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PREDICTING SIXTH GRADE PERFORMANCE ON CRITERION-REFERENCED  
READING TESTS WITH THIRD GRADE TEST SCORES

by

Michael Sean Gallacher

A thesis submitted to the faculty of

Brigham Young University

in partial fulfillment of the requirements for the degree of

Educational Specialist

Department of Counseling Psychology and Special Education

Brigham Young University

August 2008

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BRIGHAM YOUNG UNIVERSITY

GRADUATE COMMITTEE APPROVAL

of a thesis submitted by

Michael Sean Gallacher

This thesis has been read by each member of the following graduate committee and by majority vote has been found to be satisfactory.

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As chair of the candidate's graduate committee, I have read the thesis of Michael Sean Gallacher in its final form and have found that (1) its format, citations, and bibliographical style are consistent and acceptable and fulfill university and department style requirements; (2) its illustrative materials including figures, tables, and charts are in place; and (3) the final manuscript is satisfactory to the graduate committee and is ready for submission to the university library.

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## ABSTRACT

### PREDICTING SIXTH GRADE PERFORMANCE ON CRITERION-REFERENCED READING TESTS WITH THIRD GRADE TEST SCORES

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This study analyzed the correlation between students' third grade reading ability and sixth grade reading ability. The data were collected from an urban school district, and the participants were students whose records contained information from their third grade school year and their sixth grade school year. The Utah English Language Arts Criterion-Referenced Tests (ELA-CRT) administered in third and sixth grade were used to determine reading ability. Additional demographic data, including race, gender, special education identification, free/reduced lunch, and English Language Learner (ELL), was assessed and controlled for in the data analysis and provided important information concerning the overall findings. Analysis revealed that third grade reading scores had a strong predictive value on sixth grade reading scores. Certain demographic variables carried statistically significant correlations with sixth grade reading performance including race, special education identification, free/reduced lunch, and ELL identification. However, when analyzed together and considering the statistical weight each other, only third grade reading performance, free/reduced lunch, and ELL identification held significant correlations.

## ACKNOWLEDGMENTS

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## TABLE OF CONTENTS

ABSTRACT .....	v
ACKNOWLEDGMENTS .....	vi
TABLE OF CONTENTS .....	vii
LIST OF TABLES .....	x
INTRODUCTION.....	1
International Comparisons of Academic Achievement.....	1
Comparisons of Educational Progress Within the U.S.....	2
Development of Reading Skills .....	4
Definition of Reading Goals .....	5
Federal Government’s Role in Education.....	5
LITERATURE REVIEW .....	6
History of Federal Government’s Role in Education .....	6
Elementary and Secondary Education Act (ESEA).....	7
Improvement of Education .....	7
Overview of NCLB .....	8
Heart of NCLB: Accountability .....	9
NCLB: State Accountability and Responsibility.....	9
Participation .....	9
Academic Achievement .....	10
Attendance .....	10
NCLB and Utah’s Monitoring of Academic Progress .....	14
Utah’s Criterion-Referenced tests (CRTs).....	14
Utah’s Brief History of CRTs .....	14



Development of Utah’s CRTs.....	15
Levels of Proficiency.....	17
English Language Arts CRTs.....	18
Reliability and Validity of Utah’s ELA-CRTs .....	18
Utah Testing Summary.....	19
Research Questions .....	20
METHODS .....	21
Participants .....	21
Procedures .....	21
Statistical Analysis .....	24
RESULTS .....	25
Results Pertaining to the Primary Research Question .....	25
Descriptive Statistics .....	26
Correlation Matrix .....	26
Multiple Linear Regression .....	29
Results Pertaining to the Secondary Question.....	29
DISCUSSION .....	32
Findings Related to Research Questions.....	32
Primary Research Question.....	32
Secondary Research Question.....	33
Implications.....	34
Limitations.....	35
Suggestions for Further Research.....	35
Conclusion.....	36

REFERENCES ..... 37

## LIST OF TABLES

1.	Summary of Key NCLB Accountability Requirements .....	11
2.	Student Demographics Based on Third Grade Records .....	22
3.	Descriptive Statistics .....	26
4.	Correlation Matrix of Demographic Variables and ELA Test Percentages in Sixth and Third Grade .....	27
5.	Regression Containing Two Models, One Containing ELA-CRT Third Grade Scores .....	30

## INTRODUCTION

The website for the National Education Association listed several thought provoking quotes during *Education Week* in November 2007.

“Education is simply the soul of a society as it passes from one generation to another” —  
*G. K. Chesterton.*

“Education is the vaccine for violence” —*Edward James Olmos.*

“What greater gift can we offer the republic than to teach and instruct our youth?”—  
*Cicero.*

“Public education after all is the engine that moves us as a society toward a common destiny... It is in public education that the American dream begins to take shape”—*Tom Brokaw.*

"Knowledge is the food of the soul"—*Plato.*

"Liberty cannot be preserved without a general knowledge among the people"—*John Adams.*

As emphasized by these influential leaders, education has been and continues to be a primary element of civilization. As our nation considers this reality and examines our current status in regard to educating our children, some believe that we have fallen behind in our duty to provide each child with a quality education (Yell, Drasgow, & Lowrey, 2005).

### *International Comparisons of Academic Achievement*

On the international level, U.S. students' academic performance ranks behind that of other countries. More specifically, in a report released in December of 2004, the Program for International Student Assessment (PISA) ranked 15-year-old U.S. students 24th when compared to 29 other nations in the area of math literacy (Hardy, 2005): U.S. fell behind Poland, Hungary,

Spain, South Korea, Japan, the Netherlands, Canada, and Finland, just to name a few. While the U.S. performed better in other academic areas (e.g., civics, reading, and science) than in math, there is still room for improvement. In a study that collected international testing data from 1991 to 2001, it was found that 41% of the other countries scored equivalent to the United States when combining all areas tested—placing the U.S. in the “average range” (Boe & Shin, 2005). There is, however, the argument that because of differing objectives, values, and organization, and primarily the fact that in the U.S. individual states are responsible for providing education for every child (Hurn, 1983), it is not fair to compare the U.S. to other countries. But even when compared to itself over the past forty years, the U.S. has had difficulty showing improvement in education.

#### *Educational Progress Within the U.S.*

In 1990 the United States set educational goals to increase student achievement and graduation rates (Stedman, Irwin, Lyke, & Riddle, 1990). Soon after, in 1992, the U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics (NCES), National Assessment of Educational Progress (NAEP) reported that by using a compilation of tests and a scaled score ranging from 0 to 500, the nation’s eighth grade reading scores average was 260. Fifteen years later, in 2007, the score had increased by only three points to 263 (NCES, 2007). During this same time frame, the math scores increased from 268 to 281. Although this indicated some progress, the progress was not a significant improvement (NCES). In science, monitoring progress of test scores from 1996 to 2005 and using a scaled score range of 0 to 300, the nation made no progress; scores remained at 149 (NCES). There was no improvement in graduation rates either. The nation reported that in 2003 the graduation rate was 70% (Greene & Winters, 2006), similarly indicating no change since 1990.

Efforts to address this problem have been multiple, highly varied, and scattered. In the early 1980s, the Secretary of Education mandated a commission to investigate the quality of teaching and learning in America (Yell et al., 2005). The report “A Nation at Risk” was the result of the investigation. After the publication of this report in 1983, Americans became keenly aware of students’ lack of academic achievement (Yell et al.). A plethora of educational reforms were put into place, all of which produced minimal results. Between 1983 and 1987 every state enacted some sort of educational reform (Feir, 1995).

Most reforms focused on giving the state more control over policy making. Some reforms increased site-level control, giving more authority to teachers and principals (Feir, 1995). Other reforms included increased high school graduation requirements, increased student testing, and reforms of curriculum standards and materials (Feir). With momentum to promote reforms and address the problems in American education, however, reformers did not conduct sufficient research to validate positive outcomes. This urge to fix a broken system resulted in hastily enacted reforms being pre-destined to fail and even sarcastically labeled as very expensive experiments (Yecke, 1996). As Pogrow stated, “In the absence of specific, systematic interventions that work, reformers become obsessed with getting everyone on board” (Yecke, p. 11). Interventions, whether in the shape of reform or not, need to be researched before implementation.

Hence, rather than continuing to waste time and money on a variety of possible reforms, it becomes necessary to look at the data directly to ascertain where and when the problems occur. For example, if it is determined that there is a critical period for a child to learn to read, it becomes imperative to know at what age that period is, then expend efforts and interventions to focus on that age group.

*Development of reading skills.* Given that reading is an important and foundational academic skill (Caputo, 2003; Ross Smith, Casey, & Slavin, 1995; Snow, Porche, Tabors, & Harris, 2007; Spiller & Hall, 1978; Trimble, 1996), it becomes important to consider the skill in detail when considering educational success. Some important questions arise when considering educational needs related to reading. When do students establish these fundamental reading skills? To what extent are these skills already established and stabilized by the third grade? Understanding this relationship has direct implications for policy and practice.

There are many aspects, precursors, and influences that play their respective roles in children's reading ability. Language acquisition has been shown to be a vital precursor to developing literacy skills (Roth, Speece, & Cooper, 2002). Having language skills and vocabulary can help children read and comprehend text with more ease. Environmental factors have also been shown to influence reading performance in children. Children living in lower socioeconomic circumstances tend to perform lower in reading (Epps & Jackson, 2000). Research has shown that parent involvement can greatly influence children's literacy performance (Shonnenschein, Baker, Serpell, & Schmidt, 2000). Parents' involvement can help children attain those early reading skills and components that are necessary for reading.

These early reading skills and components are numerous and discussion of them can be lengthy; however, in a study of reading ability it is important to at least understand what the reading community has identified in this area. To list a few, there are concepts about print, including knowledge about reading left to right, and top to bottom. Phonological awareness and later in development, phonological recoding and decoding, all associated with recognition that letters have sounds, is of course on that list. Orthographic knowledge, or the organization of graphic structures; word reading, passage reading, fluency, reading vocabulary and

comprehension are also very important on that list of reading skills. Deficits in these skills can lead to deficits in reading (Joseph, 2006). Because reading skills are so important to academic success, there has been a great deal of time, money, and research expended to gain information to improve children's reading performance.

*Definition of reading goals.* One role of research is to provide data that informs intervention and policy, leading to more effective methods and achieving specified goals (DuPaul, 2007). Because third grade has been widely identified as an important year in reading abilities, it becomes appropriate to include that year in any study of reading performance (Ehri, 1991; Juel, 1988). Sixth grade may also be a beneficial year to examine because by sixth grade, many, if not all states' curricula, are taught out of textbooks (Altbach, Kelly, Petrie, & Weis, 1991). This thesis will, therefore, analyze the relationship between third and sixth grade reading achievement and language arts. Considering that the United States' goal is to provide all students with an equal opportunity to obtain a high-quality education, the implications of this proposed research are in line with this goal.

#### *Federal Government's Role in Education*

In considering national improvement it becomes important to understand the federal government's role in education and the federal programs currently in place. The following sections briefly describe the government's historical role in education and nationally mandated programs in which the nation's schools are participating, namely the No Child Left Behind Act of 2001(NCLB). Ultimately, the discussion leads to this study's research questions.



## LITERATURE REVIEW

Although much of the financial support for education has been provided primarily by state and local agencies, the federal government has provided narrow but crucial aid and direction for public education. For example, after the Civil War, Congress ordered that free and nonsectarian education be provided by each new state admitted to the union (Jennings, 2000). In the first half of the 1900s, the federal government played its role in education by providing federal income tax deductions for college students; by passing the GI Bill of Rights that provided financial aid to returning World War II veterans to buy homes and go to college; by enacting the National Defense Education Act to promote science and mathematics instruction; and by supporting vocational education to train workers (Jennings). Today the federal government provides an essential 10% of the funding toward public education (Yell et al., 2005).

### *History of Federal Government's Role in Education*

The government's role in education often reflected the political interests of the time period. One such example is during the time of the Civil Rights movement. As public education evolved and citizens began to understand and learn about their rights, the government took action. The Supreme Court, in *Brown v. the Board of Education*, found that it was a violation of Amendment 14 to segregate children by race in the public schools. This ruling created an interest in the quality of education being provided to African Americans. It was this interest that then led to an in-depth look at the quality of education to other groups considered disadvantaged, namely children in poverty (Jennings, 2000). In 1964, President Lyndon B. Johnson signed the Civil Rights Act, which opened the door for the government to play a larger role in education. Johnson's "War on Poverty" campaign turned its attention on the schools and enacted some early

intervention programs such as the Head Start Program, initially started as a summer program for 4-year-old children living in poverty (Gallagher, 2000).

*Elementary and Secondary Education Act (ESEA).* In 1965, as part of Johnson's War on Poverty, the Elementary and Secondary Education Act (ESEA) was passed, along with its cornerstone, Title I. Title I was primarily focused on providing and improving education for disadvantaged children. To this day ESEA is the single largest source of federal aid to public schools for grades kindergarten through 12th (Department of Education, 1996). Numerous amendments, expansions, and revisions have been attached to ESEA over the years. Most of the changes have included some form of new program. For example, there have been programs to help migrant children, neglected or delinquent children, limited-English-proficient students, and students with special needs. Some programs have attempted to enhance math and science, and others to rid schools of drugs (Department of Education, Washington, DC). No matter the different type of program, one element remains consistent: its goal to help specific groups of children achieve special objectives. The most recent reform is NCLB 2001.

*Improvement of education.* Since the enactment of Title I, the federal government has provided funding with the specific intent to aid schools in improving education. It wasn't until the publication of the report *A Nation at Risk* in 1983 that officials began to question the effects of the financial funding (Yell et al., 2005). The report brought evidence to light that federal money was not being used to finance meaningful state activities aimed to improve educational results. In fact, the National Assessment of Educational Progress showed that scores in reading and math had remained stagnant over the previous 40 years (Yell et al.). These findings encouraged legislators to demand that funding be spent only on activities that produced positive results. The *Improving America's Schools Act* of 1994 was the result of such demands. This act

created an expectation for the federal government to somehow show a link between the money spent and academic progress. Despite the effort, however, there was still little evidence of the desired growth. This goal seemed improbable without the ability to hold schools accountable. Through the passage of NCLB in 2001, the federal government required and continues to require accountability of individual schools to show measurable gains in students' achievement in reading and math.

### *Overview of NCLB*

In continuing to focus on the improvement of this nation's education and in building on the *Improving America's Schools Act*, President George W. Bush signed the *No Child Left Behind Act of 2001* on January 8, 2002 (Public Education Network, 2003). NCLB is a complex and extensive federal law with over 750 pages of law and over 1,500 pages of regulations (Public Education Network) aimed at improving the performance of U.S. primary and secondary schools by increasing standards and accountability for states, school districts and schools. Title I, Section 101 states, "the purpose of this title is to insure that all children have a fair, equal, and significant opportunity to obtain a high-quality education and reach, at a minimum, proficiency on challenging state academic achievement standards and state academic assessments" (U.S. Department of Education, 2004, para. 1). This statement implies that not all students are getting a fair and high quality education. It lists such groups as children living in poverty, students learning English as a second language, migratory children, children with disabilities, American Indian children, neglected or delinquent children, minority students, and children in need of reading assistance. Research shows that these particular groups have difficulty accessing high quality education (Anderson-Snowden, 2004; Diken & Rutherford, 2005; Epps & Jackson, 2000; Huston, 1999; McLoyd, 2000; Neal, Martin, & Moses, 2000; Poindexter, 2000; Romanowski,

2003; Ruiz, 2002; Spencer, Noll, & Cassidy, 2005). In short, the thinking behind NCLB is simple: In order for the nation's schools to improve, there must be clear and high standards set, a way to identify the schools that do not meet those standards, options for parents of students in those schools, and support for those schools. Additionally, for those schools that still perform poorly, there must be increasingly rigorous interventions.

#### *Heart of NCLB: Accountability*

Given the extensive properties of this law, it is beyond the scope of this paper to describe all of the aspects of NCLB; however, some important parts are explained. At the heart of NCLB is accountability. This accountability reaches to different domains, including state accountability and responsibility, school district accountability, and individual school accountability. Adequate Yearly Progress (AYP) has been identified by the federal government as a measurement of academic achievement to determine how schools and districts perform. An important part of AYP is the requirement for annual reporting of progress. Minimally, each state must produce an AYP report each year, and the reports must be public and easy to access.

#### *NCLB: State Accountability and Responsibility*

NCLB requires states to develop and implement a single, statewide accountability system that is effective in ensuring that all districts and schools meet AYP, and to hold accountable those schools that do not show progress. Schools must follow certain guidelines to meet AYP for participation, achievement, and attendance.

*Participation.* The participation requirement states that at least 95% of students must be tested. This includes students from each of the nine pre-identified demographic subgroups: African American, American Indian, Asian, Hispanic, Pacific Islander, Caucasian, economically disadvantaged, limited English proficient students, and students with disabilities (Utah State

Office of Education, 2003a). In order for a subgroup to be recognized and accounted for, at least 40 students of that subgroup must attend that particular school. Even if the school's tests scores are very high, if less than 95% of students from each subgroup participated, that school will not meet AYP. The main reason this aspect is added to AYP requirements is to prevent schools from not testing their low performing students. These students may be identified in a particular subgroup and the school must be responsible for their test scores. Low performing subgroups cannot be eliminated from testing in an effort to pass AYP (Utah State Office of Education, 2003a).

*Academic achievement.* The achievement requirement of AYP states that students must achieve a score that is considered proficient on a state assessment. Schools meet AYP when a designated percentage of students score in the proficient range identified as their achievement goal. There is a provision added to this requirement of AYP called the Safe Harbor Provision. The Safe Harbor Provision allows schools to meet AYP even if they do not meet the achievement goals. It states that if a school does not achieve their goals, but does have a ten percent improvement in scores from the previous year, the school meets AYP (Utah State Office of Education, 2003a).

*Attendance.* Finally, the attendance requirement states that schools must have at least an 85.7% graduation rate and at least 93% attendance to achieve AYP. All of this was designed to help all students reach proficiency by 2013-2014. This goal requires states to create annual assessments that measure children's performance in reading and mathematics. NCLB requirements for accountability are summarized in Table 1 (Padilla, Skolnik, Lopez-Torkos, Woodworth, Lash, Shields, et al., 2006).

Table 1

*Summary of Key NCLB Accountability Requirements\**

Topic	NCLB Requirements
Single, statewide system	All students must be assessed by the same state assessment, and AYP definitions must apply to all schools and districts in the state, both Title I and non-Title I [Title I schools are those schools identified with a high percentage of students who receive reduced or free lunch and typically indicates schools with students living in lower income households]
Public reporting	State and district report cards are required to include information on state assessment results, schools and districts identified for improvement, and certain other information.
Performance measures used in AYP definitions	Annual state assessments must be administered to students in reading or language arts and mathematics. Assessments must be administered at least once in grades 3-5 and 6-9 until 2005-06, when all grades 3-8 must be assessed; assessments also must be administered at least once in grades 10-12. Assessment participation rates, graduation rates, and another academic indicator for elementary and middle schools must be included. States can include additional indicators.
Criteria for state definitions of AYP for schools	<p>The criteria must include absolute targets for measures of school performance in reading or English language arts and mathematics. Participation rate targets must be at least 95 percent.</p> <p>The criteria must provide for all students to reach proficiency within 12 years (by 2013-14) and set annual measurable objectives and intermediate goals. The baseline achievement must be calculated by following a specific formula.</p> <p>The criteria must include separate, absolute targets for key groups of students (all students, major racial and ethnic groups, economically disadvantaged students, students with disabilities, and LEP students).</p> <p>Districts may use additional criteria to add schools to, but not subtract them from, state lists of identified schools.</p>
AYP for districts	The formula for AYP must be the same for districts as for schools.
Identification of schools for improvement	Title I schools that do not make AYP for two consecutive years must be identified for improvement under Title I.

*Summary of Key NCLB Accountability Requirements\**

Topic	NCLB Requirements
Identification of schools for corrective action	Title I schools that do not meet AYP for four years (after at least two years in improvement status) must be identified for corrective action.
Identification of schools for restructuring	Title I schools that do not make AYP for five and six years (after at least three and four years in improvement status) must be identified for restructuring (planning for restructuring for one year, then restructuring the following year).
Identification of districts for improvement	Districts that do not make AYP for two consecutive years must be identified for improvement under Title I. Districts that do not make AYP for four years (after at least two years of improvement status) must be identified for corrective action under Title I.
Exiting improvement, corrective action, and restructuring status	A school or district may exit from improvement, corrective action, or restructuring status when it makes AYP for two consecutive years following its identification for improvement, corrective action, or restructuring.
District assistance for schools identified for improvement	Districts must provide technical assistance to identified schools to: <ul style="list-style-type: none"> <li>• Develop and implement their school improvement plans.</li> <li>• Analyze assessment data.</li> <li>• Identify and implement professional development, instructional strategies, and methods of instruction derived from relevant scientifically based research</li> <li>• Analyze and revise the school budget to more effectively allocate school resources to support activities most likely to increase student achievement.</li> </ul>
Consequences for schools identified for improvement	Schools must develop or revise a school improvement plan. Schools must spend not less than 10 percent of their Title I funds for professional development. Parents of students in identified schools must be offered the option to transfer their child to a non-identified school in the district, with transportation provided. Districts must offer students from low-income families in identified schools supplemental educational services from an approved provider (beginning in year two of improvement).
Consequences for schools identified for corrective action	Consequences from years one and two of improvement continue to apply. Districts must implement one of a series of corrective actions defined in the legislation.

*Summary of Key NCLB Accountability Requirements\**

Topic	NCLB Requirements
Consequences for schools identified for restructuring	Consequences from years one and two of improvement continue to apply. Districts must spend the first year planning to implement at least one of a series of school restructuring efforts. During the second year, districts must implement the schools' restructuring plans.
Consequences for districts identified for improvement	Districts must develop or revise a district improvement plan. Districts must spend not less than 10 percent of their Title I funds for professional development. States must provide technical assistance to identified districts.
Consequences for districts identified for corrective action	States must implement one of a series of corrective actions for identified districts.
State assistance for identified districts and schools	States are required to establish a statewide system of support—including school support teams, distinguished principals, and distinguished teachers—to assist schools and districts identified for improvement and corrective action, as well as other districts and schools receiving Title I funds.

*Note.* This table was taken from U.S. Department of Education tables, published in Padilla et al. (2006, pp. 6 -7).



### *NCLB and Utah's Monitoring of Academic Progress*

The overall goal of NCLB is to have every student proficient in math and language arts by the 2013-2014 school year. Expectations regarding academic progress vary across different states. Likewise, consequences for not meeting the expectations vary across states, districts, and schools. In order for the government to hold states and schools accountable however, a measurement to gauge progress must be in place. NCLB requires each state to create an assessment tool to monitor progress. Utah has designed a set of tests as the primary assessment tool in which all students will participate and to which proficiency will be determined. These tests are criterion-referenced tests.

*Utah's criterion-referenced tests (CRTs).* Criterion-referenced tests (CRTs) are different from norm-referenced tests. A student's score from a CRT does not rank that student in comparison with other students, but rather assesses whether a student learned the identified information that was taught. For example, to test the student's understanding, if taught simple addition (single digits) in class, a CRT would include questions such as "1+2=?" or "4+4=?" In general, the CRT reflects what is learned in the classroom. Utah's CRTs consist of English Language Arts (ELA-CRTs), Math CRTs, and Science CRTs. States have the responsibility of developing the core curriculum for schools. Interestingly, Utah implemented a set of CRTs before NCLB required them (Nelson & Lawrence, 1994).

*Utah's brief history of CRTs.* According to Nelson and Lawrence (1994), in 1984, Utah developed its core curriculum in an effort to standardize what was being taught in districts and schools. In addition, Utah implemented the State Graduation Requirements of 1984. Professional educators and the public began to question whether or not students were being taught according to the core curriculum. Thus in 1985 the Utah's Core Assessment Program was developed, and

in 1991 CRTs were developed based on the core curriculum. Schools were held accountable based on CRT results. Impressed with the new program, one author stated:

Utah's Core Assessment Program is probably the nation's most comprehensive effort in developing and implementing a wide range of criterion-referenced testing. One of the truly remarkable aspects of this enormous development effort is the strong collection of education organizations which has contributed to this test construction program. (Nelson & Lawrence, p. 1)

The test results were used not only to check students' understanding of the core content, but also to help in discovering curriculum strengths and weaknesses (Nelson & Lawrence, 1994). In 2000, the Utah Performance Assessment System for Students (U-PASS) legislation was enacted. "This law requires an annual report of assessments and behavior indicators and includes a state accountability plan" (Utah State Office of Education, 2003b, para. 1). At present, the CRTs assess English Language Arts (CRT-ELA), Mathematics (CRT-Math), and Science (CRT-SCI). U-PASS is Utah's school accountability system. In addition to the CRTs, U-PASS includes norm-referenced tests; National Assessment of Educational Progress tests; the Basic Skills Competency Test and Direct Writing Assessments that are given in sixth and ninth grades; and the Utah Alternative Assessment (Utah State Office of Education, 2003a).

*Development of Utah's CRTs.* The Assessment Development Coordinator at the Utah State Office of Education explained the process by which CRTs are created (D. Smith, personal communication, December 12, 2007). His information is included in the following three paragraphs. In order to create a CRT in a specific area and for a specific grade, the developers must understand the content that is being taught and the grade level. For Utah, the developers are experts on the core curriculum, which is developed by committees of teachers, content area

specialists, representatives of higher education, and public citizens. Utah chose to use a multiple question format to test student knowledge and learning of the curriculum. Teachers and experts, including psychometricians, were invited to develop test items using the state's core curriculum as the guide. They developed items that included distracters, stems, and a key. Next the developers evaluated the items in a three-day workshop. They completed a bias and sensitivity review, excluding questions that demonstrated bias or insensitivity. Once the items were developed, the pilot process began. Developers administered the items to a large group of students from varying backgrounds and demographics. An analysis was conducted, determining p-values and other classical statistics, as well as Item Response Theory (IRT) values, which put simply, are the mathematical functions that specify the probability of a discrete outcome. Items were retained or discarded based on an each item's statistics, such as whether or not one specific student group dominated in getting that item correct/incorrect or if the item catered more to one gender than another. Then a team of trained teachers, local content experts, and psychometricians decided which items were to be included in the test pool, taking into consideration different characteristics, such as level of difficulty.

As the process continued, the developers equated and scaled the tests by adjusting the scaled scores according to difficulty and student performance. For a simplistic example, if the average raw score of the pilot test for a specific year was 60 out of 70 and they decided to use this average as the proficiency level, then the raw score of 60 would be scaled and converted to 160. Interestingly, if the next year the average raw score was 55 out of 70, the scaled score of 160 would be given to a student who got a raw score of 55. This process of scaling makes the level of proficiency consistent across years despite the difficulty of the CRT from year to year.

The state strives to keep the scoring stable, only allowing the scale to move less than 3 raw score points in one year. In fact, it most commonly only moves 1 point or less each year.

Finally, a Quality Assurance/Quality Control team reviewed the items before submission to the State Editor and the test development coordinator. The test development coordinator then worked with the publishers to ultimately publish the tests.

*Levels of proficiency.* The test scores are scaled and based on a standardized process and are categorized in one of four levels of proficiency. Utah's Statistics Specialist in the Assessment Section (J. Pearson, personal communication, September 6, 2007) provided the following information regarding the four levels of proficiency.

Level 1 is *minimal* proficiency. A student scoring at this level is considered *not* proficient on measured standards and objectives of the Core Curriculum in this subject. The student's performance indicates minimal understanding and application of key curriculum concepts.

Level 2 is *partial* proficiency. A student scoring at this level is considered *not* proficient on measured standards and objectives of the Core Curriculum in this subject. The student's performance indicates partial understanding and application of key curriculum concepts.

Level 3 is *sufficient* proficiency. A student scoring at this level is considered proficient on measured standards and objectives of the Core Curriculum in this subject. The student's performance indicates sufficient understanding and application of key curriculum concepts.

Level 4 is *substantial* proficiency. A student scoring at this level is considered proficient on measured standards and objectives of the Core Curriculum in this subject. The student's performance indicates substantial understanding and application of key curriculum concepts.

*English Language Arts CRTs.* The English Language Arts CRTs (ELA-CRTs) are used by the state of Utah to test learning in the areas of reading, writing, and listening. The Utah State Office of Education website describes the ELA-CRTs in the following manner:

These tests are an integral component of UPASS (Utah Performance Assessment System for Students) and the federal No Child Left Behind (ESEA) legislation. Based on the belief that reading is critical to all areas of student success, this series of tests incorporates reading passages from a variety of content areas. Students who have background knowledge from grade level science and social studies concepts, as outlined in the Core Curriculum, will have a greater understanding of the vocabulary and reading material included in these assessments. The test blueprint outlines the standards and objectives of the Core Curriculum that are assessed in the English Language Arts Criterion Referenced Tests (CRTs) and the number of items, or questions, assigned to each standard and objective. Not all core concepts can be assessed on a multiple choice test; therefore, the blueprint does not display the entire curriculum for a content area. However, it is important that ALL core concepts be taught, not only those addressed in this assessment. (Utah State Office of Education, 2003c, p. 1)

*Reliability and validity of Utah's ELA-CRTs.* The ELA-CRTs were developed by a team of educators and administrators who utilized the Standards for Educational and Psychological Testing published by the American Educational Research Association (AERA), the American Psychological Association (APA), and the National Council on Measurement in Education (NCME) (D. Smith, personal communication, December 12, 2007). The tests have undergone changes over the years, with the content being updated based upon pool items and pilot tests. In 2000, psychometric data were examined with the ELA-CRTs using a variety of procedures.

First data were correlated with scaled scores on the state norm-referenced test (Stanford Achievement Test-SAT 9). Although data were not available for all grades, the patterns of correlations were remarkably consistent, with coefficients ranging from .74 to .83. These correlations were of such high magnitude that the convergent validity of the ELA-CRTs was established. To examine possible influence of external variables, correlations with the ELA-CRTs were run with several demographic and educational variables, including gender, race, socioeconomic status, migration status, educational accommodation status, and language status.

The results revealed small to moderate correlations which are typically in the range of .10 to .20, such that the ELA-CRTs were deemed sufficiently robust across a variety of student characteristics. Evidence for internal consistency was also generated as an indicator of test reliability. Across all grades and across all subgroups (desegregated by race, socioeconomic status, gender, migration status, educational accommodation status, and language status), Chronbach alpha coefficients ranged from .79 to .95, with the omnibus average being .92. These data clearly established the internal consistency reliability of the instrument.

### *Utah Testing Summary*

In summary, the state of Utah, like all other states, is mandated by the federal government, as outlined in NCLB 2001, to prove sufficient academic performance and/or adequate improvement in each school. Utah has chosen and developed valid and reliable CRTs to measure such performance. Because the purpose of these efforts is to provide the general population with education that enables them to be proficient in the math, reading and writing, any information that can provide guidance to enhance and make better the current system of education is valuable. Therefore analyzing the results of the ELA-CRTs may give important

insight to various aspects of children's ability to read, including information regarding appropriate ages at which to intervene.

### *Research Questions*

The primary research question posed by this paper is "what is the magnitude of the association between children's reading ability at third grade, as evaluated by a measure of language arts achievement, with their same ability in the sixth grade, after accounting for known moderating variables of gender, race, special education identification, English language proficiency, and socioeconomic status?" A secondary question is "to what degree do the moderating variables impact that association?"

## METHODS

### *Participants*

The present study provides demographic and student performance data collected from the records of students enrolled in a Utah urban school district. The participants were students from which data were available from both their third and sixth grade school years. The data were collected from the 1997-1998 through the 2004-2005 school years, with 98% of the sample's data coming from the 2000-2001 and 2003-2004 school years. The number of total participants was 789. Due to missing data, however, the final analysis was conducted with 775 participants. The student demographics were drawn from their third grade school year. The participants in this study included 413 males and 376 females. For this and further demographics of interest in this study refer to Table 2. As a comparison to students nation-wide, a selection of data drawn from the U.S. Department of Education, National Center for Education Statistics (2006, 2007) are also listed in Table 2 to lend support for this study's ability to generalize its findings. As shown in Table 2, the distribution of race, language, and educational identification in this sample is similar to that of the national distribution.

Concerning mobility, while 73.6% of the students stayed in their initial school for at least four years, the rest moved to different schools within the district. Concerning days absent, the median for the participants was 6.7 days in one school year with a range from 0 to 49 days.

### *Procedures*

These data were collected by the school district, and then shared with the present author in return for statistical analysis and meaningful interpretation. The school district remains anonymous.



Table 2

*Student Demographics Based on Third Grade Records*

Variable	District Number	District Percentage	National Percentage
Gender			
Female	376	47.7	
Male	413	52.3	
Total	789	100.0	
Race			
Asian & Pacific Islander	83	10.5	4.6
African American	23	2.9	17.2
American Indian	9	1.1	1.2
Caucasian	492	62.4	57.1
Hispanic	182	23.1	19.8
Total	789	100.0	
Language			
English	589	74.7	89
Spanish	130	16.5	11 <sup>a</sup>
Tongan	34	4.3	
Other	36	4.5	
Total	789	100.0	
Educational Identification			
General Education	711	90.1	86.3
Special Education	78	9.9	13.7
Total	789	100.0	
Free/Reduced Lunch			
Paid Lunch	396	50.2	28.8
Reduced/Temporary Reduced	95	12.1	
Free/Temporary Free	241	30.8	
Certified Free	50	6.4	
Total	782	100.0	

*Note.* National student information is available on the U.S. Dept of Ed, NCES (2006, 2007).

<sup>a</sup> 11% of students nationwide are considered English language learners.

The ELA-CRTs test materials are distributed to the district testing directors approximately 10 days before the district's official testing period. The testing period is designated over a two-week period. Utah permits the districts to set the testing dates, but mandates that this testing period occur within the four weeks prior to the last Monday of the school year. This allows the testing to occur at the same point in the instructional year, regardless of the district in which students are enrolled (Kowalski, 2005). The district's testing directors then deliver the tests to the individual schools' testing coordinator, a position assigned by the principal. The testing coordinators are trained by the district's testing directors in the distribution, administration, and returning of testing materials (Kowalski, 2005). Testing materials are under strict supervision and are locked in a secure location until all testing is completed. The materials are then returned to the state.

Teachers select the order of testing (math, reading, and science). The teacher hands out the answer sheet, a pencil, and the test booklet to each student. The teacher then reads the instructions aloud. The instructions list the time period for each test section, usually between 45 and 60 minutes (M. Thomas, personal communication, February 26, 2008).

Each test consists of several sections. The language arts test contains a section on listening skills. The students listen to the teacher read a story. The students can take notes while the story is being read. After the story, the teacher reads four or five questions from the test book, waiting after each question until students write their response (M. Thomas, personal communication, February 26, 2008).

Students who are absent are given additional opportunities to make up the test. Students are pulled out of the regular routine and proctors administer the test in another room in the

building (M. Thomas, personal communication, February 26, 2008). When completed, the coordinators return the tests to the district office.

### *Statistical Analysis*

The purpose of the current study is to extend research for formative and predictive value of third grade reading ability on sixth grade reading ability. Descriptive statistics provide the framework for the data used in the statistical analysis. A correlation matrix is used to determine the associations between the independent variables, such as student demographics, and the dependent variable, which is sixth grade ELA-CRT performance. A multiple linear regression was used to evaluate the predictive statistics of the third grade ELA-CRT scores with sixth grade ELA-CRT scores. Additionally, other independent variables, such as gender, race, special education identification, English language proficiency, and socioeconomic status were analyzed for impact on student performance on the sixth grade ELA-CRT. The first model for the regression analysis included the demographic student data in terms of their predictive value and impact on sixth grade ELA-CRT performance. The second model for the regression analysis includes third grade ELA-CRT performance in conjunction with demographic student data. Subsequently, the results and implications of these analyses are discussed.

## RESULTS

It was hypothesized that the results of this data analysis would suggest that third grade reading scores are strongly predictive of sixth grade reading scores. In addition, it was hypothesized that some of the known moderating variables would also carry a significant level of correlation with sixth grade reading scores, namely, socioeconomic status, ELL identification, and special education identification. Furthermore, it was anticipated that the magnitude of the association between third and sixth grade reading scores would be only minimally affected by the association between the moderating variables and sixth grade reading scores.

The first part of this section provides the results of the statistical analysis in reference to the primary question posed in this study. The last part of this section answers the secondary research question presented in this study by using the analysis conducted for the first question.

### *Results Pertaining to the Primary Research Question*

Three data analyses were conducted to answer the primary question posed in this study: “What is the magnitude of the association between children's reading ability at third grade, as evaluated by a measure of language arts achievement, with their same ability in the sixth grade, after accounting for known moderating variables of gender, race, special education identification, English language proficiency, and socioeconomic status?” First, descriptive statistics provide a framework for the data presented. Second, a correlation matrix was produced to derive information concerning the predictive value of the demographic variables on the ELA test performance at zero order; that is, the correlation between one variable and another variable, independent of the other variables. Last a multiple linear regression was conducted to identify the magnitude of the association between all the variables and sixth grade reading scores, simultaneously controlling for those variables.

*Descriptive statistics.* Table 3 provides the analysis of the ELA third and sixth grade percentage scores, special/general education identification, minority/Caucasian, gender, free/reduced lunch, and English language learner (ELL). Of specific interest are the percentage scores in third and sixth grade. The average score for the ELA sixth grade percentage was 79.74 with a standard deviation of 14.248 and a range from 0 to 100. In sixth grade, 83% of the students' scores were considered proficient or "passing." The average score for the ELA third grade percentage was 80.95 with a standard deviation of 14.729 and a range from 5 to 100. In third grade 81% of the students' percentage scores indicated a proficient level.

These descriptive statistics specify that there was a slight negative skew with the percentage scores in both third and sixth grade, indicating that more students scored higher than the mean. Concerning kurtosis it was found that there is a Leptokurtic kurtosis for both grades, indicating that the majority of scores are more acute around the mean. This suggests that the magnitude of the correlations is minimized due to a restriction in the range. Therefore, the following correlations likely underestimate the actual association by a small margin.

Table 3

*Descriptive Statistics*

	Range		<i>M</i>	<i>SD</i>
ELA Sixth Grade Percentage	0	100	79.74	14.248
ELA Third Grade Percentage	5	100	80.95	14.729

*Correlation Matrix.* A bivariate Pearson correlation was conducted using a one-tailed test of significance (Table 4). The results of this analysis showed a significant correlation between all the variables, except gender, and ELA test percentage scores in both third and sixth grade. These

Table 4

*Correlation Matrix of Demographic Variables and ELA Test Percentages in Sixth and Third Grade*

	ELA 6 Test Percent	ELA 3 Test Percent	Special Ed	ELL	Lunch	Gender	Race
ELA 6 Test Percent	1	.722	-.344	-.391	-.459	-.037	-.362
ELA 3 Test Percent	.722	1	-.090	-.323	-.393	-.057	-.354

correlations, except gender, were significant at the 0.01 level. When looking at the correlation coefficients with the data from sixth grade ELA percentage scores, it was found that third grade percentage scores held the strongest correlation ( $r = .722$ ) of all the variables in this matrix. This correlation was positive, indicating that the higher percentage earned in third grade, correlated with a higher percentage in sixth grade.

The next strongest correlation was found in lunch indicator ( $r = -.459$ ). When coding the data for lunch indicator the ordinal numeric value of one was given to those individuals that paid for their own lunches, indicating, for the most part, a higher socioeconomic status; the ordinal numeric value of two was given to those individuals who qualified for reduced/temporary reduced lunch price, indicating a lower socioeconomic status; the ordinal numeric value of three was given to those individuals who qualified for free/temporary free lunch, indicating yet a lower socioeconomic status; and the ordinal numeric value of four was given to those individuals who qualified for the whole year certified free lunch, indicating the lowest socioeconomic status. This correlation is negative, indicating that the lower lunch indicator number, or the higher socioeconomic status, the higher the test percentage.

The next strongest correlation was found between ELL identification and sixth grade percentage scores ( $r = -.391$ ). When coding the data for ELL, the ordinal numeric value of zero was given to those individuals whose primary language is English and the ordinal numeric value of one was given to those individuals whose primary language was something other than English. This correlation is negative, indicating that those individuals whose primary language was English scored higher than those individuals whose primary language was something other than English.

The next strongest correlation was found between minority status (race) and sixth grade percentage scores ( $r = -.362$ ). When coding the data for race, the ordinal numeric value of zero was given to those individuals who were recorded as being Caucasian and the ordinal numeric value of one was given to those individuals who were recorded as a race other than Caucasian. This correlation is negative, implying that those individuals recorded as Caucasian scored higher than those coded with a higher number indicating minority status.

The next strongest correlation was found between special education identification and sixth grade percentage scores ( $r = -.344$ ). The ordinal numeric value of zero was given to those individuals who were placed in general education and the ordinal numeric value of one was given to those individuals who were served in special education. This correlation is negative, implying that those individuals placed in general education scored higher than those in special education.

Last, the weakest correlation at zero order was found between sixth grade ELA percentage and gender ( $r = -.037$ ). This correlation was not significant at either the .01 or the .05 level. This indicates that gender has little correlation with sixth grade ELA percentage scores.

*Multiple linear regression.* Table 5 illustrates that in the analysis of sixth grade ELA performance, the special education ( $\beta = -.112, p = .001$ ), ELL ( $\beta = -.151, p = .001$ ), and free/reduced lunch ( $\beta = -.263, p = .000$ ) variables seen in model one were significantly powerful in the presence of each other, and in the absence of third grade ELA performance. The zero-order correlation of race was found significant, but when analyzed in the presence of the others, race became insignificant ( $\beta = -.062, p = .221$ ). Gender remained insignificant ( $\beta = -.022, p = .510$ ).

Model 2 shows that in the analysis of sixth grade ELA performance, third grade ELA performance was an extremely powerful predictor ( $\beta = .669, p = .000$ ). The addition of third grade ELA performance resulted in a significant increment in  $R^2$  with an increase from 17 to 53 percent of the variance in sixth grade ELA performance explained. Also, the addition of third grade ELA performance suppressed the relevant significance of special education identification ( $\beta = -.038, p = .126$ ) to be statistically not significant, and decreased the significance of ELL from  $\beta = -.151$  to  $\beta = -.084$ . Gender and race remained not statistically significant.

In reference to the primary research question, and as demonstrated by these results, there was a strong correlational association between children's reading ability at third grade with their reading ability in the sixth grade. Furthermore, this correlation was still strong ( $\beta = .669$ ) even after accounting for known moderating variables of gender, race, English language proficiency, special education identification, and socioeconomic status.

#### *Results Pertaining to the Secondary Research Question*

The secondary question of this study is “to what degree do the moderating variables impact that association [referring to the association between third and sixth grade reading performance]?” To answer this question, the correlation at zero order between third and sixth grade reading scores ( $r = .722$ ), as indicated in the correlation matrix, is compared to the results



Table 5

*Regression Containing Two Models, One Containing ELA-CRT Third Grade Scores*

Model 1		Adjusted $R^2 = .173$ , $p < .0001$		
	$\beta$	T	$p$	
Special Ed	-.112	-3.383	.001	
ELL	-.151	-3.224	.001	
Lunch	-.263	-6.290	.000	
Gender	-.022	-.659	.510	
Race	-.062	-1.225	.221	
Model 2		Adjusted $R^2 = .534$ , $p < .0001$		
	$\beta$	T	$P$	
Special Ed	-.038	-1.531	.126	
ELL	-.084	-2.385	.017	
Lunch	-.097	-3.011	.003	
Gender	.022	.912	.362	
Race	.040	1.051	.294	
ELA 3 Test Percentage	.669	24.446	.000	

derived from the regression model. This model depicts the correlation between third and sixth grade scores ( $\beta = .669$ ) after controlling for the moderating variables. Thus, the minimal drop in correlation between the two results indicates, as hypothesized, that the moderating variables impact the association between third and sixth grade reading scores to a small, insignificant degree.

## DISCUSSION

### *Findings Related to Research Questions*

*Primary Research Question.* This study analyzed data from an urban city school district in Utah and found that when correlated with sixth grade reading scores, third grade reading scores held a strong predictive value. There were also some demographic variables that produced statistically significant results when correlated with sixth grade reading scores. Even when analyzed in the presence of the highly correlated third grade reading scores, it was found that socioeconomic status, as indicated by free/reduced lunch, and English language proficiency, as indicated by ELL identification, were two variables that correlated significantly with sixth grade reading performance.

These findings support the research that suggests that children living in lower socioeconomic status homes are at a disadvantage when it comes to reading performance (Karther, 1996; McDowell, Lonigan, & Goldstein, 2007; Molfese, Modglin, & Molfese, 2003; Pungello, Kupersmidt, Burchinal, & Patterson 1996). Such findings may be the result of low socioeconomic status families not having access to resources, or they may be addressed by applying Maslow's hierarchy of needs theory suggesting that certain needs must be met before other actions are taken. Different research suggests different reasons for these results, but either way, socioeconomic status seems to play its role in children's ability to read.

The findings of this study also support research that implies that English language acquisition has an effect on reading ability (Albus, Klein, Liu, & Thurlow, 2004; Gonzalez-Jensen & Beckett, 2002; Roberts & Corbett, 1997). This phenomenon may be explained by the simple notion that if a student is to be tested in English, the more they understand English the better they will perform on that test.

The focus, however, of this study is the finding that third grade reading scores were highly predictive of sixth grade reading scores within this sample population. These findings are important because they reiterate the stability of reading ability after the third grade. Given the assumption is that these reading scores reflect ability, if a child from this sample population can read at a proficient level in third grade, it is very likely that that child will continue to be a proficient reader at sixth grade. The same is true for those who were not proficient at third grade; it is very likely that they will not be proficient in sixth grade.

These findings coincide with the research that proclaims the importance of early reading intervention programs, implying that there is an expectation and a pressure to have children reading by a certain grade or else the likelihood of them reading later is decreased (Burns, Griffin, & Snow, 1999; Jeffrey & Spang, 2001; Saratore & Walsh, 1996). Concerning this paper, the explanation for such findings can only be speculated. However, the theory that after third grade the curriculum is not designed to teach reading skills lends support and clarification to such findings. In fact, this theory appears to be justified given the abundant research that supports it. For example, there is plenty of research that identifies certain programs, such as special education services in higher grades, which have been shown to increase students' reading abilities. (Cook & Schirmer, 2003; Fuchs & Fuchs, 1995; Houck, 1987; Marston, 1996). In addition, the research that supports the efficacy of adult learning lends strength to the theory that learning and ability can continue to develop (Scanlon, Mellard, Garrison, Lancaster, Mellard, & Rausch, 1998).

*Secondary Research Question.* The results indicated that the moderating variables had little impact on the association between third and sixth grade reading scores. The purpose of posing such a question allows this study to provide additional information pertaining to the

strength of the afore-mentioned association. Again, the findings of which suggested that this relationship has a strong correlation.

### *Implications*

This study indicates that some statistically significant variables carry a predictive value on reading performance at sixth grade, namely third grade reading performance, socioeconomic status, and English as a second language. Some practical implications involve the support for early intervention programs including aspects that target ELL students and students of a lower socioeconomic status. In a review of a number of studies, early intervention has been shown to be effective with reading skills improvement (Beach, 1995; Jeffreys & Spang, 2001; Toliver, 1994; Wilson & Protheroe, 2002). In most cases, early identification was recognized as a key component in finding success in reading. Because the results of the present study indicated that ELL students and students that receive free or reduced lunch scored lower on sixth grade reading scores, these variables may represent early identification/at-risk characteristics.

Another practical implication may include some aspect of addressing those students who are not on grade level by and after third grade. That is, the findings of this study suggest that what ever was being done to help these students in reading between the third and sixth grade was not widely effective in closing the performance gap between those grades. This implies the need for further research and implementation of interventions aimed at students in higher grades. One report analyzed 25 different studies that focused on interventions beyond third grade and only found one worthy to meet the evidence standards set by the publishers (What Works Clearinghouse Intervention Report, 2007).

### *Limitations*

The limitations of this study are bounded by the fact that the exact data collection method is unknown. The data were extant and given to the present author for the purpose of analysis. We are unsure of the accuracy of the test administration and the accuracy of reporting data. Thus, there may be a systematic bias due to erroneous reporting. Each student was given an identification number, however, it is speculated that some identification numbers of some students changed for unknown reasons, causing us to not use a large number of student data.

Concerning internal validity, it must be noted that the findings in this study are only correlations, not causations. In addition to issues related to internal validity, these data do not include the history of the students from third grade to sixth grade (i.e. whether they moved out of the district after third grade, then came back by sixth grade). That is, this sample only represented those students that were enrolled in the district both their third and sixth grade school years.

### *Suggestions for Further Research*

The suggestions for further research regarding the topics presented in this study may serve to give support to effective academic interventions. Sparked by the limitations section, one suggestion for further research involves analyzing testing data from which the method of data collection is known.

Additionally, the findings of this study brought to light, with robust statistical significance, that whatever was being done to help those students in reading between the third and sixth grade was not widely effective in closing the performance gap between those grades. Perhaps further qualitative research is needed to better understand the salutogenic characteristics of those few students who were able to achieve higher scores from third grade to sixth grade to

see if there are resiliency factors that played a role in this growth. Were they enrolled in after school programs? Did their parents read to them at home? Did they have parental supervision when they arrived home after school? Did they have role models or other support systems in place? Answers to questions like these may have a substantial positive impact on those students who are at risk for low reading performance, and because reading has been shown to be highly correlated with success in other academic areas (Caputo, 2003; Ross et al., 1995; Snow et al., 2007; Spiller & Hall, 1978; Trimble, 1996), these answers may serve to help education as a whole.

### *Conclusion*

As mentioned in the introduction, as the nation came to understand that it was not improving in the education realm, attention was turned to reform. However, despite these reforms, still little progress has been made. Some historians claim that this burst of ineffective concentration was due, in part, to the reformers' rush to fix things, instead of researching and studying the outcomes of possible interventions (Yecke, 1996). As part of the research and study mentality, this study provides straightforward information regarding variables that can have an impact on reading performance in sixth grade. The implications of such findings suggest that support for early interventions need to be continued. In addition, more research is suggested in the area of interventions that may be considered effective in closing performance gaps for those students that are not on grade level in reading by, and after, third grade. In this manner, while the findings of this study may be preliminary, this nation can find new ways, or improve old ways, of enhancing its children's education and improving their academic performance.

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