scores for students in third through fifth grade from one high poverty and high performing North Carolina public school district before and after the implementation of RtI was the purpose of the study. A population of students were studied for the years of 2007-2008 through 2011-2012. Central to the focus of the study was to examine scores from the North Carolina End of Grade (EOG) reading and math measures from a sample consisting of students from third grade through fifth grade.

Research Question 1

Research Question 1: For students in grade 3, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2009, 2010, 2011, 2012)?

H_{01} : For students in grade 3, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2009.

A two-way contingency table analysis was conducted to evaluate whether third grade students NC EOG 2009 Reading assessment changed in proportion posttreatment among the

three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were not found to be significantly related, Pearson $\chi(2, N=386,) = 3.31, p = .191, \text{Cramer's } V = .09$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $42/48.1 = .40, 76/77 = .45, 59/51.8 = .52$, respectively. The Null Hypothesis was retained.

H_{012} : For students in grade 3, there is no significant difference in the proportions of students in each of the four categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010.

A two-way contingency table analysis was conducted to evaluate whether third grade students NC EOG 2010 Reading assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were not found to be significantly related, Pearson $\chi(2, N=416,) = .04, p = .979, \text{Cramer's } V = .01$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $64/63.2 = .50, 91/91.1 = .49, 52/52.7 = .49$, respectively.

H_{013} : For students in grade 3, there is no significant difference in the proportions of students in each of the four categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011.

A two-way contingency table analysis was conducted to evaluate whether third grade students NC EOG 2011 Reading assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were not found to be significantly related, Pearson $\chi(2, N=398,) = .96, p = .616, \text{Cramer's } V = .04$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $64/60.3 = .50, 83/83.1 = .47, 42/45.6 = .43$, respectively.

H_{014} : For students in grade 3, there is no significant difference in the proportions of students in each of the four categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2012.

A two-way contingency table analysis was conducted to evaluate whether third grade students NC EOG 2012 Reading assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were not found to be significantly related, Pearson $\chi(2, N=408,) = .99, p = .609, \text{Cramer's } V = .04$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $59/59.5 = .48, 96/91.7 = .51, 44/47.8 = .44$, respectively.

Research Question 2

Research Question 2: For students in grade 3, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2010, 2011, 2012)?

H_{o2_1} : For students in grade 3, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010.

A two-way contingency table analysis was conducted to evaluate whether third grade students NC EOG 2010 Math assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were not found to be significantly related, Pearson $\chi(2, N=391,) = 5.19, p = .074, \text{Cramer's } V = .12$. The proportions of student NC EOG Math scores in the three assessment levels were (observed and expected) $37/30.5 = .66, 116/114.4 = .55, 60/68.1 = .48$, respectively.

H_{o2_2} : For students in grade 3, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after

Response to Intervention professional development for teachers) for students in 2011.

A two-way contingency table analysis was conducted to evaluate whether third grade students NC EOG 2011 Math assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were found to be significantly related, Pearson $\chi(2, N=371,) = 12.46, p = .002, \text{Cramer's } V = .18$. The proportions of student NC EOG Math scores in the three assessment levels were (observed and expected) $43/32.3 = .69, 104/103 = .53, 46/57.7 = .41$, respectively.

Follow-up pairwise comparisons were conducted to evaluate the differences among these proportions. Table 1 shows the results of these analyses. The Holm's sequential Bonferroni method was used to control for Type 1 error at the .05 level across all three comparisons. Two pairs were found to be statistically significant. Third grade students NC EOG 2011 Math assessment scores changed in proportion posttreatment among Level 1 & Level 2 and Level 3 as well as Level 1 & Level 2 and Level 4.

Table 1

Pairwise Comparisons Using the Holm's Sequential Bonferroni Method for Third Grade Students NC EOG 2011 Math Assessment Scores

Comparison	Pearson Chi Square	p	Cramer's V
Level 1 & 2 vs. Level 4	12.41	< .001	.268
Level 1 & 2 vs. Level 3	5.44	.020	.145
Level 3 vs. Level 4	3.49	.061	.106

H_{023} : For students in grade 3, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2012.

A two-way contingency table analysis was conducted to evaluate whether third grade students NC EOG 2012 Math assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were found to be significantly related, Pearson $\chi(2, N=383,) = 13.59, p = .001, \text{Cramer's } V = .18$. The proportions of student NC EOG Math scores in the three assessment levels were (observed and expected) $43/33.2 = .69, 117/112.9 = .55, 45/58.9 = .40$, respectively.

Follow-up pairwise comparisons were conducted to evaluate the differences among these proportions. Table 2 shows the results of these analyses. The Holm's sequential Bonferroni method was used to control for Type 1 error at the .05 level across all three comparisons. Two pairs were found to be statistically significant. Third grade students NC EOG 2012 Math assessment scores changed in proportion posttreatment among Level 1 & Level 2 and Level 4 as well as Level 3 and Level 4.

Table 2

Results for the Pairwise Comparisons Using the Holm’s Sequential Bonferroni Method for Third Grade Students NC EOG 2012 Math Assessment Scores

Comparison	Pearson Chi Square	p	Cramer’s V
Level 1 & 2 vs. Level 4	12.84	< .001	.273
Level 3 vs. Level 4	6.15	.013	.138
Level 1 & 2 vs. Level 3	3.82	.051	.118

Research Question 3

Research Question 3: For students in grade 4, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2009, 2010, 2011, 2012)?

Ho3₁: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2009.

A two-way contingency table analysis was conducted to evaluate whether fourth grade students NC EOG 2009 Reading assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and

treatment (preintervention and postintervention). Assessment level and treatment were not found to be significantly related, Pearson $\chi(2, N=406,) = 2.24, p = .326, \text{Cramer's } V = .07$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $31/29.4 = .47, 111/110.9 = .44, 42/43.7 = .42$, respectively.

Ho_{3₂}: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010.

A two-way contingency table analysis was conducted to evaluate whether fourth grade students NC EOG 2010 Reading assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were not found to be significantly related, Pearson $\chi(2, N=366,) = .16, p = .923, \text{Cramer's } V = .02$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $57/57.4 = .50, 78/76.2 = .52, 51/52.3 = .49$, respectively.

Ho_{3₃}: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011.

A two-way contingency table analysis was conducted to evaluate whether fourth grade students NC EOG 2011 Reading assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were not found to be significantly related, Pearson $\chi(2, N=380,) = 1.61, p = .446, \text{Cramer's } V = .06$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $63/62.6 = .52, 90/85.3 = .55, 47/52.1 = .47$, respectively.

Ho₃₄: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2012.

A two-way contingency table analysis was conducted to evaluate whether fourth grade students NC EOG 2012 Reading assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were not found to be significantly related, Pearson $\chi(2, N=361,) = .415, p = .813, \text{Cramer's } V = .03$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $60/58.2 = .51, 74/73.2 = .50, 47/49.6 = .47$, respectively.

Research Question 4

Research Question 4: For students in grade 4, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on

the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2010, 2011, 2012)?

Ho4₁: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010.

A two-way contingency table analysis was conducted to evaluate whether fourth grade students NC EOG 2010 Math assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were not found to be significantly related, Pearson $\chi(2, N=416,) = 2.08, p = .353, \text{Cramer's } V = .07$. The proportions of student NC EOG Math scores in the three assessment levels were (observed and expected) $29/28.8 = .45, 101/107.4 = .42, 57/50.8 = .50$, respectively.

Ho4₂: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011.

A two-way contingency table analysis was conducted to evaluate whether fourth grade

students NC EOG 2011 Math assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were not found to be significantly related, Pearson $\chi(2, N=435,) = 1.18, p = .553, \text{Cramer's } V = .05$. The proportions of student NC EOG Math scores in the three assessment levels were (observed and expected) $39/35 = .52, 122/123.1 = .46, 45/47.8 = .44$, respectively.

Ho₄: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2012.

A two-way contingency table analysis was conducted to evaluate whether fourth grade students NC EOG 2012 Math assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were not found to be significantly related, Pearson $\chi(2, N=413,) = .27, p = .874, \text{Cramer's } V = .02$. The proportions of student NC EOG Math scores in the three assessment levels were (observed and expected) $31/29.4 = .47, 111/110.9 = .44, 42/43.7 = .42$, respectively.

Research Question 5

Research Question 5: For students in grade 5, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response

to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2009, 2010, 2011, 2012)?

Ho5₁: For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2009.

A two-way contingency table analysis was conducted to evaluate whether fifth grade students NC EOG 2009 Reading assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were found to be significantly related, Pearson $\chi(2, N=379,) = 7.33, p = .026, \text{Cramer's } V = .13$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $40/51.2 = .40, 114/108.1 = .55, 44/38.7 = .59$, respectively.

Fifth grade students NC EOG 2009 Reading assessment scores changed in proportion posttreatment among Level 1 & Level 2 and Level 4.

Table 3

Results for the Pairwise Comparisons Using the Holm's Sequential Bonferroni Method for Fifth Grade Students NC EOG 2009 Reading Assessment Scores

Comparison	Pearson Chi Square	p	Cramer's V
Level 1 & 2 vs. Level 4	5.87	.015	.133
Level 1 & 2 vs. Level 3	5.41	.020	.185
Level 3 vs. Level 4	.43	.514	.039

Ho₅₂: For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010.

A two-way contingency table analysis was conducted to evaluate whether fifth grade students NC EOG 2010 Reading assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were not found to be significantly related, Pearson $\chi(2, N=414,) = .48, p = .783, \text{Cramer's } V = .03$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $72/73.2 = .55, 127/123.8 = .57, 34/36 = .53$, respectively.

Ho₅₃: For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the

North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011.

A two-way contingency table analysis was conducted to evaluate whether fifth grade students NC EOG 2011 Reading assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were not found to be significantly related, Pearson $\chi(2, N=366,) = .74, p = .688, \text{Cramer's } V = .04$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $63/61.2 = .52, 87/91 = .48, 35/32.9 = .53$, respectively.

Ho5₄: For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2012.

A two-way contingency table analysis was conducted to evaluate whether fifth grade students NC EOG 2012 Reading assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were not found to be significantly related, Pearson $\chi(2, N=378,) = .32, p = .851, \text{Cramer's } V = .02$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed

and expected) $62/62.5 = .51$, $106/103.7 = .53$, $29/30.7 = .49$, respectively.

Research Question 6

Research Question 6: For students in grade 5, is there a significant difference in proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2010, 2011, 2012)?

H_{06_1} : For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010.

A two-way contingency table analysis was conducted to evaluate whether fifth grade students NC EOG 2010 Math assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were found to be significantly related, Pearson $\chi(2, N=440,) = 14.35$, $p = .001$, Cramer's $V = .18$. The proportions of student NC EOG Math scores in the three assessment levels were (observed and expected) $43/43.8 = .52$, $147/129.8 = .60$, $45/61.4 = .39$, respectively.

Follow-up pairwise comparisons were conducted to evaluate the differences among these proportions. Table 3 shows the results of these analyses. The Holm's sequential Bonferroni method was used to control for Type 1 error at the .05 level across all three comparisons. Two

pairs were found to be statistically significant. Fifth grade students NC EOG 2010 Math assessment scores changed in proportion posttreatment among Level 1 & Level 2 and Level 4 as well as Level 3 and Level 4.

Table 4

Results for the Pairwise Comparisons Using the Holm’s Sequential Bonferroni Method for Fifth Grade Students NC EOG 2010 Math Assessment Scores

Comparison	Pearson Chi Square	p	Cramer’s V
Level 3 vs. Level 4	14.33	< .001	.200
Level 1 & 2 vs. Level 4	3.43	.064	.132
Level 1 & 2 vs. Level 3	1.64	.201	.071

Ho6₂: For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011.

A two-way contingency table analysis was conducted to evaluate whether fifth grade students NC EOG 2011 Math assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were not found to be significantly related, Pearson $\chi(2, N=391,) = 4.66, p = .097, \text{Cramer’s } V = .10$. The proportions of student NC EOG Math scores in the three assessment levels were (observed and

expected) $40/37.6 = .50$, $101/93.7 = .51$, $45/54.7 = .39$, respectively.

Ho₆₃: For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2012.

A two-way contingency table analysis was conducted to evaluate whether fifth grade students NC EOG 2012 Math assessment changed in proportion posttreatment among the three levels. The two variables were assessment level (Level 1 & Level 2, Level 3, Level 4) and treatment (preintervention and postintervention). Assessment level and treatment were found to be significantly related, Pearson (2, N=406,) = 8.55, $p = .014$, Cramer's V = .14. The proportions of student NC EOG Math scores in the three assessment levels were (observed and expected) $54/46 = .58$, $103/98.5 = .51$, $44/56.4 = .38$, respectively.

Follow-up pairwise comparisons were conducted to evaluate the differences among these proportions. Table 3 shows the results of these analyses. The Holm's sequential Bonferroni method was used to control for Type 1 error at the .05 level across all three comparisons. Two pairs were found to be statistically significant. Fifth grade students NC EOG 2012 Math assessment scores changed in proportion posttreatment among Level 1 & Level 2 and Level 4 as well as Level 3 and Level 4.

Table 5

Results for the Pairwise Comparisons Using the Holm’s Sequential Bonferroni Method for Fifth Grade Students NC EOG 2012 Math Assessment Scores

Comparison	Pearson Chi Square	p	Cramer’s V
Level 1 & 2 vs. Level 4	7.79	.005	.194
Level 3 vs. Level 4	5.04	.025	.127
Level 1 & 2 vs. Level 3	1.01	.314	.059

Summary

In this chapter data obtained from district North Carolina EOG reading and math scores for students in grade 3 through 5 were presented and analyzed. There were six research questions and 21 null hypotheses. Data collection was carried out using the North Carolina Department of Public Instruction Testing and Accountability website to acquire North Carolina End of Grade scores for cohort grouped students for school years: 2007-2008, 2008-2009, 2009-2010, 2010-2011, 2011-2012. Research question 1 results indicated no significant difference in the proportions of third grade students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers). Research question 2 results indicated Third grade students NC EOG 2011 and 2012 Math assessment scores changed in proportion posttreatment. Research question 3 results indicated no significant difference in proportions of fourth grade students NC EOG Reading assessment scores in each of the three categories posttreatment. Research question 4 results indicated no significant difference in proportions of fourth grade students NC EOG Math assessment scores in each of the three

categories posttreatment. Research question 5 results indicated fifth grade students NC EOG 2009 Reading assessment changed in proportion posttreatment among the three levels. Research question 6 results indicated fifth grade students 2010 and 2012 NC EOG Math assessment scores changed in proportion posttreatment.

CHAPTER 5

SUMMARY, CONCLUSIONS, IMPLICATIONS FOR PRACTICE, AND RECOMMENDATIONS FOR FUTURE RESEARCH

This chapter contains the findings, conclusions, and recommendations for readers who may use the results as a resource when reviewing and revising Response to Intervention implementation. The purpose of this study was to provide research in examining the difference in student achievement in reading and math through the quantitative data collection of North Carolina EOG scores for students in third through fifth grade from one high poverty and high performing North Carolina public school district between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers).

Conclusions

A chi-square analysis was conducted to address research question 1. The variable of interest in this study is the level of proficiency of which there are three levels: Level 1 & Level 2, Level 3, Level 4. The chi-square analyses assessed whether there are significant differences between the levels of proficiency for each research question (Green & Salkind, 2003). Four null hypotheses are restated below with their respective results.

H_{01} : For students in grade 3, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2009. For this null hypothesis the test did not find assessment level and treatment to be significantly related, Pearson $\chi^2(2,$

$N=386$,) = 3.31, $p = .191$, Cramer's $V = .09$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $42/48.1 = .40$, $76/77 = .45$, $59/51.8 = .52$, respectively. The Null Hypothesis was retained.

H_{012} : For students in grade 3, there is no significant difference in the proportions of students in each of the four categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010. For this null hypothesis the test did not find assessment level and treatment to be significantly related, Pearson $\chi(2, N=416)$,) = .04, $p = .979$, Cramer's $V = .01$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $64/63.2 = .50$, $91/91.1 = .49$, $52/52.7 = .49$, respectively. The null hypothesis was retained.

H_{013} : For students in grade 3, there is no significant difference in the proportions of students in each of the four categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011. For this null hypothesis the test did not find assessment level and treatment to be significantly related, Pearson $\chi(2, N=398)$,) = .96, $p = .616$, Cramer's $V = .04$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $64/60.3 = .50$, $83/83.1 = .47$, $42/45.6 = .43$, respectively. The null hypothesis was retained.

H_{014} : For students in grade 3, there is no significant difference in the proportions of students in each of the four categories (Level 1 & Level 2, Level 3, Level 4) on the North

Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2012. For this null hypothesis the test did not find assessment level and treatment to be significantly related, Pearson $\chi(2, N=408) = .99$, $p = .609$, Cramer's $V = .04$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $59/59.5 = .48$, $96/91.7 = .51$, $44/47.8 = .44$, respectively. The null hypothesis was retained.

Research question 2 addressed differences in student achievement between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers). There were three null hypothesis associated with this research question. The null hypotheses with their respective analysis are presented below.

H_{02_1} : For students in grade 3, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010. For this null hypothesis the test did not find assessment level and treatment to be significantly related, Pearson $\chi(2, N=391) = 5.19$, $p = .074$, Cramer's $V = .12$. The proportions of student NC EOG Math scores in the three assessment levels were (observed and expected) $37/30.5 = .66$, $116/114.4 = .55$, $60/68.1 = .48$, respectively. The null hypothesis was retained.

Research question 3 addressed differences in fourth grade student reading achievement between preintervention (before Response to Intervention professional development for teachers)

and postintervention (after Response to Intervention professional development for teachers).

There were four null hypothesis associated with this research question. The null hypotheses with their respective analysis are presented below.

Ho3₁: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2009. For this null hypothesis assessment level and treatment was not found to be significantly related, Pearson $\chi(2, N=406,) = 2.24, p = .326, \text{Cramer's } V = .07$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $31/29.4 = .47, 111/110.9 = .44, 42/43.7 = .42$, respectively. The null hypothesis was retained.

Ho3₂: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010. For this null hypothesis assessment level and treatment was not found to be significantly related, Pearson $\chi(2, N=366,) = .16, p = .923, \text{Cramer's } V = .02$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $57/57.4 = .50, 78/76.2 = .52, 51/52.3 = .49$, respectively. The null hypothesis was retained.

Ho3₃: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North

Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011. For this null hypothesis assessment level and treatment was not found to be significantly related, Pearson $\chi(2, N=380) = 1.61$, $p = .446$, Cramer's $V = .06$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $63/62.6 = .52$, $90/85.3 = .55$, $47/52.1 = .47$, respectively. The null hypothesis was retained.

Ho₃₄: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2012. For this null hypothesis assessment level and treatment was not found to be significantly related, Pearson $\chi(2, N=361) = .415$, $p = .813$, Cramer's $V = .03$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $60/58.2 = .51$, $74/73.2 = .50$, $47/49.6 = .47$, respectively. The null hypothesis was retained.

Research question 4 addressed differences in proportions of fourth grade students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2010, 2011, 2012).

Ho₄₁: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North

Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010. For this null hypothesis assessment level and treatment was not found to be significantly related, Pearson $\chi(2, N=416,) = 2.08$, $p = .353$, Cramer's $V = .07$. The proportions of student NC EOG Math scores in the three assessment levels were (observed and expected) $29/28.8 = .45$, $101/107.4 = .42$, $57/50.8 = .50$, respectively. The null hypothesis was retained.

Ho₄₂: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011. For this null hypothesis assessment level and treatment was not found to be significantly related, Pearson $\chi(2, N=435,) = 1.18$, $p = .553$, Cramer's $V = .05$. The proportions of student NC EOG Math scores in the three assessment levels were (observed and expected) $39/35 = .52$, $122/123.1 = .46$, $45/47.8 = .44$, respectively. The null hypothesis was retained.

Ho₄₃: For students in grade 4, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2012. For this null hypothesis assessment level and treatment was not found to be significantly related, Pearson $\chi(2, N=413,) = .27$, $p = .874$, Cramer's $V = .02$. The proportions of student NC EOG Math scores in the three

assessment levels were (observed and expected) $31/29.4 = .47$, $111/110.9 = .44$, $42/43.7 = .42$, respectively. The null hypothesis was retained.

Research Question 5 addressed differences in proportions of fifth grade students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2009, 2010, 2011, 2012).

Ho₅₂: For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010. For this null hypothesis assessment level and treatment was not found to be significantly related, Pearson $\chi(2, N=414,) = .48$, $p = .783$, Cramer's $V = .03$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $72/73.2 = .55$, $127/123.8 = .57$, $34/36 = .53$, respectively. The null hypothesis was retained.

Ho₅₃: For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011. For this null hypothesis assessment level and treatment was not found to be significantly related, Pearson $\chi(2, N=366,) = .74$, $p = .688$, Cramer's $V = .04$. The proportions of student NC EOG Reading scores in the three

assessment levels were (observed and expected) $63/61.2 = .52$, $87/91 = .48$, $35/32.9 = .53$, respectively. The null hypothesis was retained.

Ho5₄: For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2012. For this null hypothesis assessment level and treatment was not found to be significantly related, Pearson $\chi(2, N=378,)$ = .32, $p = .851$, Cramer's $V = .02$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $62/62.5 = .51$, $106/103.7 = .53$, $29/30.7 = .49$, respectively. The null hypothesis was retained.

Research Question 6 addressed differences in proportions of fifth grade students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) by year (2010, 2011, 2012).

Ho6₂: For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011. For this null hypothesis assessment level and treatment was not found to be significantly related, Pearson $\chi(2, N=391,)$ = 4.66, $p = .097$, Cramer's $V = .10$. The proportions of student NC EOG Math scores in the three

assessment levels were (observed and expected) $40/37.6 = .50$, $101/93.7 = .51$, $45/54.7 = .39$, respectively. The null hypothesis was retained.

The overall results for the research questions indicated no change in proportions of student NC EOG scores in the three assessment levels between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students. However, research questions 2, 5, and 6 had a significant change in proportions of student NC EOG scores in the three assessment levels between preintervention and postintervention.

H_{02_2} : For students in grade 3, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2011. For this null hypothesis the test showed a statistically significant difference, Pearson $\chi(2, N=371,) = 12.46$, $p = .002$, Cramer's $V = .18$. The proportions of student NC EOG Math scores in the three assessment levels were (observed and expected) $43/32.3 = .69$, $104/103 = .53$, $46/57.7 = .41$, respectively. Third grade students NC EOG 2011 Math assessment scores changed in proportion posttreatment among Level 1 & Level 2 and Level 3 as well as Level 1 & Level 2 and Level 4. Thus the null was rejected. The student proportions dropped in proficiency.

H_{02_3} : For students in grade 3, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to

Intervention professional development for teachers) for students in 2012. For this null hypothesis the test showed a statistically significant difference, Pearson $\chi(2, N=383,) = 13.59, p = .001$, Cramer's $V = .18$. The proportions of student NC EOG Math scores in the three assessment levels were (observed and expected) $43/33.2 = .69, 117/112.9 = .55, 45/58.9 = .40$, respectively. Third grade students NC EOG 2012 Math assessment scores changed in proportion posttreatment among Level 1 & Level 2 and Level 4 as well as Level 3 and Level 4. The null was rejected. The student proportions dropped in proficiency.

Ho5₁: For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Reading End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2009. For this null hypothesis the test showed a statistically significant difference, Pearson $\chi(2, N=379,) = 7.33, p = .026$, Cramer's $V = .13$. The proportions of student NC EOG Reading scores in the three assessment levels were (observed and expected) $40/51.2 = .40, 114/108.1 = .55, 44/38.7 = .59$, respectively. Fifth grade students NC EOG 2009 Reading assessment scores changed in proportion post treatment for Level 1 & Level 2 and Level 4. The null was rejected.

Ho6₁: For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2010. For this null hypothesis the test showed a statistically significant difference, Pearson $\chi(2, N=440,) = 14.35, p = .001$,

Cramer's $V = .18$. The proportions of student NC EOG Math scores in the three assessment levels were (observed and expected) $43/43.8 = .52$, $147/129.8 = .60$, $45/61.4 = .39$, respectively. Follow-up pairwise comparisons were conducted to evaluate the differences among these proportions. Fifth grade students NC EOG 2010 Math assessment scores changed in proportion posttreatment among Level 1 & Level 2 and Level 4 as well as Level 3 and Level 4. The null was rejected.

H_{06_3} : For students in grade 5, there is no significant difference in the proportions of students in each of the three categories (Level 1 & Level 2, Level 3, Level 4) on the North Carolina Math End of Grade assessment between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers) for students in 2012. For this null hypothesis the test showed a statistically significant difference, Pearson (2, N=406,) = 8.55, $p = .014$, Cramer's $V = .14$. The proportions of student NC EOG Math scores in the three assessment levels were (observed and expected) $54/46 = .58$, $103/98.5 = .51$, $44/56.4 = .38$, respectively. Follow-up pairwise comparisons were conducted to evaluate the differences among these proportions. Table 3 shows the results of these analyses. Fifth grade students NC EOG 2012 Math assessment scores changed in proportion posttreatment among Level 1 & Level 2 and Level 4 as well as Level 3 and Level 4. The null was rejected. The student proportions dropped in proficiency.

Research questions 2, 5, and 6 had a significant change in proportions of student NC EOG scores in the three assessment levels between preintervention and postintervention. Overall, the change in proportion of proficiency level was negative.

Summary

The statistical analysis as shown in the study was based on six research questions presented in Chapters 1, 3, and 4. In Chapter 3, several null hypotheses were presented for each research question. Each hypothesis was analyzed using a chi-square. The level of significance used for each in the test was .05. Findings indicated that third and fifth grade NC EOG scores changed negatively in proportion posttreatment. The results of this study show a parallel with previous research that expressed concern with the structure and implementation of Response to Intervention (McEneaney et al., 2006; Mastopieri, 2003). Mastropieri (2003) outlined three important concerns schools should address during the implementation phase of RtI. First, it is unclear whether general education teachers will embrace teaching specific reading skills found in evidence-based reading practices. Second, it is uncertain how a general education teacher can simultaneously provide Tier 1 and Tier 2 interventions in the classroom. Finally, schools will have to insure the integrity of instruction and require documentation to be maintained. Allington (2006) pointed to a lack of research that supports the use of the Three Tier model. Allington also expressed concerns that the Three Tier model would not be consistently implemented by state and local education agencies due to a lack of consistent interpretation for its use.

Recommendations for Practice

The findings and conclusions of this research have established a foundation for the following recommendations for assisting school systems and their regular education teachers with the implementation and clarification of an RtI framework:

1. The administration and faculty of the school system should consider building a district level RtI team that can address implementation issues within the district.

2. Identify places where interventions are working well, visit those classrooms, and identify support needed for others to implement at same level of quality.
3. School principals should collaborate to identify and provide structures to make interventions and enrichment within the RtI framework occur with fidelity.
4. School principals and district administration should consider the impact of teacher burnout and provide social-emotional support systems for teachers.
5. District administration should consider providing school principals with training on how to select and interpret data for decision making.

Mastropieri (2003) highlighted three major concerns schools should address during the implementation phase of RtI. First, it is unclear whether general education teachers will embrace teaching specific skills found in evidenced based best teaching practices. Second, it is uncertain how a general education teacher can simultaneously provide Tier 1 and Tier 2 interventions in the classroom. Finally, schools will have to insure the integrity of instruction and require documentation to be maintained.

Gerber (2003) claimed that evaluating the integrity of instruction is not the only variable that impacts learning outcomes. It is also important to evaluate how teachers' instructional behavior may account for differences in student outcomes. In addition, little is known about how additional training and professional development will impact costs in the following areas: (1) classroom preparation, (2) curriculum and instruction enhancements, (3) development of assessment procedures, and (4) provisions for increasingly intensive interventions.

Roehrig et al. (2008) indicated that more research is needed on effectively delivering professional development to teachers on the use of progress monitoring data to improve student results. Gallagher et al. (2008) noted that many regular education teachers do not have the formal

knowledge or training to gather and interpret formative assessment data and carry out appropriate interventions based on those data. Hoffman et al. (2009) found that regular education teachers do not have the skills to implement effective progress monitoring resulting in a disconnect between regular classroom assessments and classroom instruction.

Herzberg's motivation-hygiene theory includes a two-dimensional paradigm of factors affecting people's attitudes about work (1959). Satisfiers (motivators) describe a person's relationship with what he or she does and can be related to the task being performed. Dissatisfiers (hygienes) have to do with a person's relationship to the context or environment in which he or she performs the job. The satisfiers are connected to what a person does while the dissatisfiers connect to the situation in which the person operates (Herzberg, 1959). The impact the theory has on professional development for teachers and principals is large. District leaders need to understand that once the initial hygiene factors have been met, teachers and principals are free to discover the higher order needs necessary to build superior productivity, self-esteem, and creativity. District leaders should consider Herzberg's Motivation-Hygiene theory when organizing professional development.

According to Bandura's socio-psychological theory, self-efficacy beliefs have direct effects on one's choice of activities and settings and so can affect coping efforts once those activities begin (Leithwood, 2007). Such beliefs regulate how much effort people lay out and how long they persist in the face of failure and difficulty. Strong efficacy beliefs will equate to greater persistence at challenging tasks (Bandura, 1977). District leaders should consider investing in professional development opportunities that would build a positive sense of efficacy. Mentoring and networking offer occasions for building a strong sense of positive efficacy by providing venues that allow for mastery experiences, vicarious experiences, verbal persuasion,

and emotional arousal to occur.

Teacher burnout with initiatives must be considered when implementing new programs. Teachers are working longer hours without significant pay to meet the demands of the expanding job roles in today's classroom (Buchanan, 2009; Day, Elliot, & Kington, 2005; Galton, 2008). This intensification of teacher workload is rapidly becoming the focus of research in explaining teacher turnover, burnout, and job dissatisfaction (Ballet & Kelchtermans, 2008; Day, 2008; Goodson, Hargreaves, & Moore, 2006). However, many teachers are continuing to work longer hours due to job commitment, passion and risk of being incompetent in their profession (Day, 2008; Fernet, Guay, & Vallerand, 2008; Kelchtermans, 2005; Wong, 2006). This problem impacts teachers and students alike. When teachers are overworked without support or resources, stress can occur, and teacher burnout is likely, which creates an ineffective teacher. An effective teacher is one who can manage time and work in providing instruction to all students (Wong, 2009). But when teachers are overworked by working longer hours, work-life conflict occurs, which can result in job dissatisfaction and a loss of passion for teaching (Ehrhart, Klein, & Major, 2002).

“The readiness is all,” concludes Shakespeare's Hamlet, reeling from the changes in his kingdom and agonizing over how best to react. Readiness for change is often the bottom line for any change management strategy. If people are not ready for change, they will resist (Walinga, 2008). District leaders and administrators should consider the complexity of change theory as they work toward implementing district, state, and federal initiatives.

Recommendations for Future Research

The results of this study indicate that the district implementation of RTI had no positive effect on student achievement as measured by the North Carolina End of Grade assessments.

Recommendations for future research include a replication of this study in other rural school districts in North Carolina. Furthermore, this study could be replicated and expanded to include a qualitative design to examine the fidelity of implementations and practicing teachers' perceptions after the implementation and professional development of the RtI initiative. Research could also investigate the issue of how schools sustain their internal capacity to support and maintain RtI procedures with fidelity after the professional development phase of implementation.

Summary

The purpose of this study was to provide research in examining the difference in student achievement in reading and math through the quantitative data collection of North Carolina EOG scores for students in third through fifth grade from one high poverty and high performing North Carolina public school district between preintervention (before Response to Intervention professional development for teachers) and postintervention (after Response to Intervention professional development for teachers). The results of this study indicate that the district implementation of RtI had no positive effect on student achievement as measured by the North Carolina End of Grade assessments.

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