THE IMPACT OF STUDENT MOBILITY, GENDER, AND TITLE I STATUS ON MEASURES OF SCHOOL ACCOUNTABILITY

A Dissertation
by
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ABSTRACT

THE IMPACT OF STUDENT MOBILITY, GENDER, AND TITLE I STATUS ON MEASURES OF SCHOOL ACCOUNTABILITY

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The purpose of this study was to explore how student mobility affects school achievement in math and reading using archived testing data provided by Catawba County Schools, North Carolina. This study also explored relationships between student mobility, Title I school status, and gender when measuring academic outcomes. Through a series of analyses of variance calculations, math achievement scores were assessed for a sample of non-mobile students (n = 499), mobile students (n = 670), non-Title I students (n = 548), Title I students (n = 621), male students (n = 585), and female students (n = 584). Reading achievement scores were assessed using a series of analyses of variance calculations for a sample of non-mobile students (n = 494), mobile students (n = 651), non-Title I students (n = 539), Title I students (n = 606), male students (n = 569), and female students (n = 576).

When measuring school achievement, non-mobile students performed higher academically than their mobile peers in math and reading. Non-Title I students also showed higher achievement in math and reading than Title I students while females

outperformed males in reading. Differences in math scores were not significant. No significant interactions in math and reading achievement were found when measuring possible relationships between student mobility, Title I school status, and gender. Although the results did not show any relationships between student mobility, Title I school status, gender, and school achievement, the finding that student mobility has a significant impact on academic outcomes supports the inclusion of factoring student mobility into state and federal accountability models. It is recommended that this study be replicated in other school districts.

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CHAPTER I

INTRODUCTION

The American education system has undergone radical changes over the last century. Today, with ever increasing societal pressures and demands, the schoolhouse has evolved into a platform for educational and social transformation (Emery, 2007). The adoption of statewide accountability systems for the public school system "has been one of the most striking reforms in American education policy" (Hanushek & Raymond, 2004, p. 406). In 1996, the North Carolina General Assembly (NCGA) developed and implemented its own accountability program (ABCs) charging schools to assess student achievement, evaluate curricular programs, and analyze teacher effectiveness (NCDPI, 2007). Since the inception of the ABCs, schools have had to answer to the public about their annual performance. Every year when the results are released from the North Carolina Department of Public Instruction (NCDPI), media outlets publish school attainment goals. Schools are ranked in descending order according to their overall school proficiency (NCDPI, 2007). Schools listed at the bottom of the ranking are seen as poor performing without any additional knowledge of the school and its environment (Sanderson, 2004).

Problem Statement

According to Sanderson (2004), *student mobility* (classification of mobile and non-mobile students) is essential in understanding a school's culture and its achievement scores. Rhodes (2005) addresses the issue of student mobility by stating that "no study has defined the complex links among school mobility . . . and the specific state . . . requirements to which all U.S. public schools are now accountable" (p. 1). The purpose of this study was to explore how student mobility affects school achievement in math and reading. In addition to student mobility, other factors such as Title I school classification and gender were studied to investigate relationships that may exist with school achievement. For the purpose of this study student mobility was used to describe specific patterns of elementary school enrollment. Therefore, students who attended more than one school during their elementary school continuum (kindergarten through sixth grade) were considered mobile students. Students who had been continuously enrolled at one school during the entire seven years were identified as non-mobile. By classifying students into these distinct categories, data were available to determine the impact that a student's status has on school achievement. The following sections are designed to provide a contextual framework that will (a) explore the critical issues of student mobility, (b) explore the effect of student mobility on student achievement, and (c) outline the impact of student mobility on school achievement in standardized testing.

Student Mobility

Various factors motivate families to move and these factors can have positive and negative impacts on family members and their new environments. Therefore, it is helpful to provide data from the research that not only identify the causes of movement but also

help to explain the significance of those choices. Burkham, Lee and Dwyer (2009) note that 45% of kindergarteners across the United States changed schools at least one time in their first four years. Seventeen percent of third graders have attended at least three different schools. Thirty-three percent of fourth through seventh grade students changed schools at least once during that grade span (Black, 2006; Hanushek, Kain, & Rivkin, 2004). Between 60% to 70% of public school students have made at least one non-promotional move during their public school careers (Rumberger, Larson, Ream, & Palardy, 1999; Mao, Whitsett, & Mellor 1997). Table 1.1 shows migration data of families from the U.S. Census Bureau (2000). Trends of movement range from 44% to 47% when comparing national, regional, state, and county data. Over 50% of North Carolina residents reported moving within the same geographic area. These trends of mobility establish the reality of family movement across the nation and provide the need to explore reasons behind choices of those movements (Alexander, Entwisle, & Dauber, 2001).

Table 1.1

U.S. Census Data (2000)

Geographic Area	Population 5 Years or Older	Non-movers	Total Movers	Movers In Same Geographic Area
United States	262,375,152	142,027,478	120,347,674	N/A
Southeastern Region	93,431,879	49,013,517	44,418,362	36,760,630
North Carolina	7,513,165	3,980,197	3,532,968	2,417,295
Catawba County	132,318	74,321	57,997	29,774

(U.S. Census Bureau, 2000)

Note. Statistics from 2000 were used due to the delay of reporting from the 2010 Census.

Research shows that a significant number of American families are transient, especially those families with younger children. This type of movement needs to be further understood when trying to determine effects that student mobility may have on school achievement (Burkham, Lee, & Dwyer, 2009; Black, 2006; Mao, Whitsett, & Mellor, 1997; Mehana & Reynolds, 1995). According to current research, the following major themes provide possible explanations for student mobility: (a) family disruptions such as job loss, death, divorce, and money issues; (b) opportunity to attend a school that has stronger academic or athletic programs; and (c) movement to get away from a bad school situation (Xu, Hannaway, & D'Souza, 2009; Schwartz, Stiefel, & Chalico, 2007; Black, 2006). Although the timing of family disruptions are too complex to predict

(Ligon & Paredes, 1992), the other reasons – strategic and reactionary moves – are deliberate and account for approximately 40% of student transfers (Black, 2006).

Student Mobility and School Achievement

Research for the past 40 years suggests that student mobility is an issue in relation to how schools function. Ingersoll, Scamman, and Eckerling (1989) argue that "if evaluation is to be based on net achievement of students within a given school building, buildings with disproportionate numbers of itinerant students will be unfairly jeopardized" (p. 145). Ligon and Paredes (1992) note the importance of student mobility on school accountability by stating that "school districts are experiencing increasing problems with mobile or transient student populations. These students are exposed to less consistent instruction and are subject to other problems associated with moving to a new school environment" (p. 1). Therefore, student mobility may play an integral part in interpreting and understanding school achievement scores (Sanderson, 2004; Ligon & Paredes, 1992).

Student mobility can have positive or negative effects on achievement scores. Schools that have a low attrition rate (small mobile population) tend to score higher on assessments (Xu, Hannaway, & D'Souza, 2009). Some of the reasons for increased scores can be traced back to the very reasons for student transience. Although movement may be small, causes for movement such as family disruptions or the desire for a better education can have a positive impact on mobile students therefore increasing the chances for students to perform well in school. Students who experience longer exposure to a curricular program or method of instruction may have an increased chance of mastering grade level skills (Xu, Hannaway, & D'Souza, 2009; Schwartz, Stiefel, & Chalico, 2007;

Black, 2006). Students enrolled for at least three consecutive years score higher in reading and math when compared to students who have been enrolled for less than three years (Xu, Hannaway, & D'Souza, 2009; Evans, 1996).

Some documented negative effects that come from student mobility are due to the frequency of family movement. Students with multiple moves show a decline in achievement scores. Mobile students with at least two moves before third grade consistently score lower in reading and math. In a study conducted on eighth graders from New York City, results showed that student mobility had a negative impact on test scores and that impact was consistent across schools in New York City (Schwartz, Stiefel, & Chalico, 2007). Other studies concur with lowered achievement in reading and math for students with multiple moves (Reynolds, Chen, & Herbers, 2009; Dunn, Kadane, & Garrow, 2003; Mao, Whitsett, & Mellor, 1997, Kealey, 1982).

Student Mobility, Gender, and Socioeconomic Status

Some studies have indicated that student mobility is significant only when linked to gender and Title I school status (Smrekar & Owens, 2003; Wright, 1999; Rumberger & Larson, 1998). Other research suggests that no significant correlation exists between gender and Title I status when analyzing achievement scores (Strand & Demie, 2007; Alvarez, 2006). Therefore, it is necessary to explore the potential impact of these variables on achievement data. Determining whether student mobility, Title I school status, and gender variables have an effect on school achievement tests enables the researcher to address the impact of possible interactions with school achievement. The literature supports the need to examine student mobility more closely in determining whether or not schools are successful.

Students classified as receiving Free or Reduced Lunch (FRL) are more likely to experience attrition with an annual average rate of 26 percent (Xu, Hannaway and D'Souza, 2009). Free or Reduced Lunch students move more often than their peers which may indicate a possible correlation between FRL and increased mobility. A large percentage of FRL students come from families that rent homes for an average of two years, therefore causing shifts in residency (Burkham, Lee, and Dwyer, 2009; Pane, McCaffrey, Kalra, & Zhou, 2008; Kariuki & Nash, 1999). Students who are identified as FRL also tend to demonstrate lower levels of academic performance. In schools labeled as Title I (FRL percentage above 50 percent), academic proficiency is more challenging due to FRL students' frequent moves. Students attending Title I schools showed a deficiency of 28 scale score points in reading and 22 scale score points in math when compared to non-Title I schools (Hartman, 2006; Weckstein, 2003; Jennings, Kovalski, & Behrens, 2000; Mao, Whitsett & Mellor,1997; Alexander, Entwisle & Dauber, 2001).

Studies investigating the effects of gender and student mobility on achievement are inconclusive. The effect of student mobility on achievement in math tends to be similar for males and females but not on reading scores (Burkham, Lee & Dwyer, 2009). This point is further supported by National Assessment of Education Progress (NAEP) data from the 2009-2010 school-year. According to NAEP data from the National Center for Education Statistics, girls and boys received identical mean scale scores in math. Although both genders are similar in math results, girls outperformed boys by nine scale score points in reading (U.S. Department of Education, 2010a).

Research Questions

Due to the possible impact of student mobility on school achievement, the following research questions were addressed in this study.

1. What is the effect of student mobility on school performance scores in sixth grade math?
2. What is the effect of student mobility on school performance scores in sixth grade reading?
3. What is the relationship between student mobility and Title I school status when measuring school performance levels in sixth grade math and reading?
4. What is the relationship between student mobility and gender when measuring school performance levels in sixth grade math and reading?
5. What is the relationship among student mobility, Title I school status, and student gender when measuring school academic achievement in sixth grade reading and math?

Through a series of analyses of variance calculations, the researcher used archived testing data provided by Catawba County Schools in North Carolina to answer the research questions. The archived testing data represent math and reading scores for sixth grade students from 15 schools. The results from the data analyses helped to determine if student mobility has an impact on school achievement in math and reading. Furthermore, additional data analysis provided insight into how student mobility, Title I school status, and gender affect academic outcomes.

Definition of Terms

Clarification of the following terms is essential to this study.

Student Mobility – Student mobility helps to identify specific patterns of enrollment in elementary school settings. Student mobility consists of two categories: (1) mobile students – having attended more than one elementary school and (2) non-mobile students – having attended only one elementary school. For the purposes of this study, student mobility is a confounding factor that is neglected by current state and federal accountability models.

North Carolina Accountability Model (ABCs) – In 1996, under the direction of the Governor and the General Assembly, the North Carolina Accountability Program was implemented in all elementary and middle schools across the state. The rationale for the ABCs program was to hold schools accountable for student achievement; teach the basics (North Carolina Standard Course of Study); and allow local boards of education control over classroom instruction (NCDPI, 2007). The ABCs accountability model tracks achievement for grades three through eight by administering EOG's in reading and math. Schools are judged by two methods – overall proficiency scores and individual student growth – which in turn holds schools responsible for looking at the school as a whole and individually. Schools that show growth and meet certain proficiency levels are recognized under several different achievement categories such as Progress, Distinction, Excellence, and Honor School of Excellence. Schools that do not meet growth as expected and have low proficiency scores are labeled as Priority Schools, and state assistance is given to those schools during the following school-year.

Free or Reduced Lunch (FRL) – Free or reduced lunch is the classification of students who qualify for federally funded lunch discounts in public schools. Students who qualify (family income below poverty level) either receive free lunch and breakfast or a reduced price on their meals. The percentage of students that are FRL determines school eligibility for federal Title I monies.

Title I Schools – Title I schools receive additional federal monies based on the percentage of students who are receiving either free or reduced lunches. Title I schools are also required to make Adequate Yearly Progress (AYP) as mandated by No Child Left Behind (NCLB).

Adequate Yearly Progress (AYP) – Adequate Yearly Progress is part of the No Child Left Behind (2002) legislation requiring schools to meet annual measurable objectives. By 2014, all students are expected to reach a level of proficiency of 100% in math and reading.

No Child Left Behind (NCLB) – No Child Left Behind (2002) is the current reauthorization of the Elementary and Secondary Education Act (1965). The NCLB Act is currently being considered for revision which may alter how schools are held accountable in future settings.

Organization of the Study

Chapter I presents an overview of the issues presented by student mobility and its possible impact on school achievement. The study's purpose is framed around effects of student mobility on school achievement scores and possible correlations to Title I status and gender. Other sections in this chapter focus on the rationale of the study, research questions, and the definitions of terms. Chapter II provides a review of the literature

related to the historical impact of standardized testing; the framework of the North Carolina ABCs accountability program; student mobility and its relationship to school achievement; and theoretical frameworks of accountability. Chapter III describes the methodology used in this study. Chapter IV presents findings from the archived testing data. Chapter V consists of the review of findings from the study and concluding responses to the study's research questions along with recommendations for future studies on the topic of student mobility and achievement. This chapter also addresses limitations and possible implications of this study.

Rationale of the Study

Currently high stakes testing and accountability are at the forefront of educational transformation. State and federal leaders are using assessment data to determine school effectiveness. The current trends in educational accountability coming from state and federal policies do not include student mobility when analyzing school success. Not factoring in student mobility may cause false interpretations of data about school success, which is then used to make decisions about school programs. Previous research shows that student mobility tends to have a negative effect on achievement (Finch, Lapsley, & Baker-Boudissa, 2009; Alvarez, 2006; Sanderson, 2004; Mao, Whitsett & Mellor, 1997; Kerbow, 1996).

This study builds upon Sanderson's (2004) research that indicated stable (non-mobile) students having higher achievement scores than their mobile peers. It also expands the study by investigating possible interactions that may exist between student mobility, school Title I status, and gender when measuring school achievement. Teachers could benefit from the outcomes of this study by understanding the need to develop plans

to handle mobile populations while maintaining a balance in the classroom. Public schools (Title I and non-Title I) could benefit from the data that suggest that student mobility, in addition to Title I school status, may impact school achievement. Government agencies could benefit the most from this study by using the data to validate the importance of including the confounding variable of student mobility in school accountability models.

CHAPTER II

REVIEW OF THE LITERATURE

Marshall and Rossman (1989) note that literature reviews help the researcher make connections from current literature to gaps or expansions that may be studied. The purpose of this study is to evaluate how student mobility impacts academic outcomes of elementary schools. Interactions among student mobility, Title I school status, gender, and school achievement are also analyzed. The review of the literature presents a discussion of student mobility and its impact on accountability measures in North Carolina. The following issues form the focus: (a) historical impact of standardized testing; (b) high-stakes testing in North Carolina, (c) student mobility, and (d) theoretical frameworks of accountability.

Historical Impact of School Accountability

Standardized testing cannot be considered a recent trend to hit school systems (Linn, 2001; Koretz, 2002). It has been present in education throughout the 20th century, hiding and reappearing upon occasion. With the implementation of the North Carolina ABCs and a greater call for educational accountability, standardized testing has taken on a more prevalent role. The research on educational assessments provides historical information on the testing process ranging from Horace Mann's attempts to improve the schooling process (Messerli, 1965) to school choice and accountability reporting (Fusarelli, 2007). But, for the purpose of this study, the following snapshots of testing in

educational history will be discussed: (a) Elementary and Secondary Education Act (ESEA) (1965); (b) minimum competency testing; and (c) the report, *A Nation at Risk: The Imperative for Educational Reform* (U.S. Department of Education, 1983). These topics serve to emphasize the importance of the past on the present role of standardized testing in schools and its relationship with student mobility.

Elementary and Secondary Education Act (ESEA)

In 1965, the United States Congress enacted the Elementary and Secondary Education Act (ESEA) after a series of debates focusing on educational deficits in school systems and influence from President Johnson's *Great Society* ideology in 1964 (Rutherford & Hoffman, 1977). What transpired from this legislation would help change the way schools are funded and held accountable. The ESEA's major responsibility was to provide additional monies to schools that are identified as Title I schools. The intentions of providing funding for Title I schools – calculated by free and reduced lunch percentages – was to provide adequate opportunities for disadvantaged children (Lemann, 1999; Borman & D'Agosto, 1996; Haney, 1984; Rutherford & Hoffman, 1977). With billions of dollars being invested by the federal government through ESEA legislation and funded by taxpayers, a system of checks and balances, otherwise known as accountability, was implemented (Borman & D'Agosto, 1996; Haney, 1984; Archambault & St. Pierre, 1980; Long, Schaffran & Kellog, 1977). The accountability piece allowed for the federal government to analyze and assess current educational reforms being carried out with Title I funding. Holding Title I schools accountable enabled the federal government to maintain a sense of equality and uniformity, while providing states and school districts opportunities to develop and provide localized

instructional programs (Bowers, 1991; Airasian, 1987). Thus, the checking of accountability from the federal government and the balancing of power over curriculum and instruction at the local level allowed the ESEA legislation to become one of the most influential education decisions of the twentieth century (Haney, 1984).

The ESEA legislation, known today as No Child Left Behind (NCLB), has taken on a more prevalent role in the accountability process. In 2002, the federal legislature reauthorized the ESEA Act with bipartisan support in order to provide nation-wide accountability. NCLB, with its mental model catch-phrase of not leaving any child behind, brought forth support from parents, media and special interest groups. When the NCLB legislation was enacted in 2002, the nation seemed adamant about insuring that no child is ever "left behind" again. According to former Secretary of Education, Rod Paige, "Four years ago, this is what we saw when we arrived in Washington: we saw a *de facto* system of educational apartheid. This is no exaggeration of the facts. Millions of children were being left behind" (U.S. Department of Education, 2004, p. 1). Parents, regardless of their political affiliation, tend to favor the NCLB Act because it provides them with a sense of hope that their children will become successful citizens (Fusarelli, 2004).

The NCLB legislation calls for states to be held accountable for educational opportunities that are being given to students. Schools are measured against state benchmarks to determine Adequate Yearly Progress (AYP). The AYP data are an all or nothing concept of measurement that helps to distinguish differences between successful and failing schools (Kimmelman, 2006). In order to calculate AYP the NCLB legislation requires states to create yearly benchmarks that must be met in the form of proficiency levels (percentage of students at or above grade level defined as Levels III and IV in

North Carolina). The legislation mandates that schools must reach 100% proficiency by 2014 (Heck, 2006). Schools that meet all of their measurable objectives in the areas of reading and mathematics are considered meeting AYP goals. NCLB requires that results be sent home to parents and placed on school report cards. The media outlets also publish AYP scores in a ranking order similar to the ABCs.

A report released by the U.S. Department of Education, *ESEA Blueprint for Reform* (2010), calls for revisions to the NCLB legislation. The report notes that new teacher evaluation tools, manipulation of testing data, and using research-based instructional strategies are essential in increasing school proficiency. An infusion of federal monies is being dispersed in the form of *Race to the Top* grants. Because of this new push for ESEA reform, accountability measures are being discussed that will accurately measure school testing data as well as teacher evaluation data. It is important to note that neither the *ESEA Blueprint for Reform* nor *Race to the Top* grants include adequate measures to combat the issues of student mobility (U.S. Department of Education, 2010b). It is also important to note that educational reform occurs when political platforms change. Examples include President Johnson's *Great Society* (1964), President Reagan's *A Nation at Risk* (1983), President Bush's *No Child Left Behind* (2002), and President Obama's *Race to the Top* (2010). Each platform provided structures for accountability measures but neglected to factor in student mobility.

Minimum Competency Tests

To add to the uneasiness being felt with falling behind in math and science in the *Sputnik* era (Slobodin, 1977) and the implementation of Title I reform through ESEA legislation for disadvantaged students, several school districts and states implemented a

series of Minimum Competency Tests. The tests were designed to measure whether students were mastering basic core concepts or reading, math, and science (Koretz, 2002; Bowers, 1991). These new assessments provided explicit standards for public schools such as support of meaningful diplomas; rationale for promotion and retention; and remedial identification. Warnings of student retention and graduation denial gave the education system its first real taste of high-stakes accountability. It also started a movement to shape classroom instruction after competency assessments, which became a standard application of future high-stakes standardized tests. The structure of the Minimum Competency Tests using assessments to measure core concepts closely resembles annual standardized assessments (Bowers, 1991; Haney, 1984).

A Call to Arms

During President Reagan's tenure (1981-1989), reforming education became a major platform for change. Although the President's original objectives for educational reform centered on dismantling the education department in favor of state control of education (Borek, 2008), a reversal of goals occurred when former Secretary of Education, Terrel Bell, assigned the National Commission on Excellence in Education to conduct a study on school performance in America. The Department of Education presented a report on the state of American schools entitled, *A Nation at Risk: The Imperative for Educational Reform* (U.S. Department of Education, 1983). The report became an open call to the public exposing deficiencies in educational institutions across the United States. The introduction to the report states that:

> Our Nation is at risk. Our once unchallenged preeminence in commerce, industry, science, and technological innovation is being overtaken by competitors

> throughout the world. This report is concerned with only one of the many causes and dimensions of the problem, but it is the one that undergirds American prosperity, security, and civility. We report to the American people that while we can take justifiable pride in what our schools and colleges have historically accomplished and contributed to the United States and the well-being of its people, the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people. What was unimaginable a generation ago has begun to occur--others are matching and surpassing our educational attainments. (U.S. Department of Education, 1983, p. 1)

The findings from this report placed public education on notice. The quality of education was decreasing as was the erosion of America's position at the top of industrialized nations (Finn & Hess, 2004; Amrein & Berliner, 2002). This call to arms helped to rejuvenate the implementation of accountability and address four areas of reform as noted in the report: (a) content (curriculum), (b) expectations (standards), (c) time, and (d) teaching (Borek, 2008; Hewitt, 2008; Hunt, 2008; Guthrie & Springer, 2004). Table 2.1 provides data that show the confidence level of the public's view of education in America. The drastic dip in Table 2.1 indicates that the report helped to create a lack of support for the educational structure in the period immediately following its release.

Table 2.1

Public Confidence Before and After the Nation at Risk Report

Year	School Confidence Percentage
1977	54%
1979	53%
1983	39%
1985	47%
1987	50%

Note. The chart does not contain data from 1981 due to lack of compatibility with ratings instrument. Gallup Poll Confidence Index (as sited in Guthrie & Springer, 2004, p. 12)

Public demand for accountability began to grow and calls for standardized testing due to its scientific nature were being discussed at school, state, and federal levels. Standardized testing created an objective approach to holding schools accountable consisting of raw data scores; identical testing in school districts; and a method for parents and community members to make decisions about schools based on data (Finn & Hess, 2004; Amrein & Berliner, 2002; Kohn, 2000; Airasian, 1988; Airasian, 1987). Table 2.1 indicates the standardized testing movement becoming more significant after the *Nation at Risk* report and may be one of the causes for the overall decline of the public's confidence in education (Guthrie & Springer, 2004).

The Legacy of the *Nation at Risk* Report

The *Nation at Risk* report brought about additional accountability measures and increased federal involvement in public school systems across the United States. The

Nation at Risk report may have been the foundation for the current No Child Left Behind Legislation (2001), a reauthorization of the 1965 ESEA legislation (Hunt, 2008; Seed, 2008; Guthrie & Springer, 2004). Models of accountability and federal involvement continue to influence educational policy and decision-making. Many school systems are "hooked on federal money, and where the money [goes], regulations [are] sure to follow" (Hewitt, 2008, p. 576). *A Nation at Risk* and NCLB have created a sense of holding educators accountable for using public monies to fund education. One of the major trends to measure such accountability comes through high-stakes standardized testing. Kohn (2000) addresses the connection between the call for accountability and standardized testing by noting that:

> If the public often seems interested in test results, it may be partly because of our cultural penchant for attaching numbers to things. Any aspect of learning or life that appears in numerical form seems reassuringly scientific; if the numbers are getting larger over time, we must be making progress. (p. 3)

Therefore, the attachment of numbers to achievement allows American citizens to evaluate the effectiveness of curriculum, expectations, time, and teaching – the same measurable goals from the *Nation at Risk* report (Hewitt, 2008). According to a September 2010 Gallup Poll, 63% of Americans believed the federal government should have more or the same amount of educational control they currently hold (Saad, 2010). Table 2.2 supports the trend of the public's lack of confidence in the education system. Even with increased federal power influencing school systems across the nation with the NCLB Act, public opinion of the United States's system of education has remained static since 2000.

Table 2.2

Satisfaction with U.S. Education

Year	Satisfied	Dissatisfied
2000	47%	51%
2001	36%	61%
2002	48%	49%
2003	47%	50%
2004	48%	50%
2005	53%	45%
2006	46%	51%
2007	45%	52%
2008	46%	53%
2009	45%	52%
2010	43%	54%

(Saad, 2010)

Over half of Americans feel that an education in the public school setting is unsatisfactory. This lack of satisfaction may give added support to an expanded federal role in education. Current revisions being sought for the reauthorization of ESEA tend to focus on additional accountability of school and teacher evaluation data (U.S. Department of Education, 2010b). This focus of new accountability may lead to a higher federal involvement.

Testing and Accountability in North Carolina

The state of North Carolina has been at the forefront of testing and accountability since 1996 with the implementation of the North Carolina ABCs program. Researchers have praised the North Carolina testing and accountability program by proclaiming it a national model for other states (Manzo & Cavanaugh, 2005; Ladd, 2004; Huber & Moore, 2000). Although North Carolina has a reputation for being a successful model it is by no means a pioneer in the world of high-stakes testing and accountability. Maryland, Kentucky, Tennessee, Illinois, Florida, and Texas played major roles in developing strong state accountability models. Each model of accountability has expectations for school achievement and provides the public with information on how well schools perform (Carnoy & Loeb, 2002; Mintrop & MacLellan, 2002; Roderick, Jacob, & Bryk, 2002).

North Carolina ABCs Accountability Model

In 1996, the North Carolina General Assembly (NCGA) adopted the ABCs accountability program legislating that all schools containing any arrangement of kindergarten through eight grade students would operate under the ABCs accountability model. Although students were being tested previously by taking End of Grade (EOG) tests, no accountability system was set up to measure overall school effectiveness (Kafitz, 2006; Ware, 2000). This decision enabled the NCGA to establish a system of educational checks and balances. The accountability model focuses on three main concepts: (a) providing strong accountability with an emphasis on high student standards; (b) teaching the basics; and (c) allowing for local district control. Thus the “accountability”, the “basics” and the “control” turned into the acronym ABCs (NCDPI, 2007; Fabrizio,

2006). Although revisions have been made over the last fifteen years to the different types of assessments, Table 2.3 displays grade levels currently being administered EOG tests in North Carolina elementary schools and reported for accountability purposes.

Table 2.3

North Carolina Testing Matrix 2009-2011

Grade	Reading EOG	Math EOG	Science EOG	Proficiency Calculated	Growth Calculated
Third	Yes	Yes	No	Yes	* No
Fourth	Yes	Yes	No	Yes	Yes
Fifth	Yes	Yes	Yes	Yes	** Yes
Sixth	Yes	Yes	No	Yes	Yes

Note. *2009-2010 first year for no Third grade growth calculation, ** Fifth grade growth does not include Science. (NCDPI, 2010c)

Structural Framework of the ABCs Accountability Model

The ABCs accountability model consists of the following structural designs: "Uniform Target (UT)" and "Individual Growth (IG)" (Haertel, 2005). The UT model measures annual proficiency across the grade level span in each respective school. The IG accountability design assesses individual student growth from year to year (Haertel, 2005). By incorporating the IG and UT designs, schools in North Carolina must show growth and meet proficiency targets established by NCDPI.

In addition to counting towards the ABCs model, the UT design is also used to measure Adequate Yearly Progress (AYP). Student proficiency in reading and math

determines whether schools have met their annual measurable objectives (North Carolina Department of Public Instruction, 2007). For the ABCs accountability model schools are judged by overall proficiency scores and individual student growth, which in turn hold schools responsible for being measured as a singular entity with individual variables. Students who score proficient are given a score of Level III or IV, whereas non-proficient students receive a score of Level I or II. The ABCs model also evaluates students by measuring individual achievement by subtracting his/her previous year's scale score from the current year's scale score (y_5-y_4). The difference between the two scores helps to identify whether or not each student grew at a rate predetermined by testing and accountability officials (North Carolina Department of Public Instruction, 2008). Growth is then aggregated into grade levels and the school as a whole. Results show whether or not growth has been made based on the state's prediction models. An overall proficiency score rating is given in order to rank schools across each district and the state. It is important to note that students who are enrolled less than 140 days are not part of the ABCs growth calculation or federal AYP goals. But, all students that are enrolled on the testing date count towards the ABCs proficiency ranking for their respective schools regardless of days in attendance at that school.

Student Mobility and the ABCs Accountability Model

The ABCs accountability model enables schools to use data to make informed pedagogical decisions. The data help to determine the effectiveness of programs ranging from kindergarten to sixth grade. These types of program evaluations enable schools to make educational decisions about content, expectations, time, and teaching strategies. Research suggests that the absence of consideration of student mobility may result in

schools being measured unfairly (Alvarez, 2006; Sanderson, 2004; Kerbow, 1996). When creating, implementing or revising accountability policies, it is imperative that student mobility be considered as a piece of the results. It is difficult to hold schools accountable for learning outcomes when student mobility decreases instructional opportunities. Neglecting to recognize the importance of student mobility may provide an inaccurate assessment of the data used to make informed decisions about the school environment (Finch, Lapsley, & Baker-Boudissa, 2009; Mao, Whitsett, & Mellor, 1997). The following sections help to expand the understanding of student mobility and its impact on school achievement.

Student Mobility

The literature supports the need to examine the role of student mobility more closely in order to identify whether or not schools' assessment data are accurate. Student enrollment data has been neglected when analyzing individual school data (Goldstein, Burgess, & McConnell, 2007; Lash & Kirkpatrick, 1990). Demie (2002) notes that when measuring the academic performance of schools, it is "essential that pupil performance is related to length of time spent in schools" (p. 200). End of year test results make it difficult to accurately assess schools in North Carolina that have a transient population. Table 2.4 provides a description of which mobile students qualify for state and federal accountability measures. Mobile students enrolled for at least 140 days are factored into the ABCs growth calculation, school proficiency rating, and federal AYP classification. Students that have not met the 140 day rule are exempt from the ABCs growth calculation and AYP status, but they are counted in the school's proficiency rankings under the ABCs model. Therefore, a child who continuously attends one school from

kindergarten to sixth grade will be given the same weight when measuring school proficiency as a sixth grade student who enrolls on the day the EOG tests are administered (North Carolina State Board of Education, 2010).

Table 2.4

Testing Qualifications for Mobile Students

Enrollment	ABCs Growth	ABCs Proficiency	AYP Proficiency
> 140 Days	Yes *	Yes	Yes
< 140 Days	No	Yes	No

Note. *The ABCs growth score only counts if student took an EOG test in North Carolina the previous year.

One theme emerging throughout the literature on student mobility is the lack of a uniform set of definitions. Although this discovery may seem trivial, it has significantly altered the way one might interpret the outcomes of the reviewed studies causing a lack of consistency (Jennings, Kovalski, & Behrens, 2000). Due to the vast array of available definitions of mobility, it is necessary to review several sets of definitions in order to compile a working definition with parameters for the purpose of this study. Jennings, Kovalski, and Behrens (2000) measure mobility as the ratio of students entering and leaving during a school-year divided by total enrollment. Other studies measure mobility as any students who have experienced a non-promotional change of schools (Pane et. al, 2008; Simons, Bampton, Findlay, & Dempster, 2007; Mehana & Reynolds, 2004; Dunn, Kadane, & Garrow, 2003; Rumberger, 2003; Demie, 2002; Heinlein & Shinn, 2000). The

U.S. General Accountability Office (GAO) expands its definition of mobility in the elementary school setting by requiring three different types of mobility: (a) no school changes, (b) attendance in two schools, and (c) attendance in three or more schools (U.S. DOE, 1994). Wright (1999) argues that students who change schools within the district as well as those transferring from outside districts should be considered as mobile. The researcher's goal in formulating a working definition for the purpose of this study is to analyze all current definitions and apply certain components to the parameters that will exist in this study. Therefore, student mobility will be classified as the patterns of enrollment in elementary school settings. Student mobility will consist of two categories: (a) mobile students – having attended more than one elementary school and (b) non-mobile students – having attended only one elementary school (Sanderson, 2004; Dunn, Kadane, & Garrow, 2003).

Achievement and Mobility

High student mobility can have a negative impact on schools and districts when measuring achievement and progress (Lee, 2003; Weckstein, 2003; Alexander, Entwisle & Dauber, 2001; Mao, Whitsett, & Mellor, 1997; Evans, 1996; Mantzicopoulos & Knutson, 1993). Kerbow (1996) notes that mobility accounts for "a significant portion of the annual instability of a system [and] is actually related to the movement of a smaller percentage of students who change schools several times" (p. 151). Mobile students who have a small number of moves and are enrolled continuously in the upper elementary grades do not typically show as much negative effect on academic achievement. For those students who change schools several times during their primary years, achievement levels tend to be much lower (Mao, Whitsett, & Mellor, 1997; Kerbow, 1996). Reynolds,

Chen, and Herbers (2009) found in a meta-analysis of 16 studies on student mobility and achievement that 14 of those studies confirmed mobility playing a significant role in school performance in both reading and math. Students who moved more frequently – three times or more – recorded a larger gap between their scores when compared to other mobile and stable populations. Further research supports the argument that mobility lowers student achievement on standardized tests, therefore negatively impacting school results (Simons et. al, 2007; Sanderson, 2004; Kerbow, Ascoita & Buell, 2003; Stover, 2000; Rumberger & Larson, 1998). Students with high mobility rates (three or more moves) tend to be one full academic year behind their stable peers (Kerbow et. al, 2003; U.S. Department of Education, 1994). In Demie's (2002) study, "average performance of mobile students was substantially below that of non-mobile, sometimes as much as fifty percent" (p. 212). Heinlein and Shinn (2000) found in a study of sixth grade students that those students classified as highly mobile performed 3.8 percentile points lower in math and 5.5 percentile points lower in reading, thus proving a strong negative relationship between mobility and reading and math achievement. Similar results from another study show that 41% of mobile students scored non-proficient in reading compared with 26% of stable students. The same was true in math, 33% scored non-proficient for mobile students compared with 17% for the stable population (U.S. Department of Education, 1994).

Achievement and Non-mobility

Student mobility can have positive effects on school achievement when school results are paired with scores of the non-mobile population. The relationship among student mobility and achievement shows that "on average, the less frequent the mobility,

the better the student performance. Stable students performed better than those who moved once, who in turn performed better than those who moved twice, and so on" (Mao, Whitsett, & Mellor, 1997, p. 37). Table 2.5 suggests that non-mobility provides students who remain in a stable setting an increased opportunity for academic success.

Table 2.5

Student Non-Mobility and Achievement

Source	Non-Mobility Proficiency	Mobility Proficiency
(Demie, 2002)	69%	50 %
(Mao, Whitsett, & Mellor, 1997)	58%	37%

Non-mobile students (remaining at the same school) have a better chance of achieving academic success than those who are transient. Therefore, continuous enrollment plays a large role in student achievement. The stability of being engaged in a school's full academic program allows for non-mobile students to experience vertically aligned instruction (Sanderson, 2004; Alexander et. al, 1996; Kealey, 1982).

Other Views of Achievement and Mobility

High student mobility is not always directly associated with weak academic results and can lead to higher proficiency over non-mobile students (Pane et. al, 2008; Smrekar & Owens, 2003). Other studies argue that student mobility is not a factor in determining whether or not a school is successful. Several researchers contend that mobility, although important, may not be the main issue. Factors such as ethnicity, poverty status, and gender are correlational when together. However, mobility has not shown to have an effect on its own (Pane et. al, 2008; Rumberger, 2003; Smrekar &

Owens, 2003; Wright, 1999; Mehana & Reynolds, 1995). Rumberger et. al (1999) argue that mobility is normal for elementary schools and is only a component of poor academic achievement.

Importance of Student Mobility

Although the researchers provide many arguments on the effects of student mobility upon achievement, it is necessary to discuss the reasons behind the importance of this topic. Under current state accountability policies such as North Carolina, "it is strange that an entire system of rewards and punishments is based on whether or not a school meets certain standards at one time" (Beck & Shoffstall, 2005, p. 9), and "when test scores are annually reviewed, the student mobility rate and issues accompanying it are not taken into account" (Sanderson, 2004, p. 226). Not factoring in student mobility makes it more difficult to assess learning outcomes in a school setting. This is due to measuring unequal amounts of instructional opportunities for mobile and non-mobile populations. School performance should be related to length of time spent in schools. The lack of equality of measuring school success suggests the need for state governments and the federal government to investigate the impact student mobility has on school achievement (Finch et. al, 2009; Simons et. al, 2007; Offenberg, 2004; Demie, 2002; Mao, Whitsett, & Mellor, 1997). Even though measuring student mobility may be a complex task, Guilfoyle (2006) poses the following question, "What happens to what doesn't get measured?" (p. 4). Table 2.6 displays the reduction in elementary school assessment scores in relationship to gender and mobility. The snapshot of data helps support findings from several researchers that argue student mobility should be carefully studied when applying high-stakes testing to school settings (Xu, Hannaway, & D'Souza,

2009; Sanderson, 2004, Mehana & Reynolds, 2004; Demie, 2002). The data from Table 2.6 indicate that mobility may impact achievement scores of students according to their gender and Title I status. More than three moves during an elementary career suggests that student scores tend to decrease significantly. The disparity of achievement results between mobile and non-mobile students when factoring Title I status may indicate the importance of the correlation between the two factors (U.S. Department of Education, 2010a).

Table 2.6

Student Mobility, Gender, and Achievement

Economic Status	Number of School Moves	Male Scale Scores (Mean)	Female Scale Scores (Mean)
Title I	0	201	208
Title I	1	196	204
Title I	3 +	178	193
Non-Title I	0	221	230
Non-Title I	1	225	227

(U.S. Department of Education, 2010a)

Accountability Theories

To understand the culmination of the reviewed literature topics, it is necessary to construct a theoretical framework to provide structure to the accountability issues being studied. A theoretical framework bridges the gap between what the literature suggests and what the research questions will attempt to address. Rumberger and Larson (1998) contend that "theoretical research is useful because theories can provide an explanation of

why students change schools and why student mobility can affect . . . achievement" (p. 6). The following theoretical framework will provide more insight into the effects of student mobility on achievement and culture of the school environment.

Ecological Systems and Social Constructivism

It is important to explore elementary schools within the parameters of social constructivism and ecological systems theories when investigating how student mobility affects school achievement (Rhodes, 2005; Bronfenbrenner 1994; Bronfenbrenner, 1979). The ecological systems theory is described as "the degree of stability, consistency, and predictability over time [and] . . . is critical for the effective operation of the system" (Mehana & Reynolds, 2004, p. 95). Johnson (2008) argues that accountability policies need to "take into account the complex and dynamic nature of education" (p. 1) and that school accountability models must include "the ecological systems of the school into the equation as parameters" (p. 8). The theory of social constructivism adds to the ecological systems theory by noting that effective learning is most efficient in social learning environments where student interactions are allowed. When placing these theories in context with student mobility and accountability, the opportunity to remain in a stable and social environment may influence students to achieve personal linear growth. The frequency of social interactions enables individuals to become more effective in their surroundings, which may allow non-mobile students to develop faster in their environment than mobile students (Rhodes, 2005; Gredler & Shields, 2004; St. Pierre Hirtle, 1996; Bronfenbrenner, 1994; Kozulin, 1986).

Social constructivism and ecological systems help to build parameters around the accountability framework by including the functions and operations of school and home

environments and its effects on student mobility. Human development is essential in adjusting to school and home environments. The frequency of positive home and school interactions may enable students to achieve academic success in school. Non-mobile students tend to develop faster in their environment due to consistency from remaining in stable settings. Mobile students who frequently move may have more difficulty in adjusting to new school and home environments (Xu, Hannaway, & D'Souza, 2009; Schwartz, Stiefel, & Chalico, 2007; Black, 2006).

Stability and consistency in social learning environments are necessary variables when looking at student mobility through the lens of constructivism and ecological systems. Student mobility creates several consequences that could place the mobile population at a disadvantage with their non-mobile peers. One complication that mobile students might encounter is being placed in a sequential learning environment into which the students may or may not have been exposed. The new placement may cause students to receive repetitive learning or miss concepts altogether. Another complication is a reduction in focus on curricular issues from mobile students (Rhodes, 2005). A reversal of Maslow's (1970) scale may occur where mobile students struggle because of placement at the top of the scale (self-actualization) upon entrance into the classroom. Rather than having the chance to acclimate to the environment and develop a sense of security, mobile students tend to struggle in the classroom environment due to being thrown into critical thinking and problem solving situations (Rhodes, 2005). Non-mobile students tend to assimilate more quickly to learning situations in this social construct allowing for an acceleration of knowledge and skill development (Xu, Hannaway, & D'Souza, 2009; Sanderson, 2004; Mao, Whitsett, & Mellor, 1997; Alexander et. al, 1996;

Evans, 1996; St. Pierre Hirtle, 1996; Kealey, 1982). In the following example Rhodes (2005) notes how mobile and non-mobile students are affected in an environment where social constructivism and ecological systems are present:

> As an example, we can consider the experience of two eighth-grade students in a classroom. One is new, leads a highly mobile life and has been to six different schools. The other is in the same school in which he began kindergarten, is well known to peers, and popular. The teacher says, "Let's all get into groups of four." Two students may hear the same words and intonation from the teacher, but the direction may strike fear and anxiety in the new student, while representing a fun opportunity to the other. Social constructivists would point out that the new child is responding to an underlying meaning that his experience has caused: Will anyone invite me into their group? The other child's response is based upon his existing positive relationships with other students, and previous group and individual experience with those peers. (p. 34)

In the preceding scenario, the mobile student struggles with the new social setting. Fear and anxiety delay the mobile student from accessing the enriched environment that exists for the stable student. Such an environment develops over time and needs trust from each student, the teacher, and the collective group. Mobile students who have multiple school moves before third grade begin to close the achievement gap by sixth grade with their non-mobile peers assuming the mobile students remain stable at the same school (Heinlein, 2000). Mobile students closing the achievement gap may have benefited from the stability, consistency and social interactions of the enriched learning environment over a longer period of time.

When placing student mobility under the dual lenses of social constructivism and ecological systems, it is necessary to investigate the effects of student mobility on school achievement. Student transience may occur due to the following: family disruptions; better opportunities in academics or athletics; or moving from a bad situation. Regardless of the causes for movement, student mobility may cause a lack of consistent instruction and bring about social issues in home and school settings (Xu, Hannaway, & D'Souza, 2009; Schwartz, Stiefel, & Chalico, 2007; Black, 2006; Sanderson, 2004; Ligon & Paredes, 1992; Ingersoll, Scamman, & Eckerling, 1989). Schools in North Carolina are held accountable for each third, fourth, fifth, and sixth grade student that is enrolled on the days of EOG testing. Neglecting to consider the impact that student mobility has on school achievement allows for schools in North Carolina to be labeled unfairly and possibly cause misinformed decisions concerning curriculum, instruction, and assessment functions of schools. Schools operating under the paradigm of social constructivism and ecological systems need the necessary time to build capacity for mobile populations. Therefore, student mobility should be considered a confounding variable when measuring school academic outcomes (Finch, Lapsley, & Baker-Boudissa, 2009; Alvarez, 2006; Offenberg, 2004; Sanderson, 2004; Demie, 2002; Simons et. al, 2001, Kerbow, Ascoita, & Buell; 2003; Stover, 2000; Rumberger & Larson, 1998; Mao, Whitsett, & Mellor, 1997; Kerbow, 1996) .

Conclusion

In today's world of high-stakes testing and accountability, schools are faced with the external pressures of producing results. Students, teachers and school environments are impacted in positive and negative ways when accountability is a component of school

success and failure (Popham, 2003). Regardless of the impact of testing on individual schools, educators must be able to adapt and carry on in the age of high-stakes testing. High-stakes testing and accountability have played an historical role in molding the United States educational system. The enactment of the Elementary and Secondary Education Act (ESEA) of 1965 brought a new sense of what accountability should consist of and created a system of checks and balances to ensure academic success. Minimum Competency Tests were brought to the national forefront after concerns over *Sputnik* and a decrease in status as a national power in education. During the Reagan administration, the national report, *A Nation at Risk: The Imperative for Educational Reform* (1983), was presented to the federal government and the public, causing external demands to initiate high-stakes standardized testing in every state.

Student mobility is an issue that has not received much attention from educational entities. The review of literature placed an emphasis on how schools view accountability systems and how student variables have an effect on achievement. This study was designed to explore how student mobility applies to achievement in elementary schools in North Carolina. Archived testing data was analyzed to determine if relationships between student mobility, Title I status, and gender are linked to school achievement.

Social constructivism and ecological systems theories help to build parameters around the accountability framework by including the functions of school and home environments and its effects on student mobility. Human development is essential in adjusting to school and home environments. The frequency of positive home and school interactions enables students to achieve academic success in school. Non-mobile students tend to develop faster in their environment due to consistency from remaining in stable

settings. Mobile students who frequently move may have more difficulty in adjusting to new school and home environments (Xu, Hannaway, & D'Souza, 2009; Schwartz, Stiefel, & Chalico, 2007; Black, 2006). By using the theoretical framework consisting of social constructivism and ecological systems, the study may shed some light on how student mobility affects school achievement in math and reading.

High-stakes Testing and Accountability

Since the development and implementation of the ABCs accountability model along with public endorsement of quantitative data, North Carolina has placed a higher emphasis on achievement and accountability. Educational stakeholders are able to review school performance annually, which in turn creates either support for academic programs or calls for reform. During the review of the literature, it became evident that school success is measured for all students with perceived equal values. Regardless of the model used, mobile and non-mobile populations are assigned equal weight when determining school proficiency. This is an issue of which most educational stakeholders (i.e. parents, community members, and tax payers) are unaware. Only a school-wide snapshot of data is available for review annually, which in turn gives schools a false measurement without considering the role that student mobility may have (Sanderson, 2004).

CHAPTER III

METHODOLOGY

Purpose

The purpose of this study was to explore how student mobility affects school achievement in math and reading. The study also examined the interactions between the following variables on school achievement; (a) student mobility, (b) Title I status, and (c) gender. The follow research questions examine how student mobility impacts academic achievement scores in math and reading.

Research Questions

1. What is the effect of student mobility on school performance scores in sixth grade math?
2. What is the effect of student mobility on school performance scores in sixth grade reading?
3. What is the relationship between student mobility and Title I school status when measuring school performance levels in sixth grade math and reading?
4. What is the relationship between student mobility and gender when measuring school performance levels in sixth grade math and reading?
5. What is the relationship among student mobility, Title I school status, and student gender when measuring school academic achievement in sixth grade reading and math?

Context of the Study

Student Mobility

Research on student mobility is conflicting when trying to determine if it is connected to student achievement. Many researchers contend that student mobility is closely linked with increases or declines in student and school achievement (Rhodes, 2005; Sanderson, 2004; Beck & Shoffstall, 1997). Others argue that although the mobility variable may be indirectly linked to achievement, it is only a symptom of bigger issues such as gender and student poverty (Strand & Demie, 2007; McCoy & Reynolds, 1998). The major reason for the competing arguments lies within the lack of consistency when determining variables and key identifiers of mobility. It is necessary to further understand the key identifiers of mobility as well as the impact mobility may have on school achievement.

Rationale

Following a review of the literature, it appears that the North Carolina ABCs model has neglected to include student mobility into proficiency calculations. Sanderson (2004) argues that student mobility is a significant factor in predicting school success. Rather than disaggregate data based upon this variable, schools' ratings are "based on its standardized test scores without any consideration for its mobile population and diverse student body [and] is grossly unfair and yet this is what happens annually" (Sanderson, 2004, p. 226). The design of this study adds to the literature of Sanderson (2004) by elaborating on her findings of stability having a positive effect and mobility having a negative effect on achievement test scores of fifth grade students in a school in Pennsylvania. This study expands her framework to include a larger population of

students in addition to exploring effects of student mobility, Title I school status, and gender on school achievement. Student mobility categories (mobile and non-mobile) allow for the researcher to analyze effects of students being in a school setting for seven consecutive years and those that have moved into the school at some point during the seven years. In Sanderson's (2004) study, she used a graduated scale to assess student mobility that counted the number of continuous enrollments starting in each grade level. For the purposes of this study, the researcher classified student mobility into two categories that may provide a new insight of how continuous enrollment impacts school achievement.

Research Design

Methods

The design of the study was quantitative – manipulating sets of data to make informed inferences. Creswell (1994) indicates that quantitative methods are essential in discovering whether variables affect outcomes, therefore justifying the importance of using data to determine the impact of student mobility on school achievement. In order to get an accurate picture of the effect of student mobility on school achievement, it was necessary to conduct a series of analyses of variance calculations of the archived testing data to determine if there was any significance between the following variables: (a) student mobility; (b) Title I status; (c) gender; and (d) math and reading EOG scores. The results of the data analyses helped to determine if student mobility had a correlational impact on school achievement.

Data Selection

Location

After receiving approval from the Catawba County Schools Research Review Board (June 22, 2010) and the Appalachian State University Review Board (September 22, 2010), archived testing data were collected from fifteen elementary schools in the Catawba County School System in North Carolina. The Catawba County District was chosen because the school system was a sample of convenience. Sixth grade student End of Grade (EOG) testing data in math and reading were used. This was due to sixth grade being the terminal grade in elementary schools in the Catawba County School District. In order to provide appropriate data collection and analysis, test data from the 2009-2010 school-year was used to measure effects of student mobility on achievement. This allowed an improved reliability of the data and validity of the study by keeping the results current with scale scores currently being used by North Carolina (Triola, 2008; Moore, 2000).

Only one year of testing data were usable due to the lack of flexibility in the district's data management system. Data for the 2009-2010 school-year listed each student's enrollment date into elementary school. Data for the 2007-2008 and 2008-2009 school-years did not list elementary enrollment dates. The archived testing data from the student management system were not flexible in determining elementary enrollment dates of students from previous years. Instead, the enrollment date into middle school replaced the elementary enrollment date. The fifteen schools were spread across the district and provided a diverse snapshot of the county's population. Nine of the schools were

identified as having Title I status – meeting the criteria of high free and reduced lunch percentages. Table 3.1 shows Catawba County Schools' status of Title I Programs.

Table 3.1

Title I Status

School	Free and Reduced Lunch Percentage	Title I Status
School A	26.34%	Not Served
School B	36.14%	Not Served
School C	39.37%	Not Served
School D	41.27%	Not Served
School E	44.13%	Not Served
School F	47.08%	Not Served
School G	49.80%	Served
School H	54.14%	Served
School I	55.48%	Served
School J	56.33%	Served
School K	56.53%	Served
School L	59.77%	Served
School M	62.19%	Served
School N	65.30%	Served
School O	75.00%	Served

(Catawba County Schools, 2010)

Data Terms

For the purposes of this study and from the review of the literature, student mobility consisted of two categories: (a) sixth grade students who have experienced seven years of continuous enrollment within a single elementary school – meaning that the student started at the entry stage of Kindergarten and completed sixth grade by the end of the 2009-2010 school-year and (b) sixth grade students who have not enrolled in the same elementary school continuously for seven years. Data were collected from a district management system known as the North Carolina Window on Student Education (NCWISE). Catawba County Schools provided archived testing data to the researcher to analyze effects of student mobility on student achievement. Catawba County Schools adopted NCWISE in 2000, but not all North Carolina districts adopted the state initiative as quickly. Schools that have not used the NCWISE data information system for the last seven years may not have accurate digital records. So, when a student transfers into Catawba County Schools, school enrollment locations will not show up in NCWISE if a student's previous school wasn't using the data management system. By setting parameters of the mobility definition as any thing less than seven years of stability, it allowed for student data to be coded easily as zero for non-mobile students and one for those that qualify for mobile recognition.

Data Collection

Several data points were collected during the study. The following NCWISE data were needed as key identifiers for the study: attendance data; gender; math and reading scores; school Title I status; and school location. Personal student information such as legal name, address, student number, and contact information were not collected or

displayed during this study. A pseudonym for each school ensured anonymity while randomized numbers provided confidential identification for students. The data were entered into a Microsoft Excel© spreadsheet in order to sort and filter the data. Then the data were imported into the SPSS© software program. The results were analyzed to determine the impact of student mobility on school achievement. The relationship to school Title I status and gender was also explored.

Conclusion

Through a series of analyses of variance calculations, the researcher was able to use archived testing data from Catawba County Schools to explore the impact that student mobility has on academic outcomes. In addition, the data helped to identify any interactions between student gender and a school's Title I status on student mobility and academic outcomes. Test scores representing the sixth grade population were used for calculation purposes. This was due to that grade level representing the exit stage of elementary schools in Catawba County. Findings from the data analyses are discussed further in Chapter Four.

CHAPTER IV

RESULTS

The purpose of this study was to explore how student mobility (i.e., pattern of student enrollment in elementary school settings) affects school achievement in math and reading. School socioeconomic status (SES) known as Title I status (classified as Title I status and Non Title I status) and student gender (male and female) were also used in conjunction with student mobility to examine possible main and interaction effects on reading and math achievement scores. Specifically, the following research questions were addressed:

1. What is the effect of student mobility on school performance scores in sixth grade math?
2. What is the effect of student mobility on school performance scores in sixth grade reading?
3. What is the relationship between student mobility and Title I school status when measuring school performance levels in sixth grade math and reading?
4. What is the relationship between student mobility and gender when measuring school performance levels in sixth grade math and reading?
5. What is the relationship among student mobility, Title I school status, and student gender when measuring school academic achievement in sixth grade reading and math?

The first two research questions used an independent-samples *t*-test because the question is examining the difference in math and reading achievement scores between two groups: mobile students (defined as students who attend more than one school during their elementary school continuum, kindergarten through sixth grade) and non-mobile students (i.e., students that have been continuously enrolled during their elementary school continuum, kindergarten through sixth grade). The third, fourth and fifth research questions were addressed using ANOVAs to detect any main and interaction effects.

Sample Sizes

This section begins with a brief description of group sample sizes. Then, descriptive statistics on math and reading achievement scores for the different groups (mobile and non-mobile students); (Title I and Non Title I status of schools); and (male and female students) of participants are presented. Group sample sizes concerning math achievement scores are presented in Table 4.1. There were math achievement score data from a total of 1169 students. There were 499 students classified as Non-Mobile students and 670 students classified as Mobile students. In addition, there were 548 students that were in Non-Title I schools and 621 students in Title I schools. In terms of gender, there were 585 male and 584 female students. Group sample sizes concerning reading achievement scores are presented in Table 4.2. There were reading achievement score data from a total of 1145 students. There were 494 students classified as Non-Mobile students and 651 students classified as Mobile students. In addition, there were 539 students that were in Non-Title I schools and 606 students in Title I schools. In terms of gender, there were 569 male and 576 female students.

Achievement Scores

Refer to Table 4.1 for information on math achievement scores and Table 4.2 for reading achievement scores for the major groups of participants (student mobility, Title I status, and gender). The mean un-weighted math achievement score was 360.87 (*SD* = 7.72) and the mean un-weighted reading achievement score was 355.81 (*SD* = 7.30).

Table 4.1

Sample Size and Descriptive Statistics of Math Achievement Scores

Group	*n*	Mean (SD) Math Achievement Score
Student Mobility		
Non Mobile	499	362.23 (7.58)
Mobile	670	359.86 (7.67)
Title I Status		
Non Title I	548	362.41 (7.56)
Title I	621	359.52 (7.61)
Gender		
Male	585	360.54 (7.57)
Female	584	361.21 (7.86)
Total	1169	360.87 (7.72)

Table 4.2

Sample Size and Descriptive Statistics of Reading Achievement Scores

Group	*n*	Mean (SD) Reading Achievement Score
Student Mobility		
Non Mobile	494	357.06 (6.86)
Mobile	651	354.86 (7.48)
Title I Status		
Non Title I	539	357.42 (6.66)
Title I	606	354.38 (7.54)
Gender		
Male	569	355.12 (7.50)
Female	576	356.49 (7.04)
Total	1145	355.81 (7.30)

Research Questions One and Two

The first two research questions asked what is the effect of student mobility on school performance in math and reading. To answer this question, an independent-samples *t*-test was used because it specifically evaluates the difference between means of two independent groups, and each case has a score on two variables, the grouping

variable (in this case, student mobility) and the test variable (in this case, the achievement score).

The Result of the *t*-test for Math Achievement

An independent-samples *t*-test was conducted to evaluate whether students classified in the non-mobile group had higher math achievement scores than students classified in the mobile group. Results were statistically significant, $t(1167) = 5.25$, $p < .001$. Indeed, students classified as non-mobile had higher math achievement scores ($M = 362.23$) than students classified as mobile ($M = 359.86$). To assess the effect size (practical significance) of the results, the *d* statistic (Cohen, 1988) was computed which was .31, which can be interpreted as a comparatively small effect size, as convention is that .2, .5, and .8 are small, medium, and large effect sizes respectfully.

The Result of the t-test for Reading Achievement

An independent-samples *t*-test was conducted to evaluate whether students classified in the non-mobile group had higher reading achievement scores than students classified in the mobile group. Results were statistically significant, $t(1143) = 5.11$, $p < .001$. Indeed, students classified as non-mobile had higher reading achievement scores ($M = 357.06$) than students classified as mobile ($M = 354.86$). To assess the effect size (practical significance) of the results, the *d* statistic (Cohen, 1988) was computed which was .30, which can be interpreted as a comparatively small effect size, as convention is that .2, .5, and .8 are small, medium, and large effect sizes respectfully. Results indicated that students classified as non-mobile students had statistically higher math and reading achievement scores than their counterpart classified as mobile students. However, the practical significance (effect sizes) of these differences were rather small in nature, as the

actual mean difference in math achievement scores between the two groups was 2.37 points and the mean difference in reading achievement scores between the two groups was 2.20 points.

Research Question Three

The third research question asked what is the relationship between student mobility and Title I status when measuring school performance in sixth grade math and reading. To answer this question, a two-way analysis of variance (ANOVA) was used as each student had scores on three variables: two factors (whether or not they were classified as mobile or non-mobile and whether or not they were in a Title I or non Title I school) and the dependent variable (test achievement score). Each ANOVA analysis was conducted first with math achievement scores as the dependent variable and then reading achievement scores as the dependent variable. For main effects, because there are just two groups for each main effect, one can directly infer which group had higher achievement scores based on the un-weighted mean of each group (i.e., no post-hoc analyses need to be conducted because none of the factors had three or more levels).

The Result of the Two-Way ANOVA – Math Achievement

A 2 x 2 ANOVA was conducted to evaluate the effects of student mobility and Title I status of schools on math achievement scores. The means and standard deviations for math achievement scores as a function of the two factors are presented in Table 4.3. ANOVA results can be found in Table 4.4.

Table 4.3

Sample Size and Descriptive Statistics of Math Achievement Scores for Mobility and Title I Status Subgroups

Group	*n*	Mean (SD) Math Achievement Score
Non Mobile, Non Title I	270	363.49 (7.31)
Non Mobile, Title I	229	360.75 (7.65)
Mobile, Non Title I	278	361.35 (7.67)
Mobile, Title I	392	358.81 (7.50)
Total	1169	360.87 (7.72)

Table 4.4

Analysis of Variance results for Math Achievement Scores Examining Main Effects and Interactions for Mobility and Title I Status Subgroups

Source	*df*	*F*	η^2	*p*
Student Mobility	1	20.67	.017	< .001
Title I Status	1	34.76	.029	< .001
Interaction	1	0.05	.000	.824
Error	1165	(56.67)	.954	

Note. Values enclosed in parentheses represent mean square.

The ANOVA indicated no significant interaction between student mobility and Title I status, F (1, 1165) = 0.05, p = .82. However, there were significant main effects for student mobility, F (1, 1165) = 20.67, p < .001, and Title I status, F (1, 1165) = 34.76, p < .001. Based on Table 4.1 (and results from Research Question One), students classified in the non-mobile group had higher math achievement scores than students classified in the mobile group. In addition, based on Table 4.1, students in Non Title I schools had higher math achievement scores (M = 362.41) than students in Title I schools (M = 359.52). However, the partial eta-square statistic (Olejnik & Algina, 2003; Levine & Hullet, 2002) which examines the effect size (i.e., practical significance) of the findings were rather small. The partial η^2 for student mobility (1.7%) and the partial η^2 for Title I status (2.9%) account for the variability of math achievement.

The Result of the Two-Way ANOVA – Reading Achievement

A 2 x 2 ANOVA was conducted to evaluate the effects of student mobility and Title I status of schools on reading achievement scores. The means and standard deviations for reading achievement scores as a function of the two factors are presented in Table 4.5. ANOVA results can be found in Table 4.6.

Table 4.5

Sample Size and Descriptive Statistics of Reading Achievement Scores for Mobility and Title I Status Subgroups

Group	*n*	Mean (SD) Reading Achievement Score
Non Mobile, Non Title I	269	358.27 (6.46)
Non Mobile, Title I	225	355.62 (7.05)
Mobile, Non Title I	270	356.58 (6.76)
Mobile, Title I	381	353.64 (7.73)
Total	1145	355.81 (7.30)

Table 4.6

Analysis of Variance results for Reading Achievement Scores Examining Main Effects and Interactions for Mobility and Title I Status Subgroups

Source	*df*	*F*	η^2	*p*
Student Mobility	1	18.45	.016	< .001
Title I Status	1	42.96	.036	< .001
Interaction	1	0.11	.000	.739
Error	1141	(50.24)	.948	

Note. Values enclosed in parentheses represent mean square.

The ANOVA indicated no significant interaction between student mobility and Title I status, F (1, 1141) = 0.11, p = .74. However, there were significant main effects for student mobility, F (1, 1141) = 18.45, $p < .001$, and Title I status, F (1, 1141) = 42.96, $p < .001$. Based on Table 4.2 (and results from Research Question Two), students classified in the non-mobile group had higher reading achievement scores than students classified in the mobile group. In addition, based on Table 4.2, students in Non Title I schools had higher reading achievement scores (M = 357.42) than students in Title I schools (M = 354.38). However, the partial eta-square statistic (Olejnik & Algina, 2003; Levine & Hullet, 2002) which examines the effect size (i.e., practical significance) of the findings were rather small. The partial η^2 for student mobility (1.6%) and the partial η^2 for Title I status (3.6%) account for the variability of reading achievement. Results found

main effects for student mobility (students classified in the non-mobile group had higher math and reading achievement scores than students classified in the mobile group) and Title I status (students in Non Title I schools had higher math and reading achievement scores than students in Title I status schools). However, the practical significance (effect sizes) of these differences were rather small in nature. The differences for student mobility were previously discussed under Research Question Two. With regards to Title I status, the actual mean differences were small for both math achievement scores (2.89 points) and reading achievement scores (3.04 points).

Research Question Four

The fourth research question asked what is the relationship between student mobility and gender when measuring school performance in sixth grade math and reading. To answer this question, a two-way analysis of variance (ANOVA) was used as each student had scores on three variables: two factors (whether or not they were classified as mobile or non-mobile and whether or not they were male or female) and the dependent variable (test achievement score). Each ANOVA analysis was conducted first with math achievement scores as the dependent variable and then reading achievement scores as the dependent variable. For main effects, because there are just two groups for each main effect, one can directly infer which group had higher achievement scores based on the means of each group (i.e., no post-hoc analyses need to be conducted because none of the factors had three or more levels).

The Result of the Two-Way ANOVA – Math Achievement

A 2 x 2 ANOVA was conducted to evaluate the effects of student mobility and gender on math achievement scores. The means and standard deviations for math

achievement scores as a function of the two factors are presented in Table 4.7. ANOVA results can be found in Table 4.8.

Table 4.7

Sample Size and Descriptive Statistics of Math Achievement Scores for Mobility and Gender Subgroups

Group	*n*	Mean (SD) Math Achievement Score
Non Mobile, Male	237	361.94 (7.68)
Non Mobile, Female	262	362.50 (7.51)
Mobile, Male	348	359.59 (7.37)
Mobile, Female	322	360.15 (7.99)
Total	1169	360.87 (7.72)

Table 4.8

Analysis of Variance results for Math Achievement Scores Examining Main Effects and Interactions for Mobility and Gender Subgroups

Source	*df*	*F*	η^2	*p*
Student Mobility	1	26.92	.023	< .001
Gender	1	1.54	.001	.215
Interaction	1	0.00	.000	.995
Error	1165	(58.29)	.976	

Note. Values enclosed in parentheses represent mean square.

The ANOVA indicated no significant interaction between student mobility and gender, F (1, 1165) = 0.00, p = .99. There was a significant main effect for student mobility, F (1, 1165) = 26.92, p < .001, but not gender, F (1, 1165) = 1.54, p = .22. Based on Table 4.1 (and results from Research Question One), students classified in the non-mobile group had higher math achievement scores that students classified in the mobile group, but the partial eta-square statistic (Olejnik & Algina, 2003; Levine & Hullett, 2002) which examines the effect size (i.e., practical significance) of the findings were rather small. The partial η^2 for student mobility (2.3%) account for the variability of math achievement. Results found no interactions and one main effect for math achievement scores (students classified in the non-mobile group had higher math achievement scores than students classified in the mobile group).

The Result of the Two-Way ANOVA – Reading Achievement

A 2 x 2 ANOVA was conducted to evaluate the effects of student mobility and gender on reading achievement scores. The means and standard deviations for reading achievement scores as a function of the two factors are presented in Table 4.9. ANOVA results can be found in Table 4.10.

Table 4.9

Sample Size and Descriptive Statistics of Reading Achievement Scores for Mobility and Title I Status Subgroups

Group	*n*	Mean (SD) Reading Achievement Score
Non Mobile, Male	232	356.32 (6.57)
Non Mobile, Female	262	357.72 (7.05)
Mobile, Male	337	354.30 (7.98)
Mobile, Female	314	355.46 (6.87)
Total	1145	355.81 (7.30)

Table 4.10

Analysis of Variance results for Reading Achievement Scores Examining Main Effects and Interactions for Mobility and Gender Subgroups

Source	*df*	*F*	η^2	*p*
Student Mobility	1	24.73	.021	< .001
Gender	1	8.87	.008	.003
Interaction	1	0.08	.000	.777
Error	1141	(51.79)	.971	

Note. Values enclosed in parentheses represent mean square.

The ANOVA indicated no significant interaction between student mobility and gender, F (1, 1141) = 0.08, p = .78. However, there were significant main effects for student mobility, F (1, 1141) = 24.73, p < .001, and gender, F (1, 1141) = 8.87, p = .003. Based on Table 4.2 (and results from Research Question Two), students classified in the non-mobile group had higher reading achievement scores that students classified in the mobile group. In addition, based on Table 4.2, females had higher reading achievement scores (M = 356.49) than males (M = 355.12). However, the partial eta-square statistic (Olejnik & Algina, 2003; Levine & Hullett, 2002) which examines the effect size (i.e., practical significance) of the findings were rather small. The partial η^2 for student mobility (2.1%) and the partial η^2 for gender (0.8%) account for the variability of reading achievement. For reading achievement scores, results found no interactions and two main

effects, one for student mobility (students classified in the non-mobile group had higher reading achievement scores than students classified in the mobile group) and gender (females had higher reading achievement scores than males). However, the practical significance (effect sizes) of these differences were rather small in nature. The differences for student mobility was previously discussed under Research Question One. With regards to gender, the actual mean differences were small for reading achievement scores (1.37 points).

Research Question Five

The fifth research question asked what is the relationship among student mobility, Title I school status, and student gender when measuring school academic achievement in sixth grade math and reading. To answer this question, a 2 x 2 x 2 analysis of variance (ANOVA) was used as each student had scores on four variables: three factors (whether they were classified as mobile or non-mobile; whether or not they were in a Title I status school; and whether they were male or female) and the dependent variable (test achievement score). Each ANOVA analysis was conducted first with math achievement scores as the dependent variable and then reading achievement scores as the dependent variable. For main effects, because there are just two groups for each main effect, one can directly infer which group had higher achievement scores based on the means of each group (i.e., no post-hoc analyses need to be conducted because none of the factors had three or more levels).

The Result of the 2 x 2 x 2 ANOVA – Math Achievement

A 2 x 2 x 2 ANOVA was conducted to evaluate the effects of student mobility, title I status, and gender on math achievement scores. The means and standard deviations

for math achievement scores as a function of the three factors are presented in Table 4.11. ANOVA results can be found in Table 4.12.

Table 4.11

Sample Size and Descriptive Statistics of Math Achievement Scores for Mobility, Title I, and Gender Subgroups

Group	*n*	Mean (SD) Math Achievement Score
Non Mobile, Non Title I, Male	130	363.65 (7.45)
Non Mobile, Title I, Male	107	359.85 (7.46)
Non Mobile, Non Title I, Female	140	363.34 (7.19)
Non Mobile, Title I, Female	122	361.53 (7.76)
Mobile, Non Title I, Male	141	360.80 (6.76)
Mobile, Title I, Male	207	358.77 (7.66)
Mobile, Non Title I, Female	137	361.92 (8.50)
Mobile, Title I, Female	185	358.84 (7.34)
Total	1169	360.87 (7.72)

Table 4.12

Analysis of Variance results for Math Achievement Scores Examining Main Effects and Interactions for Mobility, Title I Status, and Gender Subgroups

Source	*df*	*F*	η^2	*p*
Student Mobility (SM)	1	20.03	.017	< .001
Title I Status (TIS)	1	35.58	.030	< .001
Gender (G)	1	2.03	.002	.155
SM x TIS Interaction	1	0.08	.000	.777
SM x G Interaction	1	0.01	.000	.919
TIS x G Interaction	1	0.28	.000	.599
SM x TIS x G Interaction	1	2.87	.002	.091
Error	1161	(56.64)	.949	

Note. Values enclosed in parentheses represent mean square.

The ANOVA indicated no significant two-way interactions between student mobility and Title I status, F (1, 1161) = 0.80, p = .78, student mobility and gender, F (1, 1161) = 0.01, p = .92, Title I status and gender, F (1, 1161) = 0.28, p = .60. Furthermore, there was no significant three-way interaction between student mobility, Title I status, and gender, F (1, 1161) = 2.87, p = .091. The partial η^2 for student mobility (1.7%) and the partial η^2 for Title I status (3.0%) account for the variability of math achievement.

The Result of the 2 x 2 x 2 ANOVA – Reading Achievement

A 2 x 2 x 2 ANOVA was conducted to evaluate the effects of student mobility, title I status, and gender on reading achievement scores. The means and standard deviations for reading achievement scores as a function of the three factors are presented in Table 4.13. ANOVA results can be found in Table 4.14.

Table 4.13

Sample Size and Descriptive Statistics of Reading Achievement Scores for Mobility, Title I Status, and Gender Subgroups

Group	*n*	Mean (SD) Reading Achievement Score
Non Mobile, Non Title I, Male	129	357.66 (6.34)
Non Mobile, Title I, Male	103	354.77 (6.55)
Non Mobile, Non Title I, Female	140	358.93 (6.53)
Non Mobile, Title I, Female	122	356.34 (7.39)
Mobile, Non Title I, Male	137	355.82 (6.60)
Mobile, Title I, Male	200	353.26 (8.66)
Mobile, Non Title I, Female	133	357.36 (6.85)
Mobile, Title I, Female	181	354.07 (6.56)
Total	1145	355.81 (7.30)

Table 4.14

Analysis of Variance results for Reading Achievement Scores Examining Main Effects and Interactions for Mobility, Title I Status, and Gender Subgroups

Source	*df*	*F*	η^2	*p*
Student Mobility (S)	1	17.24	.015	< .001
Title I Status (T)	1	43.49	.037	< .001
Gender (G)	1	9.60	.008	.002
S x T Interaction	1	0.08	.000	.780
S x G Interaction	1	0.12	.000	.726
T x G Interaction	1	0.10	.000	.755
S x T x G Interaction	1	0.30	.000	.586
Error	1137	(49.99)	.940	

Note. Values enclosed in parentheses represent mean square.

The ANOVA indicated no significant two-way interactions between student mobility and Title I status, F (1, 1137) = 0.08, p = .78, student mobility and gender, F (1, 1137) = 0.12, p = .73, Title I status and gender, F (1, 1137) = 0.10, p = .76. Furthermore, the ANOVA indicated no significant three-way interaction between student mobility, Title I status, and gender, F (1, 1137) = 0.30, p = .59. The partial η^2 for student mobility (1.5%) and the partial η^2 for Title I status (3.7%) account for the variability of reading achievement.

Conclusion

This study examined whether there were main effects and interactions between several variables (student mobility, Title I status schools, and gender) on math and reading achievement scores. Results showed main effects for student mobility, with students classified as non-mobile having higher math and reading achievement scores than students classified as mobile. To answer the first two research questions, student mobility does have an effect on math and reading achievement scores. Results also showed main effects for Title I status, with students in non Title I schools having higher math and reading achievement scores than students in Title I schools. Concerning gender, males and females had statistically the same math achievement score, and females had higher reading achievement scores than males. However, for all of these main effect findings, none were of high practical significance as the effect sizes for each respective finding was small in nature. Of equal importance were findings concerning interactions. None of the two-way or three-way interactions were statistically significant. In conclusion, with regards to Research Questions 3 and 4 neither a school's Title I status nor gender had an impact on the relationship between student mobility and math or reading achievement scores, and with regards to Research Question 5, there is no interaction between a school's Title I status and gender on the relationship between student mobility and math or reading achievement scores.

CHAPTER V

DISCUSSION

The outcomes from this research project cannot be fully understood by only looking at results from the statistical analyses. Combining data with the problem, purpose, significance, and method of analysis will allow for a more transparent picture of the study. Therefore, the following sections are necessary in determining the impact of student mobility on academic outcomes. This chapter will begin with a summarization of the study. A section with the interpretation of results, study limitations, and possible implications will follow. Then recommendations for future research will be discussed. Finally the chapter will provide a summary of findings derived from this study.

Summary of the Study

Statement of the Problem

Currently schools are being held to higher accountability standards for achievement than any other time in American history. With state accountability models; federal legislation; and current calls for reforms to curriculum, instruction, and staff development, schools are facing increasing pressures to improve tested academic areas. Schools are mandated under state and federal policies to assess students in reading and math. Scores are reported to the public in the form of composite school scores and disaggregated student subgroup scores. Regardless of which scores are given higher significance by educational stakeholders, neither accountability model (state or federal)

address the confounding variable known as student mobility. Student mobility helps to identify specific patterns of enrollment in elementary school settings and consists of two categories: (1) mobile students – having attended more than one elementary school and (2) non-mobile students – having attended only one elementary school. Student mobility may have a negative impact on school achievement therefore causing high mobility schools to receive unequal treatment as compared to stable schools (Simons et. al, 2007).

Purpose

In an effort to better understand the problem of student mobility, the purpose of this study was to explore how student mobility affects school achievement in math and reading. Other factors such as school Title I classification and gender were studied to determine the impact of each on student mobility and achievement. The following research questions examine how student mobility impacts academic achievement scores on math and reading End of Grade (EOG) assessments.

1. What is the effect of student mobility on school performance scores in sixth grade math?
2. What is the effect of student mobility on school performance scores in sixth grade reading?
3. What is the relationship between student mobility and Title I school status when measuring school performance levels in sixth grade math and reading?
4. What is the relationship between student mobility and gender when measuring school performance levels in sixth grade math and reading?

5. What is the relationship among student mobility, Title I school status, and student gender when measuring school academic achievement in sixth grade reading and math?

Significance

This study is significant because it examines the effect of student mobility on measures of school accountability (Goldstein, Burgess, & McConnell, 2007; Demie, 2002; Lash & Kirkpatrick, 1990). This study further examines the interaction of student mobility with such commonly acknowledged factors as gender and Title I status on measures of school accountability. Currently under the North Carolina ABCs model of accountability, students are given equal representation on the school's proficiency ratings regardless of the length of enrollment in the current school. Therefore, schools are measured on a single snapshot in time rather than a cumulative analysis. A sixth grade student who has experienced the school's culture, curriculum and leadership for the entire elementary continuum will be given the same weight as any student who is considered mobile. This type of analysis neglects to recognize the significance of student mobility. Not factoring in student mobility may cause false interpretations of data about school success, which is then used to make decisions about school programs (Finch, Lapsley, & Baker-Boudissa, 2009; Alvarez, 2006; Sanderson, 2004; Mao, Whitsett & Mellor, 1997; Kerbow, 1996). With the current state (ABCs) and federal (NCLB) accountability policies being used in North Carolina, it is necessary to begin a discussion about analyzing the data accurately by factoring in student mobility.

This study is also significant because it investigates how student mobility impacts schools in North Carolina. As discussed in the literature review, student mobility is a

variable that needs to be addressed when measuring school achievement. Rather than neglecting student mobility and using misinformed testing data, this study takes a transparent look at how mobile and non-mobile students impact school achievement scores. The study builds upon Sanderson's (2004) study of student stability (non-mobility). It also expands the previous study by looking at other factors such as Title I status and gender status in order to determine if any main effects or interactions exist with student mobility and academic outcomes.

Another area of significance relates to the current accountability demands being placed upon school systems across the United States. In North Carolina, elementary schools are mandated to give annual EOG tests in math and reading and report the results to the public. Schools in this study must meet annual objectives in dual accountability models (ABCs and NCLB). Student mobility impacts the way results are interpreted for both accountability models. The only safeguard to help schools that serve mobile populations is the 140 day rule. Under the ABCs model, growth scores are excluded for students who are in a particular school for less than 140 days, but both mobile and non-mobile students receive equal weight when calculating school proficiency. Therefore, all students regardless of their attendance have an impact on school achievement. In addition, this also affects school based decisions concerning curriculum, pedagogy and leadership. Not including student mobility in the data analysis may provide an inaccurate representation of academic outcomes (Finch, Lapsley, Baker-Boudissa, 2009; Goldstein, Burgess, & McConnell, 2007; Alvarez, 2006; Sanderson, 2004; Demie, 2002; Mao, Whitsett, & Mellor, 1997; Kerbow, 1996; Lash & Kirkpatrick, 1990).

Finally, this study is significant because school achievement has been interwoven with state and federal policies very heavily for the past three decades. This trend does not seem to be fading away with current talks to reauthorize ESEA; *Race to the Top* grants for accountability; and overall attempts to restructure testing in North Carolina. Other variables in this study (a) student mobility, (b) Title I school status, and (c) gender are topics of importance but difficult to control. All three are visible factors that may affect school achievement but cannot be changed by educators. In an attempt to accurately interpret school achievement it is necessary to factor in student mobility. The current trends in educational accountability coming from state and federal policies do not include student mobility when analyzing school success. This study suggests that student mobility is masking valid interpretations of school effectiveness. Therefore, student mobility should be factored into state and federal accountability models in order to provide a more accurate representation of school academic outcomes.

Method

In order to determine how student mobility impacts school achievement, the researcher used a series of analyses of variance calculations to analyze archived testing data provided by Catawba County Schools, North Carolina. The following points describe the methods used to run and analyze the data in order to answer each research question:

- The first two research questions focus on how student mobility impacts school achievement in math and reading. Since the focus relies on measuring mobile and non-mobile students and their relationship to achievement in math and reading, an independent-samples *t*-test was conducted. This analysis allowed for the

researcher to evaluate math and reading scores of mobile students compared to non-mobile students.

- The third question asks how a school's Title I status impacts the relationship between student mobility and academic outcomes. A two-way analysis of variance (2 x 2 ANOVA) was used to measure the three variables involved. The 2 x 2 ANOVA helped the researcher to detect any main effects and interactions between the two factors (mobility status and Title I status) and the dependent variable (test score). Two separate tests were run to assess the impact on math and reading scores.
- The fourth question looks at how student gender impacts the relationship between student mobility and academic outcomes. Another two-way analysis of variance (2 x 2 ANOVA) was used to measure the three variables. The 2 x 2 ANOVA was used to search for any main effects and interactions between the two factors (mobility status and gender status) and the dependent variable (test score). Two separate tests were run to assess the impact on math and reading scores.
- The fifth question addresses possible interactions between a school's Title I status, student gender, and student mobility on a school's academic outcomes. Since four variables are considered in this analysis a 2 x 2 x 2 analysis of variance (ANOVA) was used. The 2 x 2 x 2 ANOVA helped the researcher to determine if any of the three factors (mobility status, Title I status, and gender status) had interactions with the dependent variable (test scores). Two separate tests were run to assess the impact on math and reading scores.

Archived testing data were collected from 15 elementary schools located in Catawba County Schools (North Carolina). The data consisted of archived testing results for sixth grade students from the 2009-2010 school-year. Sixth grade data were chosen since that grade signifies the end of the elementary continuum in this school system. The data were taken from the NCWISE information management system and exported to a spreadsheet by Catawba County Schools.

A total of 1,169 math scores and 1,145 reading scores were used to answer the research questions. Fewer reading scores are attributed to some students being under the category of the Exceptional Children's Program. These students showed large discrepancies in reading abilities and qualified for an alternative assessment in reading. Although each child who took the alternative assessment in reading received a proficiency rating (Level I, II, III, or IV) similar to their non-disabled peers, their scores were not used to answer the questions to this study. The alternative assessment uses a different scale score than the regular EOG assessments therefore justifying the exclusion of the alternative assessment scores. It should also be noted that a small number of math scores were also excluded due to some students qualifying for an alternative math assessment.

Interpretation of the Results

The interpretation of the results pertaining to the impact of student mobility on math achievement is presented first. Then results pertaining to effects and interactions of Title I status and gender status on student mobility and math achievement are discussed. Next, the interpretation of the results pertaining to the impact of student mobility on reading achievement is presented. Finally, the results pertaining to the effects and

interactions of Title I status and gender status on student mobility and reading achievement are presented.

Student mobility and Math Achievement

The results from this study show that the relationship between student mobility and academic outcomes is statistically significant when looking at math scores. Although the effect size is small, non-mobile students scored 2.37 scale score points higher than their mobile peers. When comparing the means to the proficiency cutoff scale score for math, 351 (NCDPI, 2010b), non-mobile students were 11.23 points higher than the cutoff compared to mobile students being 8.86 points higher. The non-mobile population's average was within two points of being categorized as a level IV, which is the top level of proficiency on EOG tests. The results from the data suggest that student mobility does impact student achievement in math.

Title I status and math achievement. When trying to determine how Title I status impacts the relationship between student mobility and academic outcomes, it was necessary to explore any effects or interactions between the variables. The results from the study show that Title I status does have a significant main effect on academic outcomes in mathematics. Although the effect size was small, students from non-Title I schools scored 2.49 scale score points higher than their peers attending Title I schools. When comparing the means to the proficiency cutoff scale score for math, 351 (NCDPI, 2010b), students from non-Title I schools were 11.41 points higher than the cutoff compared to students attending Title I schools being 8.92 points higher. The student average from the non-Title I schools was within two points of being categorized as a level IV, which is the top level of proficiency on the EOG tests. The results from the data

suggest that Title I status does impact student achievement in math, but no significant interactions between student mobility and Title I status were found.

Gender status and math achievement. The results from the study indicate that gender status has no impact on student mobility and academic outcomes in mathematics. No significant interactions were found between student mobility and gender. Although non-mobile students scored higher on math achievement tests, gender did not have an effect on academic outcomes in mathematics.

Interactions and math achievement. The results from the study show that no significant two-way interactions exist when analyzing math achievement between the following variables; (a) student mobility and Title I status; (b) student mobility and gender; and (c) Title I status and gender. In addition no evidence existed of any three-way interactions between student mobility, Title I status and gender.

Student mobility and Reading Achievement

The results from the study show that the relationship between student mobility and academic outcomes is statistically significant in reading. Although the effect size was small, non-mobile students scored 2.20 scale score points higher than their mobile peers. When comparing the means to the proficiency cutoff scale score for reading, 350 (NCDPI, 2010a), non-mobile students were 7.06 points higher than the cutoff compared to mobile students being 4.86 points higher. The results from the data suggest that student mobility does impact student achievement in reading.

Title I status and reading achievement. When trying to determine how Title I status impacts the relationship between student mobility and academic outcomes, it was necessary to explore any effects or interactions between the variables. The results from

the study show that Title I status does have a significant main effect on academic outcomes in reading. Although the effect size was small, students from non-Title I schools scored 3.04 scale score points higher than their peers attending Title I schools. When comparing the means to the proficiency cutoff scale score for reading, 350 (NCDPI, 2010a), students from non-Title I schools were 7.42 points higher than the cutoff compared to students from Title I schools being 4.38 points higher. The results from the data suggest that Title I status does impact student achievement in reading, but no significant interactions between student mobility and Title I status were found.

Gender status and reading achievement. The results from the study show that gender status does have a significant main effect on academic outcomes in reading. However, no significant interactions were found between student mobility and gender. Although the effect size was small, female students scored 1.37 scale score points higher than male students. The results from the data suggest that gender status does impact student achievement in reading, but no significant interactions between student mobility and gender status were found.

Interactions and reading achievement. The results from the study show that no significant two-way interactions exist when analyzing reading achievement between the following variables (a) student mobility and Title I status; (b) student mobility and gender; and (c) Title I status and gender. In addition no evidence existed of any three-way interactions between student mobility, Title I status and gender.

Summary of Results

The purpose of the study was to determine whether student mobility impacted school achievement in math and reading. Mobility and non-mobility play a pivotal role in

measuring school success. Students receiving continuous exposure to a single school environment allows for school achievement to be higher than students who move in and out of a school (Sanderson, 2004; Demie, 2002; Alexander, Entwisle, & Dauber, 1996; Kealey, 1982). Similar results to Sanderson's (2004) research were found in this study. Students who were identified as non-mobile scored higher on achievement tests than their mobile peers.

In an effort to expand the study, other factors such as Title I status and gender were considered when exploring the impact of student mobility on academic outcomes. The results indicated that Title I status also has an impact on school achievement in math and reading. Students from non-Title I schools scored higher than students from Title I schools. However, no interaction was found between student mobility and Title I status in relation to academic outcomes. In regards to gender status, females outscored males in reading achievement but no significance was found in math achievement. No interaction was found between student mobility and gender status in relation to academic outcomes. The results also indicated no significant interactions between student mobility, Title I status, gender, and academic outcomes in math and reading.

The effect sizes were small when calculating the impact of student mobility on academic outcomes. It is important to note that student mobility and Title I status main effects exist when measuring each variable against academic outcomes in math and reading. Gender status also showed a small effect for reading achievement but no effect for math achievement. Even though no interactions were found between the variables and academic outcomes, the data suggest that similar results to Sanderson's (2004) study were found in this study. Students who were classified as non-mobile scored higher in

math and reading than the mobile students. Therefore, the researcher suggests that student mobility is a confounding variable that needs to be considered when measuring the academic outcomes of schools.

Study Limitations

This study had four major limitations. The first two limitations were due to issues with the NCWISE data information system. Numerous errors, missing data and lack of data manipulation caused the study to be limited in terms of providing a more accurate representation of the data. Regardless of the issues with the NCWISE data, Jennings, Kovalski and Behrens (2000) argue that " . . . at times the researcher must analyze records that are incomplete or struggle with sets of data that have key variables omitted" (p. 7).

The first limitation to the study was that Catawba County Schools only provided one year of testing data that the researcher could use. After requesting data for the following school-years - 2007-2008, 2008-2009, and 2009-2010 - the data were downloaded and given to the researcher in a spreadsheet format. Due to incompatibilities in the NCWISE system the researcher could not use data sets from the 2007-2008 and 2008-2009 school-years. The data from the 2009-2010 school-year showed each student's entry date into elementary school. Unfortunately the two previous years worth of data did not show the entry date for elementary school. Instead the data showed the entry dates into each student's middle school. Since the researcher was not able to link the testing data from the previous two years to the correct elementary school, it was necessary to exclude those results.

The second limitation was that the NCWISE information system was not able to provide additional data that would help to better define mobility. The data provided did not contain dates for every entry and withdrawal into Catawba County Schools. Only entry dates into the current school were available. Therefore, students who moved one time were given equal weight to students who moved multiple times. It was also not possible to document students who were identified as geographically mobile (moves within the school system).

The third limitation was that data were only collected from one school system in North Carolina. With 115 school systems in the state it would be difficult to generalize the results of this research. Although the EOG testing data come from a uniform set of tests, it would be beneficial to include other school districts within differing geographic areas. This study focused on testing data from a rural school district. Assessing other districts with a mixture of urban and rural settings may provide a clearer insight into how student mobility impacts academic outcomes.

The fourth limitation was that sample sizes were small. When assessing math results, 1,169 students were used. Reading accounted for 1,145 students. These small sample sizes may have weakened the power of the analyses. Therefore, main effects between groups did not show a major statistical significance.

Implications

This study shows that academic outcomes may be dependent on variables that are a part of each school. In the data set used from Catawba County Schools (North Carolina) it is evident that schools with high student mobility may have a different impact on academic outcomes than schools with low student mobility. Results also indicate that

Title I status and gender may have an impact on academic outcomes. Although results show small effects for mobility and Title I status, both are statistically significant, therefore causing a need to conduct further research into how factors such as student mobility and Title I status impact school success. It is important to note that although both factors show an effect on academic outcomes, neither is dependent upon the other. Therefore, this study produced no interactions between student mobility and Title I status in relation to academic outcomes in math and reading.

Implications for Teachers and Schools

This study has implications for teachers and schools when determining ways to combat issues surrounding student mobility. One implication that may be applicable to the public school setting is the idea of building social capital, an integral piece of ecological systems theory discussed previously in the literature review (Johnson, 2008; Gredler & Shields, 2004; Bronfenbrenner, 1994). According to Goddard (2003), "schools characterized by high levels of social capital had higher pass rates for their students on the high-stakes state-mandated assessments" (p. 69). Social capital ideology such as nurturing and induction programs for mobile students may help to provide ample opportunities for transient populations to more quickly assimilate into their new settings. Schools that are under the envelope of the *United States Department of Defense* (DOD) tend to effectively handle student mobility through a variety of methods. Their methods and programs, which include building social capital, have proven to be successful. DOD schools, with an annual 37% attrition rate, boast some of the highest scores on National Assessment of Educational Progress (NAEP) assessments when compared to public

schools across the nation (Smrekar & Owens, 2003). According to Smrekar and Owens (2003), DOD schools have a belief to "do the right things and do things right" (p. 167).

Coleman (1987) contends that schools should develop and implement programs that contain "attention, personal interest, intensity of involvement, and . . . intimacy" (p. 38). Such structure may consist of the following items that need to be explored more in depth to help bridge the achievement gap between mobile and non-mobile students:

- Standardized testing in DOD schools is a key component to interpreting academic outcomes. By using testing results to measure individualized successes and struggles, teachers may be able to create a better plan of action for student success. School leaders can also use these results to modify and implement their school improvement plans. Standardized testing in DOD schools differs from traditional public schools due to a uniform set of tests being used at each DOD site. This enables DOD schools to track student movement and growth for families that are being transferred to different bases. Unfortunately, this is not the case in public schools. Although NCLB (2002) requires states to administer high-stakes testing in math and reading, it does not mandate which tests should be used. Therefore, each state uses different tests to measure academic outcomes. This prevents accountability systems from tracking student success of students moving from other states (Smrekar & Owens, 2003).
- Due to the structure of social capital in DOD schools, care plans are developed for mobile students. Upon entry into school, new students are interviewed about their previous school and learning opportunities. This enables teachers to develop a personalized baseline for learning. Students are also assessed within the first two

days to determine their academic levels in reading and math. In addition to interview data and academic levels, schools form a partnership with parents and develop home and school commitments. Involving the school and parents allows for a stronger relationship to develop between the child and adults in his or her life (Smrekar & Owens, 2003).

Implications for Government Entities

This study provides implications for accountability systems that government entities regulate on school systems. Research has indicated that neglecting student mobility when interpreting testing data causes a misrepresentation of data (see chapter 2). The results indicate that mobile students are at a disadvantage when being compared with non-mobile populations in school settings. State and federal officials may need to further explore the impact that student mobility has on academic outcomes. Two possible solutions to help with student mobility are (a) weighted results and (b) increased flexibility with data storage systems. Using weighted scores based upon enrollment could help to assess the progress of mobile and non-mobile students in addition to providing a more accurate picture of the composite achievement outcomes of schools (Offenberg, 2004). Increasing flexibility with data storage systems may also enable government entities, school officials, and researchers opportunities to disaggregate data and use the results to make more informed decisions about school functions.

Implications for Title I Schools

Results from this study suggest that students in Title I schools perform lower in math and reading when compared to their peers in non-Title I schools. More research needs to be conducted in this area to determine factors behind the achievement gap.

Although Title I schools are categorized by FRL percentages, it is important to note that this study did not label each student as above or below the poverty level. Results show only the school status and do not reflect the true picture that effects of the poverty level may cause. The purpose of this study was to investigate the possible impact of school mobility on academic outcomes. Title I status was a factor considered to have possible interactions with student mobility. Results suggest that both student mobility and Title I status are significant, but no interactions exist between the two factors. Even though no interactions were found from the data analysis, it is important to note that Title I status does have an impact on academic outcomes in math and reading. Further exploration is needed when considering the relationship between Title I status and school achievement.

Implications for Gender Status

Gender status was another factor that was considered when exploring for interactions with student mobility and academic outcomes. Although no interactions were found, results indicate that females outperform males in reading achievement. Further exploration is needed when considering the relationship between gender status and school achievement.

Implications for the Community

Results from this study indicate that student mobility and Title I school status have significance when measuring and interpreting school achievement. Mobile students and Title I students tend to have lower score when compared to their peers. These results can cause implications in the communities that surround schools. For schools that have issues with mobility or poverty (as measured by Title I status), effects can be felt in community support, real estate values, and the local economy.

Recommendations for Future Research

As a result of this study there are six recommendations. These recommendations may help to enhance the importance of paying attention to student mobility and offer insight into ways that can help transient populations overcome issues of mobility. Furthermore, the recommendations will provide suggestions to expand current research. The following are recommendations for future studies:

1. Follow the effects of student mobility into middle and high school settings. Even though research suggests that mobility is most harmful in the elementary setting, it may prove beneficial to analyze how mobility impacts students in secondary school settings (Offenberg, 2004; Sanderson, 2004; Dunn, Kadane, & Garrow, 2003; Rumberger & Larson, 1998).
2. Redefine student mobility in order to provide more accurate results. Since data used in the study were not flexible in determining entry dates, the researcher suggests that future studies of student mobility be categorized as the following; (a) mobility as the number of years in the current school and (b) non-mobility as continuous enrollment. Defining mobility in this way may be helpful in determining if this study's definition of mobility and number of years' attendance impact academic outcomes differently.
3. Expand the Title I status variable. Students from Title I schools could be coded as below or above the poverty rate. This coding may help to provide an in-depth analysis of the effectiveness of school programs in a Title I setting. Conducting this study could also help explore possible interactions between student mobility and student poverty in relation to academic outcomes.

4. Explore how gender status impacts school achievement. In this study females scored higher on reading achievement tests than male students. Differences between scores in math were not significant. There is a need to further investigate this to determine if results can be replicated in additional districts and if any significant differences are found in math achievement.
5. Examine school accommodations for mobile populations. This raises two important questions for additional research. First, how do schools with high mobility and high proficiency function differently than schools with high mobility and lower proficiency? Second, what is the impact on the classroom environment in highly mobile schools?
6. Replicate this study in other settings and with larger group sizes. Since this study was conducted in one North Carolina school system, expanding the study into other school systems (rural and urban) may be beneficial. If similar results are found in other school systems, then conclusions about the impact of student mobility on academic outcomes will gain external validity. The expansion into more school districts would increase the sample size, therefore possibly revealing statistically significant interactions that were not evident in this study.

Conclusion

This study suggested that student mobility has an impact on academic outcomes. Students identified as mobile (having attended more than one elementary school) scored lower than their non-mobile (having attended only one elementary school) peers in math and reading. Student mobility should be considered when determining measures of school accountability. Neglecting to include student mobility may lead to misinformed decisions

based on school outcomes. Second, this study helps add to the literature base examining student mobility and its relation to student achievement. Since previous research focused on mobility and achievement, this study expanded the research base by investigating outcome interactions between student mobility, Title I status, gender and achievement. Although no interactions were found, the study revealed that student mobility and Title I status each have significant effects on academic outcomes in math and reading, while gender status showed significance in reading achievement. Finally, this study validated the importance of using data to make informed decisions about school programs. Looking at ways that schools function with issues of student mobility as a part of "life rather than an intractable problem" (Smrekar & Owens, 2003) is supported by the review of literature and data analysis. This study may prove useful to others interested in exploring similar studies or pursuing recommendations for future research on student mobility and its impact on academic outcomes.

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BIOGRAPHICAL INFORMATION

Thomas Clifton Howell was born in Speedwell, Virginia, on March 25, 1977. He graduated from Saint Stephens High School in Hickory, North Carolina, in June 1995. After high school, he attended Catawba Valley Community College, in Hickory, North Carolina for two years before transferring to Appalachian State University, in Boone, North Carolina. Mr. Howell received the following degrees from Appalachian State University: Bachelor of Science in Elementary Education in December 1999, Master of School Administration in May 2003, and the Educational Specialist degree in Educational Leadership in May 2005. He was awarded the Doctor of Education degree in May 2011.

Mr. Howell is an Assistant Principal at Webb A. Murray Elementary School in Hickory, North Carolina. He is married to Diane Howell, who is a school nurse in Hickory, North Carolina. Mr. Howell is also the proud father of Hope Marie Howell, who was five years old at the time this biography was written.