STUDENT ACADEMIC SUCCESS AS RELATED

TO STUDENT AGE AND GENDER

By

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ABSTRACT

This study examined the possible relationship between student age and student gender on academic achievement on a state mandated assessment for a cohort of North Georgia elementary school students in their first, second, and third grade years. Study results indicated that student age had a statistically significant impact on academic achievement for students in their first and third grade years on the mathematics portion of the assessment. Older students within the cohort scored at higher academic levels of achievement on the mathematics assessment than did younger students. Student age did not have an impact on scores for the reading portion of the assessment. Study results also indicated that student gender did not impact achievement scores on either the mathematics or reading portion of the assessment. Implications from the results suggest a need to include gender sensitivity training for teachers, increased mathematics support for younger students, and parent education workshops.

DEDICATION

This dissertation is dedicated to my husband, James, and my two children, Coda and Teagan. I hope you guys are proud of me, because I am so proud of you.

This dissertation is also dedicated to my Aunt Dianne Tennant, my mentor for as long as I can remember.

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Lastly, a tremendous thanks to my family. You've encouraged me from the beginning, and have shown that support by providing meals, babysitting, and pep-talks. They say it takes a village to raise a child; I say it takes a family to write a dissertation.

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CHAPTER 1

INTRODUCTION TO THE STUDY

This dissertation describes a research study that examined the possible relationship between students' school entrance ages and their academic success. Specifically, how does the academic success of students who enter school at an age comparatively younger or older than their peers (and therefore remain comparatively either younger or older than their peers within their grade level) compare to the academic success of students who enter school at an age comparatively average to their peers? Academic success was defined and determined by a state mandated criterion-referenced academic assessment. This research study also examined the issue of student gender as a possible contributing factor, in addition to age, to student academic success.

Statement of the Problem

Educators and parents have been known to hold strong beliefs about academic practices that are unsupported by research. The benefit of such academic practices may have been proven false or there may be insufficient research or conflicting research in the field to substantiate them. One example is the belief that academic success is strongly and positively related to a student's age at entrance to school or compared to the age of classmates (Grissom, 2004; Lorne, 2001). Some parents "wonder whether they should delay enrollment even when their child seems ready for kindergarten" (Oshima & Domaleski, 2006, p. 212), especially after reading newspaper articles or hearing stories heralding successes for young children whose parents delayed their entry into school (Graue & DiPerna, 2000). Numerous studies regarding school entrance age and student success have been published, yet experts do not agree on the extent to which student age affects student success, or if it produces a consistent affect at all (Beattie, 1970; Ede, 2004; Gray, 1985; Griffin & Harvey, 1995; Grissom, 2004; Hedges, 1978; May, Kundert, & Brent, 1995; Meisels, 1995; Quinlan, 1996).

At the time of this study, Georgia's entrance age policy for first grade required the student to be six years old on or before September first of that school year (Georgia Department of Education, 2010e). However, states differ on school entrance age policies, from the August first cut-off date used by Indiana, Hawaii, and Missouri, to the January first cut-off date used by Connecticut and Vermont (Education Commission of the States, 2010). This disagreement among various states and other education experts can lead to confusion for parents, teachers, and education policy makers.

Purpose of the Study

The primary purpose of this study was to investigate the possible relationship between chronological age and academic success for a cohort of children as they progressed through their first, second, and third grade school years. Academic success was defined as meeting minimum requirements on the Georgia Criterion-Referenced Competency Tests in both reading and mathematics (Georgia Department of Education, 2010b). The secondary purpose of this study was to determine if gender, paired with age, was related to student academic success. This question addresses the belief that female children mature at a faster rate than male children, and are thereby less affected by age and early school entrance (Ede, 2004; Gray, 1985). This study also added to the body of literature in the field of education where the issue of school entrance age and academic success is still questioned due to mixed findings from previous studies and reports.

Rationale for the Study

Many parents rely on classroom teachers and education policy makers to recommend what is best for their children when they enter the realm of formalized schooling. Despite this, there is still debate among these professionals over what effect school entrance age has on a student's academic achievement (Ede, 2004; Gray, 1985; Griffin & Harvey, 1995; Grissom, 2004; Hedges, 1978; Meisels, 1995; Quinlan, 1996). The underlying theoretical framework encompassed in this ongoing debate and examined in this study relates to student age and gender. DeMeis and Stearns (1992), Gullo and Burton (1992), Trapp (1995), and Parks (1996) all found a positive link between delayed entry into school (age of the student at school entry), and improved academic performance. These authors recommended delaying a child's entrance into school as a possible way to improve academic performance. Grissom (2004) also found a positive relationship between age and academic success for some of the older children in his study, but argued "against modifying entrance age policies, delaying school entry…or retaining students to improve academic achievement" (p. 1) based on results with students deemed overage. Grissom (2004) found that students who were older yet still age appropriate to their peers did better academically than their younger classmates, but students who were overage from previous retentions and other factors actually performed worse academically than their peers. Wood, Powell, and Knight (1984) also disagreed with changing entrance age policies, but for a different reason, stating "chronological age of children entering kindergarten within the range of 4 to 6 years is unrelated to eventual success or failure" (p. 8). May, Kundert, and Brent (1995), Meisels (1995), and Quinlan (1996) also studied age and student success, and found no link between increased student age at school entry and improved academic performance.

Gender may also have conceptual underpinnings linked to student academic success. Lorne's (2001) longitudinal study on school readiness factors, including age and gender, reported the gender difference between students considered at high readiness and low readiness for school to be insignificant. In contrast, Ede (2004) stated that "gender needs to be considered, as it plays a role in kindergarten performance" (p. 207). Oshima and Domaleski (2004) reported that "gender was a significant predictor for reading, but not for mathematics" (p. 215) when studying students in grades kindergarten through eight. Clearly, research studies in the area of student gender related to academic performance have also yielded mixed results.

Educators and policy makers should have a broad scope of literature and research studies available to them when they make academic recommendations to parents (Grissom, 2004). Further research in the area of student success and school entrance age can add additional evidence to the body of literature in the field of education. In addition, the longitudinal nature of this study allowed the researcher to examined test score data on individual students over a three year period, a perspective which is often lacking in the research on student success and age (Grissom, 2004; Oshima & Domaleski, 2006).

Definition of Terms

Academic redshirting. The term redshirting indicates academic redshirting, which refers to "postponing entrance into kindergarten of age-eligible children in order to allow extra time for socio-emotional, intellectual, or physical growth" (Katz, 2000, p. 2).

Carpet County Schools. Carpet County Schools is a pseudonym used to represent the actual Georgia county school system in which this study took place.

Causal-comparative research. Causal-comparative research “attempts to determine the cause, or reason, for existing differences in the behavior or status of groups of individuals” (Gay, Mills, & Airasian, 2006, p. 595).

Chi square test. A chi square test “compares the proportions actually observed in a study to the expected proportions to see if they are significantly different” (Gay, Mills, & Airasian, 2006, p. 370).

Chronological age. Jenkins (2003) referred to chronological age as “a student’s actual age from birth” (p. 7).

Coding. The term coding refers to the numerical subcategory codes on the Georgia CRCT which indicate participation in special programs such as gifted, special education, English as a second language, speech, and others (Georgia Department of Education, 2010b).

Cohort. Cohort refers to students from the sample population who fit the study criteria. These students were enrolled in Carpet County Schools as first graders during the 2005-2006 school year and remained in Carpet County Schools for the next two years. They were assessed using the Georgia CRCT for first grade in 2006, the Georgia CRCT for second grade in 2007, and the Georgia CRCT for third grade in 2008.

Compulsory education. Compulsory education refers to “school attendance that is required by law on the theory that it is to the benefit of the state or commonwealth to educate all the people” (Johnson, Dupuis, Musial, Hall, & Gollnick, 1999, p. 295).

Cut-off date. A cut-off date refers to the date at which a child must turn or have turned the required age to be allowed to enroll in a public school.

Delimitation. A delimitation refers to “the boundaries of the study, and ways in which the findings may lack generalizability” (Glatthorn & Joyner, 2005, p. 168).

Economically disadvantaged. The term economically disadvantaged is a status conferred on students who participated in the National School Lunch Program (NSLP).

Georgia CRCT. The Georgia Criterion Referenced Competency Tests (CRCT) is a set of student assessments that are “designed to measure how well students acquire the skills and knowledge described in the Georgia Performance Standards” (Georgia Department of Education, 2010b). These assessments are required of all Georgia students in grades one through eight.

Georgia Performance Standards (GPS). The Georgia Performance Standards are state curriculum standards which provide the academic content which students are required to master at each grade level, beginning in first grade (Georgia Department of Education, 2010e). Georgia’s academic standards are in accordance with the No Child Left Behind Act of 2000 (U.S. Department of Education, 2006).

Interval variable. An interval variable is “a measurement scale that classifies and ranks subjects” and “is based on predetermined equal intervals, but does not have a true zero point” (Gay, Mills, & Airasian, 1999, p. 599).

Limitation. A limitation is “some aspect of the study that the researcher knows may negatively affect the results of the study but over which the researcher has no control” (Gay, Mills, & Airasian, 2006, p. 83).

Maturational age. Jenkins (2003) referred to maturational age as “readiness to achieve at a set task” (p. 7).

Mean. The mean is “the arithmetic average of a set of scores. The mean is found by adding all the scores in a given distribution and dividing that sum by the total number of scores” (Georgia Department of Education, 2010b).

National School Lunch Program (NSLP). The NSLP is a “federally assisted meal program operating in public and nonprofit private schools and residential child care institutions. It provided nutritionally balanced, low-cost or free lunches to children each school day” (United States Department of Agriculture, 2011, p. 1).

No Child Left Behind Act of 2002. The No Child Left Behind Act of 2002 (NCLB) emphasizes the importance of school accountability on student academic achievement measures. The goal of these assessments is to ensure that students remain on track for academic success, including high school graduation (U.S. Department of Education, 2010).

Non-successful. The label “non-successful” was given to students in the study who scored below 800 on the Georgia Criterion Referenced Competency Tests, which resulted in a designation of Does Not Meet Standards.

Oldest. The label “oldest” was given to students in the study who are chronologically the oldest quartile of students in each given cohort, minus any students labeled Overage.

Overage. The label “overage” was given to students in the study with birth dates which made them eligible for enrollment in an earlier school year.

Public school. A public school refers to an educational institution which is operated and controlled by state and local government (Johnson, Dupuis, Musial, Hall, & Gollnick, 1999).

Quartile. There are four quartiles within a set of data, which refers to percentile rankings within the data set. The upper quartile is the 75^{th} percentile and above, while the lower quartile is the 25^{th} percentile and below (Gay, Mills, & Airasian, 2006).

Readiness. La Paro and Pianta (2000) used an operational definition of readiness which included a child’s academic skills, abilities, and behaviors. Additionally, Schunk (2008) defined readiness as “what children are capable of doing or learning at various points in development” (p. 330).

Scale score. A scale score is “a mathematical transformation of a raw score. Scale scores provide a uniform metric for interpreting and comparing scores within each grade level and content area” (Georgia Department of Education, 2010b).

School accountability. “Accountability in education means holding schools responsible for what students learn” (Johnson, Dupuis, Musial, Hall, & Gollnick, 1999, p. 215).

School entrance age. School entrance age refers to the individual chronological age at which a student enrolls into a public school setting, regardless of grade level. For many students, this occurs during the pre-kindergarten, kindergarten, or first grade years (Katz, 2000; Meisel, 1992).

Standard deviation. The standard deviation is “a measure of the variability or dispersion of scores that represents the average difference between individual scores and the mean. The more the scores cluster around the mean, the smaller the standard deviation” (Georgia Department of Education, 2010b).

Standard error of measurement (SEM). The standard error of measurement is “the amount an examinee’s observed score (the score an examinee actually receives on a test) may vary from his or her ‘true’ score, based on the reliability of the test” (Georgia Department of Education, 2010b).

Student attrition. The term attrition referred to the percentage of students who left the school district at some point during the time period of the study which caused them to miss one or more grade level Georgia CRCT tests. These students were eliminated from the study.

Student diligence. Student diligence can be defined as “effort expended toward holistic educational development” (Bernard, Drake, Paces, & Raynor, 1996, p. 10).

Successful. The label “successful” was given to students who scored at or above 800 on the Georgia Criterion Referenced Competency Tests, which resulted in a designation of Meets Standards or Exceeds Standards.

Variable. A variable is a concept such as intelligence, height, or aptitude that can assume any one of a range of values (Gay, Mills, & Airasian, 2006, p. 603).

Youngest. The label “youngest” was given to students who are chronologically in the youngest quartile of students in each given cohort.

Study Limitations

Gay, Mills, and Airasian (2006) defined a limitation as “some aspect of the study that the researcher knows may negatively affect the results of the study but over which the researcher has no control” (p. 83). There are some clear limitations in the current study. Many researchers (Brown & Wright, 2011; Crnic & Lamberty, 1994; Gullo & Burton, 1992; Valenti, 2009) have stated that preschool experience can improve academic success for students. However, the variable of preschool experience was not available in the data set which contained the Georgia CRCT scores for participants and used for this study. Therefore, this lack of information became one limitation of this study.

Student movement and redistricting within the Carpet County School District which resulted in students changing elementary schools within the district was a second limitation of this study. To remain part of this sample, students must have taken the Georgia CRCT for first grade in 2006, second grade in 2007, and third grade in 2008 while enrolled as students of the district. Any excessive student movement which resulted in a student leaving the Carpet County

School District and missing an assessment during the years in question resulted in removal of that student from the sample. In addition, all schools within the district adopted the district's vision, mission, and beliefs statement which included having a unified focus on students. This unified focus included following the same curriculum guides and pacing for each grade level across the district, thereby minimizing curriculum loss for students who changed schools within the district. Therefore, while student movement within the school district caused by redistricting or other forces remained a limitation of this study, the impact may have been minimal.

An additional limitation of this study was related to the sample of the study, specifically student identification within the Cohort. Individual student data for students who took the Georgia CRCT was reported to the researcher anonymously and with random student identifiers (rather than Social Security Numbers or student ID numbers), revealing only each participant's gender, birth date, grade, coding for special programs such as gifted, special education, or English as a second language, and the scores for the Georgia CRCT for each year in question. Each participant was assigned a random study number and tracked participants in the Cohort by gender, birth date, and special programs coding. Any participant from the study Cohort who could not be positively tracked from first through third grade was eliminated from the study. Although this reduced the number of participants in the Cohort, thereby limiting the scope of the study, such measures helped to maintain the internal validity of the data.

Study Delimitations

Glatthorn and Joyner (2005), defined study delimitations as "the boundaries of the study, and ways in which the findings may lack generalizability" (p. 168). The primary delimitation of this study was related to the participants themselves. Students who were eligible to start school in a given year yet were enrolled in the following year were removed from the study, as well as any student receiving services for gifted, English as a second language, speech, or special education. Any possible implications drawn from this study must take into account the study population and may not apply to other diverse populations not related to the population studied by the researcher.

A second delimitation of this study was related to the student assessment tool, the Georgia Criterion-Referenced Competency Test (CRCT). The Georgia CRCT is specifically correlated to test the Georgia Performance Standards (Georgia Department of Education, 2010b) and may not correlate to student curriculum from other states, thereby limiting generalizability to other locations (Dworkin, 2005).

Research Questions and Hypothesis

The research questions and hypothesis for this study relate to a cohort of students who remained in Carpet County Schools for three consecutive years. Each of these students, hereafter referred to as the Cohort, were assessed on the Georgia CRCT for first grade in spring of 2006, second grade in spring of 2007, and third grade in spring of 2008.

Research Question 1: Is there a significant difference in reading scores between male and female first grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort?

Null Hypothesis 1: There is no significant difference in reading scores between male and female first grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort.

Research Question 2: Is there a significant difference in mathematics scores between male and female first grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort?

Null Hypothesis 2: There is no significant difference in mathematics scores between male and female first grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort.

Research Question 3: Is there a significant difference in reading scores between male and female second grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort?

Null Hypothesis 3: There is no significant difference in reading scores between male and female second grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort.

Research Question 4: Is there a significant difference in mathematics scores between male and female second grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort?

Null Hypothesis 4: There is no significant difference in mathematics scores between male and female second grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort.

Research Question 5: Is there a significant difference in reading scores between male and female third grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort?

Null Hypothesis 5: There is no significant difference in reading scores between male and female third grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort.

Research Question 6: Is there a significant difference in mathematics scores between male and female third grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort?

Null Hypothesis 6: There is no significant difference in mathematics scores between male and female third grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort.

CHAPTER 2

REVIEW OF LITERATURE

Much research has been conducted concerning the proper time for children to begin formal schooling, and what factors can affect a child's academic success (Crnic & Lamberty, 1994; DeMeis & Stearns, 1992; Graue & DiPerna, 2000; Gullo & Burton, 1992; Langer, Kalk, & Searls, 1984; Lincove & Painter, 2006; Ogletree, 1988; Oshima & Domaleski, 2006; Parks, 1996; Trapp, 1995; Uphoff & Gilmore, 1985). Following is a review of multiple publications in the fields of education and psychology addressing some of the many aspects of school success for children, specifically, the history of school entrance age requirements, student age as a factor in school success, school readiness as a factor in school success, gender as a factor in school success, other factors in school success, parental responses to literature, and trends in school accountability.

History of School Entrance Age Requirements

The United States Constitution does not instruct America on how to educate its youth, thereby leaving the responsibility and power of education up to the individual states (United States Constitution). In 1940, there were over 117,000 separate school districts within the United States, each with its own set of rules on how, and when, to educate children. By 1980, due mainly to school district consolidation, this number dropped to approximately 16,000 (Johnson, Dupuis, Musial, Hall, & Gollnick, 1999). With fewer school districts in each state, it became easier for state governments to pass and enforce compulsory education laws. Compulsory education refers to “school attendance that is required by law” (Johnson, Dupuis, Musial, Hall, & Gollnick, 1999, p. 295). Each of the fifty states, plus the District of Columbia, have compulsory education laws requiring children to attend a public or private school, or a home school program (Education Commission of the States, 2010).

The age of compulsory attendance varies from state to state, with eight states plus the District of Columbia requiring students to attend school at age five, 24 states requiring students to attend school at age six, 16 states requiring students to attend school at age seven, and two states requiring mandatory attendance at age eight. Compulsory attendance refers to student age, however, not grade level, and many states offer kindergarten, but some do not require students to attend (Education Commission of the States, 2010). In Georgia, where the compulsory attendance age is six years old, parents can choose, but are not required, to enroll their children in kindergarten at age five. Alternately, Georgia parents may choose to wait until their child is six years old and enroll him or her in either first grade along with age appropriate peers, or in kindergarten as one of the oldest children in that grade (Georgia Department of Education, 2010e).

Student enrollment cut-off dates also determine when a child is allowed to enroll in school, and vary from state to state. A cut-off date refers to the date at which a child must turn or have turned the required age to be allowed to enroll in a public school. Currently, there are fourteen different cut-off dates across the United States, from August 1st, at the beginning of the school year, all the way to January 1st, at the midpoint of the school year. September 1st is the most popular cut-off date, with nineteen states, including Georgia, using it as a means to determine student enrollment eligibility (Education Commission of the States, 2010; Georgia Department of Education, 2010e). In addition, eight states leave it up to the local education authority (LEA) to determine the student cut-off date for their students (Education Commission of the States, 2010).

It is important to note that student enrollment dates can be changed by state legislatures. According to the Education Commission of the States (2010), Arkansas, California, and Nebraska will be changing their cut-off dates within the next three years. Each of these states will be requiring students to turn the appropriate age between six and ten weeks earlier in the school year, effectively ensuring that student cohorts entering the classroom will be older than in previous years.

Age as a Factor in Student Academic Success

In an overview of the historical data regarding school enrollment age and school success, Gray (1985) stated "findings on the importance of chronological age are mixed" (p. 9). Gray (1985) also noted "historical data do not establish a clear, rational 'right age' for school entry" (p. 5). Many researchers have studied the possible relationship between school entry age and academic success. Nearly fifty years ago, Green and Simmons (1963) studied student age as a contributing factor to school success, comparing "early entrants to years of achievement" (p. 45). Green and Simmons (1963) questioned the wisdom of enrolling students at an earlier age and summarized, "despite the extra year of schooling, the early entrant is only three months superior in achievement to the regular entrant at a particular age" (p. 45). Hedges (1978) also studied student age and academic success, "No matter what the entrance age limit may be, the children who enter [earliest] have more problems and achieve less than those of equal IQ who enter [later]" (p. 8). Hedges (1978) concluded, "earlier is not always better" (p. 9).

While these researchers studied the possible benefits and drawbacks of enrolling students into school earlier than their peers, other researchers studied students enrolled as the oldest of their peer groups. Crosser (1991) found that academic benefits for students who entered school a year older than their peers persisted through ninth grade for both males and females. Langer, Kalk, and Searls (1984), DeMeis and Stearns (1992), Gullo and Burton (1992), Trapp (1995) and Parks (1996) found a positive link between delayed age of school entry and improved academic performance. When compared to younger, yet still age appropriate peers, a meta-analysis by La Paro and Pianta (2000) and a research study by Stipek and Byler (2001) concluded that older children in school classrooms performed better academically than their younger peers. However, it must be noted that some researchers who agreed on the "short term academic and behavioral benefits" of delayed school entry could not agree on the long-term benefits (Oshima & Domaleski, 2006, p. 212).

In contrast to studies which found a positive connection between student age and academic performance, Wood, Powell, and Knight (1984) stated, "chronological age of children entering kindergarten within the range of 4 to 6 years, is unrelated to eventual success or failure" (p. 8). Dietz and Wilson (1985), and DeMeis and Stearns (1992) agreed, finding no significant relationship between a student's age and academic achievement. In the first of two studies about school entrance age and education policies, Meisels (1992) argued against the practice of purposeful school delay, which can make an age appropriate student seem young and immature by comparison. In his second study, Meisels (1995) again examined students whose parents purposefully delayed their entry into school, making them the oldest children among their classmates, and again failed to find improved academic performance levels. May, Kundert and Brent (1995), Quinlan (1996), and Morrison (1997) agreed with earlier findings showing no link between student age and academic success.

In two rare studies extending beyond the elementary years, Langer, Kalk, and Searls (1984) followed by Lincove and Painter (2006) studied student achievement into the middle and high school years. Langer, Kalk, and Searls (1984) used data from the 1979 National Assessment of Educational Progress study to determine a possible relationship between student age and achievement scores for students in the fourth, eighth, and eleventh grades. This study found that the oldest students had "significantly higher achievement" than the younger students in fourth grade (at age nine), but these differences had "disappeared by age 17" (p. 61). Lincove and Painter (2006) studied student entrance age in kindergarten and subsequent eighth grade , tenth grade, and twelfth grade achievement scores, and found that "young and older students had similar eighth-grade achievement" (p. 165). Additionally, they found that the younger students outperformed the older students on tests in both the 10^{th} and 12^{th} grades (Lincove & Painter, 2006).

Research studies that examined the link between a student's age and academic performance most often refer to the student's chronological age, not maturational age. However, Gray (1985) noted, "Among children of the same chronological age, developmental and mental age can vary considerably" (p. 14). Braymen (1987) questioned "whether chronological age is an efficient criterion to determine readiness for schooling" (p. 179). The author raised the question of defining school success, pointing out that some schools use criterion-referenced approaches which suggests that "once a child can satisfactorily perform the tasks required at the kindergarten level, the child should be permitted to enroll in kindergarten" (p. 181). Braymen (1987) also discussed parents and educators who "challenged the idea of minimum task performance and compared children with their age-related classmates" (p. 180). Regardless of the definition of school success, Braymen (1987) stated "the issue surrounding optimal age for school entrance has become not merely maturation but rather relative age within a classroom. There will always be a youngest child in any group or grade" (p. 180).

Ogletree (1988) encouraged the use of "maturity age rather than chronological age" when considering school entrance, due to the "importance of maturity as a key predictor of school readiness" (p. 2). He urged that traditional approaches "must be replaced with a developmental approach that examines the needs of the child and the process of the child's development" (Ogletree, 1988, p. 4). Crnic and Lamberty (1994) also made the distinction between students' chronological age and their maturational age, stating that chronological age is related to school readiness, while maturational age is related to learning readiness (Crnic & Lamberty, 1994). Shepard (1997) agreed that emotionally mature children may do better in school compared to younger, less mature children, but stated there are "no valid instruments" to identify these children (p. 86). Jenkins (2003) agreed, referring to chronological age as "a student's actual age from birth" while maturational age was referred to as "readiness to achieve at a set task" (p. 7). Jenkins (2003) linked the idea of maturational age to maturational readiness, and stated, "children should be expected to achieve a specified standard prior to school entry" (p. 8). These researchers (Braymen, 1987; Crnic & Lamberty, 1994; Jenkins, 2003; Ogletree, 1988; Shepard, 1997) agreed that maturational age could differ from chronological age, and that a child's maturity was often a better predictor of a student's school readiness. Morrison's (1997) research on groups of younger and older first graders found no academic differences between the two age groups, and suggested readiness screenings for children entering school, which would take into account the child's maturity. However, possible solutions for testing a child's maturity readiness which could be done on a large scale and with valid results (Shepard, 1997) were sorely lacking.

Currently, research findings in the educational literature regarding age and academic performance are inconclusive. While most agree that early entry into school is not advised outside of special cases, there is no agreement on the value of delayed school enrollment.

School Readiness as a Factor in Student Academic Success

"On the very first day of school, there are wide differences in children's readiness to learn (Ravitch, 2010, p. 239). The term readiness has many different definitions, from a concrete skills basis (e.g., can count from one to ten), to a developmental or behavioral basis (e.g., can listen and follow directions) (La Paro & Pianta, 2000; Meisels, 1995). In La Paro and Pianta's (2000) meta-analysis on student readiness, these authors identified an operational definition of readiness, which included a child's academic skills, abilities, and behaviors. In contrast, Schunk (2008) defined readiness as "what children are capable of doing or learning at various points in development" (p. 330). However, the movement to promote performance standards as a way to hold schools accountable for student academic progress "hinges upon assessment of skills and abilities, thereby increasing the intensity and focus on these elements" (La Paro & Pianta, 2000, p. 444). As long as school accountability is based primarily upon the performance of children on skill based assessments, student school readiness will continue to be an important issue.

When considering a student's readiness to enter school, some authors (Crnic & Lamberty, 1994; Jenkins, 2003; Ogletree, 1988; Shepard, 1997) encourage parents and educators to look to a student's maturity level rather than chronological age, even though the majority of states determine eligibility to enter school by birth date (La Paro & Pianta, 2000; Saluja, Scott-Little, & Clifford, 2000). Ogletree (1988) urged educators to replace traditional approaches "with a developmental approach that examines the needs of the child and the process of the child's development" (p. 4). In an apparent effort to consider the individual developmental needs of children, some states, such as Wisconsin, allow children to enroll into school early if their intellectual and developmental abilities are assessed as superior (Laughlin, 1995). To be considered superior, children must score a certain percentile rank on a state-specified cognitive abilities test, usually 90th percentile or higher. In addition, children undergo an interview process with teachers or other school personnel to see if they can function within the classroom setting (Laughlin, 1995). In Georgia, where this research study took place, there is no apparent statewide provision for early enrollment into kindergarten (Georgia Department of Education, 2010e, 2010g) or pre-kindergarten (Georgia Department of Early Care and Learning, 2011). Instead, children who are deemed advanced by their teachers or parents are referred for the gifted education program, where they are tested using criteria to determine if they are gifted (Georgia Department of Education, 2010c).

Many schools assess a child's readiness to enter school using some form of intellectual assessment (La Paro & Pianta, 2000; Laughlin, 1995). The intellectual assessments used most often for young children place a high degree of emphasis on a child's verbal intelligence and language acquisition skills (Laughlin, 1995), including the *Stanford-Binet Intelligence Scale: Fourth Edition* (Thorndike, Hagen, & Sattler, 1986), the *Differential Abilities Scales – Second Edition* (Elliott, 2007), the *Slosson Intelligence Test-Revised* (Nicholson & Hibpshman, 1991). The *Slosson Intelligence Test – Primary* is an expanded version of the earlier intelligence screening, and includes both a verbal and non-verbal section which educational and health professionals can use to obtain cognitive information about children aged two through seven (Erford & Pauletta, 2005; Erford, Vitali, & Slosson, 1999). Another popular intellectual screening instrument used for assessing young children entering preschool or kindergarten is the *Wechsler Preschool and Primary Scale of Intelligence-Revised* (WPPSI-R; Wechsler, 1989). The

WPPSI-R takes more than an hour to administer and score (Laughlin, 1995). In an attempt to offer a viable substitute screening instrument for young children which would take less time to administer and score, and therefore be more cost effective, Laughlin (1995) proposed the school readiness portion of the *Bracken Basic Concept Scale* (Bracken, 1984) be used as a quick and effective preschool readiness screening instrument.

Not all school readiness instruments are based solely on student intelligence (Buttram, Covert, & Hayes, 1976; Chew & Morris, 1984; La Paro & Pianta, 2000). The *Hayes Early Identification Listening Response Test* (HEILRT) measures a student's readiness level based on "listening comprehension, visual perception, and fine motor skills" (Buttram, Covert, & Hayes, 1976, p. 544). The HEILRT was developed to be a quicker, more efficient measurement comparable to the *Metropolitan Readiness Test* (MRT; Nurss & McGaurvan, 1976), which takes approximately 80 minutes across the recommended three or four testing sessions (Hayes, Mason, & Covert, 1975). *The Lollipop Test* was developed in Georgia as another school readiness instrument that would take less time to administer than the MRT, and would be a less threatening assessment in an individual testing setting (Chew & Morris, 1984). *The Peabody Picture Vocabulary Test – Third Edition* (PPVT-III; Dunn & Dunn, 1997) is another popular readiness measurement used in several states (La Paro & Pianta, 2000). The PPVT-III takes approximately 20 minutes to administer to individual students, is easy to score, and assesses the verbal ability and receptive vocabulary of even very young children (Dunn & Dunn, 1997).

In an extensive meta-analysis on school readiness and readiness instruments (La Paro & Pianta, 2000), the authors reviewed 70 reports published between 1985 and 1998 that identified student readiness instruments and reported student scores from readiness testing completed in kindergarten or preschool, as well as subsequent follow up scores from academic testing in first or second grade. La Paro and Pianta (2000) identified two commonly discussed domains present in almost all readiness tests: the domain of cognition, language, and academic skills development, and the domain of behavior and social-emotional development. In Georgia, where this research study took place, school readiness is currently measured using the *Georgia Kindergarten Inventory of Developing Skills* (GKIDS; Georgia Department of Education, 2010g). The GKIDS assessment replaced the *Georgia Kindergarten Assessment Program* (GKAP) assessment beginning with the 2008-2009 school year, and is the instrument adopted by the Georgia State Board of Education for first grade readiness testing of all Georgia public school students. The purpose of GKIDS is to "assess academic domains of English/language arts and mathematics…as well as two non-academic domains that address students' Approaches to Learning and Personal/Social Development" (Georgia Department of Education, 2010g). GKIDS is a performance based assessment given during the kindergarten year and used as a tool for first grade placement decisions, in conjunction with teacher recommendations and other relevant information (Georgia Department of Education, 2010g). However, parents who wish for their child to continue on to the next grade are not held to teacher recommendations or GKIDS assessment results (Georgia Department of Education, 2011); a student's chronological age, determined by their birth date, is still the major school eligibility criteria for most states, including Georgia (La Paro & Pianta, 2000; Saluja, Scott-Little, & Clifford, 2000).

Childhood Development as Related to School Readiness

Schunk (2008) defined readiness as "what children are capable of doing or learning at various points in development" (p. 330). To study the process of a child's growth and development, one must look at the main theories on human development. Meece (2002) identified five main types of theories on human development: biological theories, cognitive theories, behavioral theories, psychoanalytic theories, and contextual theories. Wading through conflicting developmental theories to explain an educational situation can be confusing, as it immediately brings up the old argument regarding the influence of “nature versus nurture”. In this argument, the belief in the overriding importance of a person’s heredity and biology, otherwise known as nature, and the contrasting environmental view of learning, otherwise known as nurture, appears to be one of the oldest controversies in behavioral science (Schunk, 2008). This argument lies at the base of the philosophical debate among theorists of human development. If one prescribes to a strict biological viewpoint, then “learning will proceed pretty much at its own rate and others cannot do much about it” (Schunk, 2008, p. 330). However, if one believes “the environment makes a difference, then we can structure it to foster development” (Schunk, 2008, p. 330).

The two main types of human development theories which deal with a student’s age and cognitive development (readiness to learn) are behavioral development theories and cognitive development theories. Biological theories of development, an umbrella term under which one could categorize maturationist philosophy, propose that children “proceed through a set sequence of invariant stages of development in roughly the same time” (Schunk, 2008, p. 332). From this perspective, students who are the oldest within their classrooms should enjoy an advantage over younger students who might not have developed or matured to the same extent as their older peers.

Maturationist philosophy, which conceptualizes childhood development within the terms of biological maturation, equates school readiness with the biological time clock within each child (Graue & DiPerna, 2000; Smith & Shepard, 1988; Uphoff & Gilmore, 1985). Just as learning to walk and losing baby-teeth is an issue of physical maturity, some believe that all childhood development, including cognitive learning, is based on individual maturation (Smith & Shepard, 1988). Maturationist views state that a child must be developmentally ready to learn before a school environment can benefit them (Uphoff & Gilmore, 1985); that "readiness is only amenable to the passage of time (Graue & DiPerna, 2000, p. 511).

Childhood development theories which focus on biological processes relate language acquisition and development to a child's chronological age, naming birth through five years old as a "critical period in language development" (Schunk, 2008, p. 391). Language development is a key component which directly affects a child's learning and cognitive development (Dichtelmiller, Jablon, Dorfman, Marsden, & Meisels, 2001; Meece, 2002; Schunk, 2008). According to Jensen (2005), there is an explosion in vocabulary development when a child is between two and three years old, extending up to approximately five years old. Children who come to school at four years old (pre-kindergarten for many four year olds) or five years old (kindergarten for many five year olds) are entering the school setting at a critical time for them to learn to acquire, extend, and use new words in new ways.

In contrast to biological theories of development, cognitive theories "focus on how children construct their understandings of themselves and the world about them" (Schunk, 2008, p. 334). These cognitive theories of development are often called constructivist theories because children actively formulate, or construct, their own knowledge through interaction with their environment and the people and objects within it (Johnson, Dupuis, Musial, Hall & Gollnick, 1999; Meece, 2002; Schunk, 2008). Perhaps the most well known theorist within the field of cognitive development was Jean Piaget. Like biological theories, Piaget's (1970) theory assumes there are set developmental foundations a child must progress through to achieve full cognitive development. Piaget's (1970) theory names four levels, or stages of development, and assumes that these stages are sequential, discrete, and separate, with no blending or merging between stages (Meece, 2002; Schunk, 2008). Although Piaget's (1970) theory cautions that individuals move through the four stages of development at differing ages and one should not equate a stage with a particular age, approximate age ranges do accompany each of the four stages (Johnson, Dupuis, Musial, Hall & Gollnick, 1999; Schunk, 2008). Children between the approximate ages of two and seven years (the pre-kindergarten, kindergarten, and first grade years for many children entering school for the first time) are in Piaget's Preoperational stage (1970). The Preoperational Stage is characterized by a child's thoughts which are mainly anchored in the present, even though they are able to imagine the future and remember the past (Schunk, 2008). Children in this stage have difficulty distinguishing fact from fiction and often believe that cartoon characters and imaginary friends are real. They sometimes believe that six of an item, such as cookies or quarters, is more when they are spread out in a row instead of stacked up in a pile because they do not often attend to more than one dimension at a time (length instead of width, or height, see Schunk, 2008). Children begin to move out of the Preoperational Stage and into the Concrete Operational Stage (Piaget, 1970) at the approximate age of seven, where they begin to think abstractly and when language skills "accelerate dramatically" (Schunk, 2008, p. 339). Like the earlier biological theories, cognitive development, as described by Piaget (1970), suggests that older children might enjoy an advantage over younger peers because they have a higher likelihood of progressing to a further stage of development. This viewpoint would assure that older children are more ready to take advantage of typical classroom instruction (Graue & DiPerna, 2000).

Lev Vygotsky was another prominent developmental theorist whose work falls under the umbrella of cognitive theories. Vygotsky (1978) emphasized the importance of the social environment as key to a child's learning and overall development (Meece, 2002; Schunk, 2008). His Sociocultural Theory (Vygotsky, 1978) revolves around the concept that development and learning cannot be separated, or dissociated, from their context; the interaction between the student and their environment transforms the thinking of the learner (Meece, 2002; Schunk, 2008). From a Vygotskian viewpoint, withholding a child from the school environment because he is younger than his peers is actually detrimental to that child's learning. Instead, Sociocultural Theory (Vygotsky, 1978) would suggest enrolling even very young children into educational settings which encourage interaction with peers and adults, thereby leading to student learning and further cognitive development (Graue & DiPerna, 2000).

Georgia Assessments of Childhood Development and School Readiness

The Georgia Department of Early Care and Learning (2011), the entity operating the Georgia pre-kindergarten system, has chosen the Work Sampling System (WSS; Dichtelmiller, Jablon, Dorfman, Marsden, & Meisels, 2001) as the framework from which to view the individual developmental milestones for pre-kindergarten students. The WSS is a performance assessment system which is designed to assess performance indicators by grade level, beginning in pre-kindergarten and extending through grade five. The WSS breaks down student pre-kindergarten performance into seven domains: language and literacy, mathematical thinking, scientific thinking, social studies, the arts, personal and social development, and physical development and health (Dichtelmiller, Jablon, Dorfman, Marsden, & Meisels, 2001). The Work Sampling System was correlated to the Georgia Pre-K Content Standards as a way to match academic content with developmental milestones for young children in the pre-kindergarten setting. Academic developmental performance indicators for pre-kindergarten students include items such as listens to gain meaning, demonstrates awareness of phonological concepts, and begins to understand number and quantity (Georgia Department of Early Care and Learning, 2006). Non-academic developmental performance indicators include items such as "demonstrates self confidence," "participates in small groups and class life," and " takes care of personal self-care needs independently" (Georgia Department of Early Care and Learning, 2006, p. 1). These guidelines for childhood developmental milestones can be used to help determine what pre-kindergarten students should be able to do while in pre-kindergarten, and when they are performing significantly above or below accepted levels of developmental readiness.

Georgia's kindergarten content standards fall under the Georgia Performance Standards (GPS) and apply to both academic and non-academic developmental areas. The kindergarten standards contain the following domains: English/Language arts and reading, mathematics, science, social studies and physical education with a subset domain labeled "information processing skills" (Georgia Department of Education, 2008b, p.19). Kindergarten performance standards within these domains are items such as the ability to track text from the top of the page to the bottom and from left to right, naming all the upper and lower case letters in the alphabet, and catching and tossing a ball (Georgia Department of Education, 2008b). Kindergarten developmental goals and standards build upon the performance standards and indicators introduced in pre-kindergarten, and teachers seeking to identify the developmental level of an individual kindergarten student might look upon the preceding grade level's (pre-kindergarten) performance standards to gain insight into that student's needs.

First grade Georgia Performance Standards (GPS) follow the same domains as the kindergarten standards: English/Language arts and reading, mathematics, science, social studies and physical education with a subset domain labeled "information processing skills" (Georgia Department of Education, 2008a, p. 22). Performance standards for first graders within these domains are items such as recognizing words through common spelling patterns, counting by twos, fives, and tens, and following three step oral directions (Georgia Department of Education, 2008a). Teachers who question the developmental level of children who fall below the expected performance levels can review the content standards and performance indicators of the preceding grade levels (kindergarten and pre-kindergarten) to help them pinpoint the expected developmental and performance level of these children.

As previously noted, children entering into a Georgia first grade must have turned six years old by September 1st of the school year in which they are enrolling, and Georgia kindergarten children must have turned five years old by September 1st of the school year in which they are enrolling (Georgia Department of Education, 2010e). Similarly, children entering a Georgia pre-kindergarten must have turned four years old by September first of the school year in which they are enrolling (Georgia Department of Early Care and Learning, 2011). However, these state mandated cut-off ages for pre-kindergarten, kindergarten, and first grade do not prohibit children who are older than the cut-off dates from enrolling into these grades. Perhaps most importantly, Georgia content standards and developmental performance indicators are set up by grade level, not by chronological age (Georgia Department of Early Care and Learning, 2008; Georgia Department of Education, 2008a, 2008b), which could give an advantage to children whose increased age gave them a developmental advantage in meeting grade level performance standards over their younger peers.

Gender as a Factor in Student Academic Success

Gender can also be considered as a possible factor in overall school success. Beattie (1970) found “the differences between boys and girls in achievement were as great as or greater than the differences between younger and older entrants” (p. 13). Beattie (1970) referred in part to the Green and Simmons (1963) study which detailed small yet noticeable differences between children who were the oldest and youngest members in their classes. Gray (1985) also studied gender differences, and stated, “sex differences have been shown to be related to academic success” (p. 10). Gray (1985) cited an earlier study by Gredler (1980), which found that “differences in academic achievement between younger and older entrants often were found only in boys” (p. 9). In an Australian study conducted with a sample of over 880 prep (equivalent to first grade) students, Boardman (2006) found that student gender was a factor in overall academic success, particularly in the area of reading.

Male children often seem to be the focus of studies on gender differences in the classroom. In preschool classrooms across nine different states, teachers rated inappropriate behaviors such as aggression toward others, lack of attention, refusal to obey, and turning inward for both boys and girls between the ages of three and six (Feil, Severson, & Walker, 1998). Fifty-five percent of boys versus 45% of girls fell within these categories for inappropriate behaviors, causing the authors to propose a more effective screening measurement to reduce the overrepresentation of boys (Feil, Severson, & Walker, 1998). In a survey of school teachers and principals in the southeastern United States, Tomchin and Impara (1996), asked teachers in grades kindergarten through seventh grade to give input behind their reasoning when retaining students, with student gender as a possible factor for grade level retention. Teachers in the lower grades (kindergarten through third grade) reported that maturity was the second most important factor in their decision, second only to academic performance. While only two out of 96 teachers said they considered student gender in their decision to retain a student (Tomchin & Impara, 1996), Thompson and Cunningham (2000) reported, “Nationally, by high school, the retention rate for boys is about ten percentage points higher than for girls” (p. 3). Parents may also hold a perception about gender and academic success. The National Center for Education Statistics (NCES) stated “boys are more often redshirted than girls” (West, Meek, & Hurst, 2000, p. 1). Ede (2004) urged parents and educators to look at gender linked to school success, and stated “gender needs to be considered, as it also plays a role in kindergarten performance” (p. 208). The author pointed out that girls “enjoy a slight advantage over boys entering kindergarten” in both letter and letter-sound recognition. Ede (2004) also noted “twice as many boys as girls (14 versus 7 percent) had difficulty speaking clearly,” and “twice as many boys as girls (18 versus 9 percent) had difficulty paying attention” (p. 207). This lack of attention in class may result in lower academic performance levels, the primary factor considered by many teachers when recommending student retention (Tomchin & Impara, 1996).

While Ede (2004) focused primarily on the reading and language acquisition skills of very young children, Oshima and Domaleski (2006) studied gender in relation to academic success in the reading and math domains. They found gender to be significant for predicting success in reading but not in mathematics in elementary and middle school. The authors determined age to be a “better predictor of reading than was gender through Grade 2,” but “gender became a better predictor than age for Grades 3-5” (Oshima & Domaleski, 2006, p. 215). Regardless of the degree of emphasis one may put on a student’s age or gender when it relates to academic success, there is reason to believe that both age and gender can be considered factors in a student’s academic success.

Other Factors in Student Academic Success

Educational studies propose many factors in addition to age and gender which may contribute to student success, including, but not limited to: student intelligence, student diligence, preschool experiences, and socioeconomic status.

It is little surprise to many that student intelligence and academic success often go hand in hand. The positive relationship between a student's intelligence, based on intelligence tests such as the *Stanford-Binet Intelligence Scale* (Thorndike, Hagen, & Sattler, 1986) or the *Slosson Intelligence Test-Revised* (Nicholson & Hibpshman, 1991), and academic success has been well documented (Beattie, 1970; Hoge & Coladarci, 1989; Mayfield, 1979; Naglieri, 1996; Naglieri & Bornstein, 2003). However, in a meta-analysis conducted by Clarke (1984), which investigated the possible link between childhood cognitive development and early childhood experiences, many young children with seemingly low intelligence increased their cognitive functioning (as evidenced through intelligence test scores and observed academic performance) through rich and stimulating environments. A child's biologically acquired cognitive skills (nature) may certain help them succeed academically, but one should not discount the importance of environment (nurture) as well.

Some have identified student diligence as another factor which may contribute to student academic success. On occasion, a child demonstrates the intellectual ability to achieve yet does not perform well on achievement measures due to lack of effort, or diligence (Mayfield, 1979). Bernard, Drake, Paces, and Raynor (1996) defined student diligence as "effort expended toward holistic educational development" (p. 10). These authors studied the relationship between student diligence and support from teachers and parents, based on the underlying idea that student diligence can affect student academic competence (Knapp & Michael, 1980). Bernard, Drake, Paces, and Raynor (1996) found a significant level of correlation between student ability and performance (grade point average) as well as a difference in the level of student diligence among the grade levels. The highest level of student diligence was shown by third graders, followed by fourth, fifth, and then sixth graders. Additionally, the authors found no difference in levels of student diligence between genders at these elementary grade levels, yet found a significant difference between genders at the high school level. Arthur (2002) also studied student diligence and found that hard work was a positive contributing factor in academic success when the author studied "the relationships between student diligence, student support systems, and other related factors, and student academic performance" (p. 11). Therefore, student diligence is another factor which may contribute to student success.

Preschool experience might also be a contributing factor in student academic success. Preschool is available to more children now than in previous years, in part due to a strong professional belief that preschool experiences can help children succeed in school (Brown & Wright, 2011; Crnic & Lamberty, 1994; Gullo & Burton, 1992; Valenti, 2009). Students' preschool experiences were examined by Henry, Gordon, Henderson, and Ponder (2003) to determine "how differences in children's pre-kindergarten experiences and their experiences during primary school influenced their success in school" (p. 59). The results of this study showed that third grade standardized test scores were not significantly affected for children enrolled in the pre-kindergarten program versus children not enrolled in the pre-kindergarten program. However, Magnuson, Meyers, Ruhm, and Waldfogel (2004) studied the math and reading scores of kindergarten and first grade students who had attended preschool compared to the scores of children who had not attended preschool, and found that children who had attended preschool scored higher in both math and reading, and were retained less than children who had not attended preschool. Valenti (2009) also found a significant positive relationship between full day preschool attendance and first grade reading scores.

The socioeconomic status of students may also be considered a contributing factor in student academic success. Cosden, Zimmer, and Tuss (1993) studied the impact of ethnicity, age, and sex combined with socioeconomic status (SES) on student achievement scores in kindergarten and first grade, finding that overall district SES was closely tied to student scores. Poor language acquisition skills, in particular the lack of a rich and varied vocabulary, can be directly tied to lower socioeconomic status (Hart & Risley, 1995; Hoff, 2003) and can affect children throughout childhood, including the school years (Hart & Risley, 1995). Tajalli and Opheim (2005) and Lincove and Painter (2006) also studied the significance of student socioeconomic status (SES) on academic achievement, concluding that student achievement scores were positively associated with higher socioeconomic status. Socioeconomic status can also affect when a child enters school, with economically disadvantaged parents relying on preschools and kindergartens as a safe and inexpensive place for their children to stay throughout the day while the parents work (Pianta, Barnett, Burchinal, & Thornburg, 2009). While many economically disadvantaged parents might like to keep their children at home an extra year, some may need to send their children to school as soon as possible to reduce the costs of child care.

Parental Responses to Research

Parents who believe that younger children do not perform as well academically as their older peers may choose to purposefully delay school entry. This has been termed “academic redshirting” (Katz, 2000, p. 2). Originally a college sports’ term, redshirting refers to “postponing an athlete’s career” to give him another year to “physically grow and improve his skills” for use in upcoming sports seasons (Katz, 2000, p. 2). According to Katz (2000), academic redshirting refers to “postponing entrance into kindergarten of age-eligible children in order to allow extra time for socio-emotional, intellectual, or physical growth” (p. 2).

Before the current term redshirting was coined, however, Uphoff and Gilmore (1985) recommended delayed school entry as a way to combat a more demanding curriculum which young students may find too difficult. Cosden, Zimmer, and Tuss (1993) also studied young students in the school setting and stated, “more retained students had birth dates in the first two quartiles than in the last two” and “children who were retained were younger than those who were not retained” (p. 215). Brent, May, and Kundert (1996) studied students whose parents had purposely delayed school entry and reported that the majority of these students had autumn birthdays. This might be explained by an earlier research finding (Katz, 2000): “redshirting is most often practiced in the case of children whose birthdays are so close to the cut-off dates that they are very likely to be among the youngest in their kindergarten class” (p. 2).

Researchers are divided on the possible effects of academic redshirting, and whether incidences of redshirting are on the rise. A California study found “a significant decline in the frequency of holding out for boys and girls” (Bellisimo, Sacks, & Mergendoller, 1995, p. 205). However, a twelve-year study in a suburban school showed a “significant increase in the number of children who had delayed school entry” (Brent, May, & Kundert, 1996, p. 123). Both of these studies found that boys were held out more often than girls. The National Center for Education Statistics (NCES) reported that redshirting occurred in approximately 9% of all cases of children eligible to enter kindergarten (West, Meek, & Hurst, 2000).

Trends in School Accountability

The No Child Left Behind Act of 2001 (NCLB, 2003) emphasizes the importance of school accountability on student academic achievement measures. “Accountability in education means holding schools responsible for what students learn” (Johnson, Dupuis, Musial, Hall, & Gollnick, 1999, p. 215). The goal of these assessments is to eliminate gaps in test scores among students of differing cultural, language, racial, and socioeconomic backgrounds (Dworkin, 2005; Ravitch, 2010) and ensure that students remain on track for academic success, including high school graduation (U.S. Department of Education, 2010). Under NCLB (2003) regulations, accountability for student academic testing begins in third grade, which can put an increased level of pressure on kindergarten, first, and second grade students to meet academic expectations (Cosden, Zimmer, & Tuss, 1993; Crosser, 1998; Dworkin, 2005; Graue & DiPerna, 2000; Meisels, 1992; Shepard, 1997; Tuerk, 2005).

According to the *Georgia Promotion and Retention Guide for 2010*, a third grade regular education student's promotion, placement, or retention status is primarily determined by his or her scores on the reading portion of the Georgia CRCT (Georgia Department of Education, 2010f). Similarly, the promotion, placement, or retention of fifth grade regular education students in Georgia is primarily determined by their scores on both the reading and mathematics portions of the Georgia CRCT (Georgia Department of Education, 2010f). In addition to grade level advancement decisions in the upper elementary grades, some school systems use standardized test scores in grades as early as kindergarten to determine student placement into pre-first grade transitional classrooms and extra year programs (Graue & DiPerna, 2000; Tuerk, 2005; Wodtke, Harper, Schommer, & Brunelli, 1989).

Elementary school children are not the only ones affected by yearly testing. "NCLB's high-stakes accountability system rewards or punishes school districts, schools, and teachers for the academic performance of their students" (Dworkin, 2005, p. 170). Results from state mandated standardized testing can affect fund allocation for schools as well as evaluation of school personnel (Dworkin, 2005; Johnson, Dupuis, Musial, Hall, & Gollnick, 1999; Ravitch, 2010; Tuerk, 2005; Wodtke, Harper, Schommer, & Brunelli, 1989). Some teachers may be so anxious by testing expectations that they act outside the parameters of standardized testing procedures. Wodtke, Harper, Schommer, and Brunelli (1989) studied kindergarten testing procedures carried out in small group settings with an average of 11 students per group. In several instances, teacher testing practices were so non-standardized the validity of test results could be called into question. Two classroom teachers in a low-performing school district exhibited nonstandard testing practices and procedures that were suggestive of tester effects (Wodtke, Harper, Schommer, & Brunelli, 1989, p. 223). In 2011, over 170 school teachers and administrators in Atlanta, Georgia, were fired after the state of Georgia discovered suspicious erasures on state mandated assessments (Osunsami & Forer, 2011, July 6). Eighty-two teachers confessed to correcting student answer sheets, and each of the educators named in the report were subsequently fired, including then-Superintendent Hall, the National Superintendent of the Year in 2009. Teachers interviewed after the fiasco blamed their actions on the stress of high stakes testing, threats of job loss, and an atmosphere where cheating was encouraged. One teacher stated, "We were told to get these scores by any means necessary…We were told our jobs were on the line" (Osunsami & Forer, 2011, July 6, p. 1).

Issues surrounding school accountability will continue as long as school successes and failures are made public and are tied to the financing of education (Johnson, Dupuis, Musial, Hall, & Gollnick, 1999). The current educational environment of increased testing and school accountability can make teaching and learning a stressful event. The result of these trends in school accountability is an increased and unprecedented level of academic rigor required from elementary age children (Cosden, Zimmer, & Tuss, 1993; Crosser, 1991; Graue & DiPerna, 2000), and increased stress and worry for educators (Dworkin, 2005; Graue & DiPerna, 2000; Osunsami & Forer, 2011; Ravitch, 2010; Tuerk, 2005).

Summary of the Literature

Individual states and counties are responsible for setting school policies within their districts and school entrance age requirements vary across the nation (Education Commission of the States, 2010; Georgia Department of Education, 2010e). Many schools assess a child's readiness to enter school using some form of intellectual assessment (La Paro & Pianta, 2000; Laughlin, 1995), but a student's chronological age continues to be the criteria for school entry used by most states (La Paro & Pianta, 2000; Saluja, Scott-Little, & Clifford, 2000).

Literature regarding the relationship between a student's entrance age into school and his or her academic performance was inconclusive (DeMeis & Stearns, 1992; Langer, Kalk, & Searls, 1984; Lincove & Painter, 2006; May, Kundert, & Brent, 1995; Meisels, 1995; Trapp, 1995). Although some researchers propose using a student's maturational age rather than chronological age as a way to determine school readiness (Braymen, 1987; Crnic & Lamberty, 1994; Ogletree, 1988; Shepard, 1997), there does not seem to be a viable, cost effective way to do this in a public school setting (Jenkins, 2003). In addition to unresolved questions regarding how and to what degree student age may be related to school performance, the possible relationship between student gender and academic success is contested by some authors (Beattie, 1970; Ede, 2004; Gray, 1985; West, Meek, & Hurst, 2000).

Student age and gender are not the only factors related to student academic success. A child's school readiness may be a factor in his or her later academic success, and differing theories on human development (Meece, 2002; Schunk, 2008) can affect how teachers and parents view a child's readiness to enter school (Graue & DiPerna, 2000). Research in the areas of individual student ability (Beattie, 1970; Hoge & Coladarci, 1989; Mayfield, 1979; Naglieri, 1996; Naglieri & Bornstein, 2003) and student diligence (Arthur, 2002; Bernard, Drake, Paces,

& Raynor, 1996; Knapp & Michael, 1980) found that these may also be factors in student success. A student's preschool experiences may also be a contributing factor to his or her school success (Brown & Wright, 2011; Crnic & Lamberty, 1994; Gullo & Burton, 1992; Valenti, 2009) as well as the family's socioeconomic status (Cosden, Zimmer, & Tuss, 1993; Lincove & Painter, 2006; Tajalli & Opheim, 2005).

Parents respond to information regarding student academic success in different ways, some choosing to postpone their child's school entrance (Bellisimo, Sacks, & Mergendoller, 1995; Brent, May, & Kundert, 1996; Katz, 2000; Uphoff & Gilmore, 1995). The prevalence of this event coined the term "redshirting" (Katz, 2000).

Schools are under tremendous pressure to have students succeed in school (Cosden, Zimmer, & Tuss, 1993; Crosser, 1998; Dworkin, 2005; Graue & DiPerna, 2000; Meisels, 1992; Shepard, 1997; Tuerk, 2005) and it is no surprise that educators and parents are looking for ways to increase student learning and academic success rates. The literature on recent trends in school accountability highlighted the increased demands on both grade level curriculum and student expectations within the classroom. With increased pressure to perform successfully in school and with both funds and public scrutiny tied to state mandated test scores (Crosser, 1998; Cosden, Zimmer, & Tuss, 1993; Dworkin, 2005; Johnson, Dupuis, Musial, Hall, & Gollnick, 1999; Tuerk, 2005; Wodtke, Harper, Schommer, & Brunelli, 1989), factors related to school success will continue to be an important issue.

CHAPTER 3

METHODOLOGY

Participants

The Carpet County School District had a student enrollment of 13,188 in 2009, according to the Georgia Department of Education (2007). The district was considered economically disadvantaged, with 66% of all student families meeting Title I criteria (Georgia Department of Education, 2007). At the time of this study, the district was made up of 13 elementary schools, five middle schools, and four high schools and several special purpose schools. According to the 2009-2010 State of Georgia K-12 Report Card, 57% of students in Carpet County Schools were White, 37% were Hispanic, two percent were Black, and the remaining four percent were Asian, Native American/Alaskan Native, or Multiracial (Georgia Department of Education, 2007). Within the demographic category of Students by Other Subgroups, 17% of students were designated as *Limited English Proficient* and nine percent were designated as *Students with Disabilities* (Georgia Department of Education, 2007).

The sample for this study was comprised of a group of students enrolled in the 13 elementary schools, who remained in Carpet County Schools for three consecutive years, and who were assessed on the reading and mathematics portions of the first grade Georgia CRCT in the spring of 2006, the second grade Georgia CRCT in the spring of 2007, and the third grade Georgia CRCT in the spring of 2008. Throughout the study these students were referred to as the Cohort. Students from the participant pool were excluded from the study if they received gifted education services, special education services, speech services, or English as a second language (ESL) services at any time during the three years. These students were excluded in an attempt to eliminate the potentially confounding variables of disability, English speaking ability, or English language acquisition; factors that can distort academic success and unduly affect the primary research questions (Grissom, 2004; May, Kundert, & Brent, 1995; Sweeney, 1995). In addition, students who had birth dates making them eligible to enroll in school the previous year were labeled “Overage” and excluded from the study. It was not possible to determine the reason these students did not enroll during their first year of school eligibility, and no reliable analysis could be conducted if information such as possible retention or purposeful school delay cannot be obtained.

Within the Cohort, students were divided into quartile groups based on their birth dates. A quartile refers to groups of percentile rankings within the data set. Students were ranked in age from youngest to oldest and then quartile break points were calculated. The upper quartile was the 75^{th} percentile and above, while the lower quartile was the 25^{th} percentile and below (Gay, Mills, & Airasian, 2006). The youngest quartile of students were labeled as ”Youngest” and the oldest quartile of students were labeled as “Oldest” with the exception of any students with birth dates which made them eligible for enrollment in an earlier school year. As noted previously, these students were labeled Overage and their Georgia CRCT scores were removed from the study sample.

Assessments Used

All students in Georgia, grades one through eight, are required to complete the Georgia Criterion-Referenced Competency Tests (CRCT) (Georgia Department of Education, 2010b). The assessments are designed to “yield information on academic achievement at student, class, school, system, and state levels" (Georgia Department of Education, 2010a, p. 3). While each elementary school in the Carpet County School District does offer a kindergarten program, students in this program are not eligible to take the Georgia CRCT, which is "designed to measure how well students acquire the skills and knowledge described in the Georgia Performance Standards" (Georgia Department of Education, 2010b). Students in first, second, and third grades take the Georgia CRCT in three content areas: reading, language arts, and mathematics. In addition, students in grade three also take the Georgia CRCT in two additional content areas: science and social studies (Georgia Department of Education, 2010a). All items on the Georgia CRCT are selected response (multiple-choice) questions, and students are administered two sections in each content area, each section consisting of between 25 and 30 questions. Students only take tests in one content area per day (Georgia Department of Education, 2010b). According to the Georgia Department of Education's website (2010b), the Georgia CRCT has been peer reviewed by a team of outside experts in assessment and testing to ensure that the CRCT met federal guidelines for accuracy and reliability in testing. "The CRCT was found to meet the nationally recognized professional and technical standards for assessment programs" (Georgia Department of Education, 2010b, p. 1).

The Georgia CRCT is reported using scale scores; scores are derived by converting the raw score (number of correct test answers) to the CRCT scale. The CRCT scale scores are "…equivalent across test forms within the same content area and grade" (Georgia Department of Education, 2010a, p. 6). The scores from this test provided the data for this study.

Data Collection and Preparation

The data collection process for this study was initiated by a phone call to the Executive Director of Assessment and Accountability for the Carpet County School District in March of

2011. The researcher complied with instructions to petition for formal written approval from the Executive Director of Assessment and Accountability for the Carpet County School District. The researcher requested access to the CRCT test scores of all Carpet County students who had taken the Georgia CRCT for first grade during the 2005-2006 school year, second grade during the 2006-2007 school year, and third grade during the 2007-2008 school year. In addition, the researcher requested these data to include any state designations for eligibility of special services such as gifted education services, speech services, or English as a second language services, but not include any student identifiers such as student name or social security number. Instead, the researcher requested that an anonymous student identifier be used in the data set. A copy of the form requesting access to student assessment data may be found in Appendix A. The researcher received a letter of permission from the Carpet County School District in May of 2011. A copy of this permission letter may be found in Appendix B. A proposal was then sent to the University of Tennessee at Chattanooga Office of Research Integrity to receive Institutional Review Board (IRB) approval to conduct the study. A copy of this form requesting IRB approval may be found in Appendix C. IRB approval was granted June 2, 2011. A copy of this approval letter may be found in Appendix D. After notifying the Executive Director of Assessment and Accountability for the Carpet County School District of IRB permission to proceed, the researcher received data used in this study in the form of a Microsoft Excel (2010) spreadsheet. The spreadsheet was imbedded on a data CD which was received through the Carpet County School District inter-office mail to the elementary school where the researcher worked. The interoffice mail packet was accepted by the school clerk of that elementary school who then contacted the researcher to retrieve the packet. The researcher picked up the interoffice packet containing the data CD in June of 2011.

Data included in the spreadsheet from the Carpet County School District included the students' grade, age, gender, CRCT scores for that year, any special services designations such as special education, gifted, speech, or ESL, and a random student identifier.

To prepare data for analysis, the researcher first removed any students from the data set that indicated they were eligible to receive special services. These students were excluded in an attempt to isolate the variables of age and gender, rather than existence of a disability, English speaking ability, or English language acquisition, factors that could distort academic success and unduly affect the primary research questions (Grissom, 2004; May, Kundert, & Brent, 1995; Sweeney, 1995). Of the original 1,126 students who took the first grade CRCT in 2005/2006, 321 students were removed from the study due to indications that they were eligible to receive special services. Additionally, three students were removed from the data set due to incomplete birth date information. To determine which students had remained in Carpet County Schools and taken the Georgia CRCT in first grade, second grade, and third grade, the researcher sorted the remaining 802 students using gender, birth date, and the random student identifier. Of these 802 students, the researcher positively identified 373 students as remaining in the Carpet County School District three consecutive years, from first grade through third grade. These 373 students represent 33.1% of the original student sample for this study.

Next, the researcher sorted the remaining 373 students by birth date, from oldest to youngest. Forty-four of the 373 students were considered overage and were removed from the study. Overage students had birth dates which made them eligible to enroll in school the previous year. After culling all ineligible students from the data set, 329 students and their corresponding CRCT scores remained, representing 29.2% of the original sample population. These students fit all the study criteria and were designated for this study as the Cohort.

Procedure

The research design used in this study is best described as a causal-comparative research approach. Causal-comparative research "attempts to determine the cause, or reason, for existing differences in the behavior or status of groups of individuals" (Gay, Mills, & Airasian, 2006, p. 595). In this study, the researcher examined the Georgia CRCT reading and mathematics scores for each study participant, and the scores were classified within score ranges. Participants had already grouped age and by gender.

Students in first, second, and third grade take the Georgia CRCT in three academic areas: reading, language arts, and mathematics. Student scores from the reading and mathematics portions of the exam were analyzed for this study. The Georgia Department of Education uses scores from the reading portion only of the CRCT to determine promotion, placement, or retention of students at the end of third grade (Georgia Department of Education, 2010f). This fact made the investigation of reading essential to meet the purposes of the study. Although Georgia does not use the mathematics outcomes for promotion, placement or retention of students at the end of third grade, literature on the subject suggests the possibility of differing success rates between mathematics and reading for individual students (Ede, 2004; Naglieri, 1996; Oshima & Domaleski, 2006). Because of these findings, mathematics was also included in the analysis. Language arts scores were not analyzed because these scores are not considered under the Georgia guidelines for promotion, placement, or retention of elementary aged students (Georgia Department of Education, 2010f) and because these data would quite likely have been confounded with the large number of English Language Learners in the Carpet County School District.

Student test scores from the Georgia CRCT are reported with numerical values corresponding to three levels of performance: Does Not Meet the Standard, Meets the Standard, and Exceeds the Standard (Georgia Department of Education, 2010a). During the time of this study students scoring below 800 on the Georgia CRCT, resulting in a state designation of Does Not Meet the Standard, were labeled as non-successful. Students were designated as successful if they scored 800 or above on the Georgia CRCT, resulting in a state designation of Meets the Standard or Exceeds the Standard. In addition, the researcher further split the state designation of Meets the Standard into three score ranges: Successful, Level One for scores ranging from 800 to 815; Successful, Level Two for scores ranging from 816 to 830; and Successful, Level Three for scores ranging from 831 to 849. Those students scoring at 850 or above, which therefore garnered the state designation of Exceeds the Standard, were assigned the score range of Successful, Level Four. This resulted in a total of five possible score ranges for each student at each content area.

It is important to note that while the score required to earn a designation of Meets the Standard (800) and Exceeds the Standard (850) is the same across the grade levels, the mean, standard deviation, and resulting standard error of measurement are unique at each grade level and content area. This is because the Georgia CRCT assesses independent grade level performance standards and which may vary in difficulty (Georgia Department of Education, 2010a). Indeed, the Georgia Department of Education (2010a) specifically cautions users that "…it is not appropriate to compare scale scores across [different] grades and content areas" (p. 6). However, scale scores can be compared "…across all test forms and administrations for the same content area and grade" (p. 9). Therefore, conventional parametric statistics that require the assumption of equal interval data could not be used in the analysis. Analyses were instead conducted using a Chi Square test for proportions within each separate grade level and separate subject area, using gender and age as categorical variables. Using this procedure, 12 Chi Squares were conducted. Each Chi Square was similar as a 2 (levels of gender or age) by 5 (levels of test outcome). Six Chi Squares were conducted on reading scores and an identical procedure was used for mathematics. To control for the potential of repeated tests, each Chi Square was tested at alpha =.05/12 or .004.

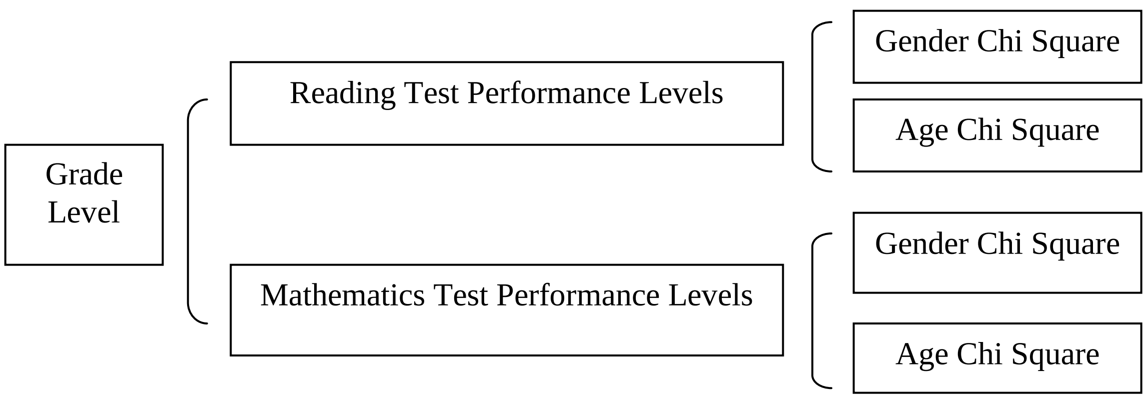

Figure 3.1

Research Design

Figure 3.1, titled Research Design, provides an illustration of the design used in the study. The data for each grade is separated by content area and five levels of test performance. The scores are then analyzed by gender and age (youngest and oldest quartiles). The design repeats for grades one, two, and three.

Coding the Data

After determining the Cohort, the data was coded prior to analyzing. First, the 329 Cohort students were broken into age quartiles (329/4 = 82.25) using 25% of oldest children and 25% of the youngest children within the Cohort. In a research study by Cosden, Zimmer and Tuss

(1993), and in a meta-analysis by La Paro and Pianta (2000), researchers often compared student age groups using quartiles. The researcher sought to mimic this process in an attempt to align this portion of the study with the available literature. This study process differs from the process used by Crosser (1991) in which his oldest group was comprised of children with summer birth dates (only those students born in June, July, and August). The researcher chose to follow the quartile process described earlier, using the 25% oldest and youngest students within The Cohort, regardless of specific birth date ranges. This process was in accordance with Braymen (1987), who believed that school entrance age was important, but that "…relative age within a classroom" was equally important, because "…there will always be a youngest child in any group or grade" (p. 180).

The quartile of youngest students consisted of 83 students with birth dates ranging from April 29, 1999 to September 1, 1999. These students were labeled Youngest. In the Youngest quartile, the 82nd and 83rd students had birth dates which fell on the same day, so both students were included in the sample. The quartile of oldest students consisted of 84 students with birth dates ranging from September 3, 1998 to December 3, 1998. These students were labeled Oldest. In the Oldest quartile, the 82nd, 83rd, and 84th students had birth dates which fell on the same day, so all three students were included in the sample.

When dividing students in the Cohort into age quartiles for oldest and youngest, student gender was not taken into consideration as part of the selection process. However, student gender is an important descriptor in this study as it pertains to the stated secondary purpose of the study related to the possible relationship between student gender and student academic success. For this study, 83 of the study participants (49.7%) were male, and 84 of the study participants

(50.3%) were female. This near-equal numbers of male and female study participants provides a basis for an accurate proportional judgment using Chi Square.

After labeling the Cohort by student age, the students' corresponding CRCT reading and mathematics scores were classified within score ranges. In order to input score ranges into a statistical software program, codes were assigned for the following score ranges: zero (non-successful; scores 799 and below), one (successful, scores between 800 and 815), two (successful, scores between 816 and 830), three (successful, scores between 831 and 849) and four (successful, scores 850 and above).

Research Analysis

Using the SPSS program, data were analyzed using a Chi Square test for proportional statistics. Chi square was selected due to the nature of the scores reported on the Georgia CRCT. In all, 12 Chi Squares were conducted. Each Chi Square was a 2 (Age - Youngest or Oldest) X 5 (Levels of CRCT Score Ranges). Each of these tests was conducted at each grade level (first through third grade) by gender. Six Chi Squares were conducted on reading scores and an identical procedure was used for mathematics. To control for the potential of repeated tests, each of the Chi Square was tested at alpha =.05/12 or .004 for reading and mathematics.

Summary of Research Design

Participants in this research study were a cohort of regular education elementary school students from the Carpet County School District in northwest Georgia. Each of the participants were assessed using the state mandated Georgia CRCT for reading and mathematics in first, second, and third grades consecutively, beginning in first grade in the 2005-2006 school year. This approach allowed for a longitudinal aspect to the study. The participants were then broken into quartile sections based upon their relative age within the group, and the oldest and youngest quartiles were given labels as oldest and youngest. The gender of the participants was also labeled so that gender comparisons could be made. The CRCT scores of each of the participants was ranked within score ranges zero through four. The SPSS program was then used to compare relationships between CRCT performance of the oldest and youngest groups on both the reading and mathematics portions of the CRCT for each of the school years in question.

CHAPTER FOUR

RESULTS

Chapter Introduction

The primary purpose of this study was to investigate the relationship between chronological age and academic success for a cohort of children during their first, second, and third grade school years. The secondary purpose of this study was to determine if gender, paired with age, is related to student academic success. In both instances academic success was defined as meeting minimum requirements on the Georgia Criterion-Referenced Competency Tests in reading and mathematics (Georgia Department of Education, 2010b). Chapter Four presents the findings from the data gathered to address these questions. This chapter describes how data were collected and prepared for analysis, how the statistical procedures were carried out, and the results of the analysis relative to each of the research questions presented in Chapter One.

Research Questions

The research questions for this study relate to a cohort of students who remained in Carpet County Schools for three consecutive years. These students, hereafter referred to as the Cohort, were assessed on the Georgia CRCT for first grade in spring of 2006, second grade in spring of 2007, and third grade in spring of 2008. This study deals with the Cohort of students defined above and includes participants from all 13 elementary schools in the Carpet County School District.

In all, there were six research questions for this study and six corresponding null hypothesis to determine the relationship between student academic success and student age and gender for the Cohort of students in the Carpet County School District. The research questions and null hypothesis were as follows:

Research Question 1: Is there a significant difference in reading scores between male and female first grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort?

Null Hypothesis 1: There is no significant difference in reading scores between male and female first grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort.

Research Question 2: Is there a significant difference in mathematics scores between male and female first grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort?

Null Hypothesis 2: There is no significant difference in mathematics scores between male and female first grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort.

Research Question 3: Is there a significant difference in reading scores between male and female second grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort?

Null Hypothesis 3: There is no significant difference in reading scores between male and female second grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort.

Research Question 4: Is there a significant difference in mathematics scores between male and female second grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort?

Null Hypothesis 4: There is no significant difference in mathematics scores between male and female second grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort.

Research Question 5: Is there a significant difference in reading scores between male and female third grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort?

Null Hypothesis 5: There is no significant difference in reading scores between male and female third grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort.

Research Question 6: Is there a significant difference in mathematics scores between male and female third grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort?

Null Hypothesis 6: There is no significant difference in mathematics scores between male and female third grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort.

These research questions and null hypothesis are intended to reveal relationships between student age as the youngest or oldest members of their Cohort and student test scores on the Georgia CRCT. Secondarily, these research questions and null hypothesis are also intended to reveal relationships between student gender and student test scores on the Georgia CRCT. These relationships are important when considering the emphasis parents, teachers, administrators, and the public place on pupil performance on standardized tests (Cosden, Zimmer, & Tuss, 1993; Crosser, 1998; Dworkin, 2005; Graue & DiPerna, 2000; Meisels, 1992; Shepard, 1997; Tuerk, 2005).

Results

Reporting of the results is organized by each research question and corresponding null hypothesis, followed by a brief explanation of each question and a summary of the results.

Research Question 1**:** Is there a significant difference in reading scores between male and female first grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort?

Null Hypothesis 1: There is no significant difference in reading scores between male and female first grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their Cohort.

Study results indicated no significant difference between test scores of male and female first grade students on the reading portion of the Georgia CRCT. Likewise, no significant difference was discovered between test scores of youngest and oldest first graders on the reading portion of the Georgia CRCT. Statistical analysis on both age and gender factors for first grade reading test scores failed to reach the rejection alpha level of .004 and therefore failed to reject the null hypothesis. Null Hypothesis 1 was accepted for Research Question 1. Put simply, study results show that student age and gender were not considered factors in first grade success on the reading portion of the Georgia CRCT. Table 4.1 shows results for Research Question 1.

Table 4.1

First Grade Reading Scores on Georgia CRCT

First Grade	χ^2	Reading: p-value	Outcome
Age: oldest vs. youngest	6.265	.180	not significant
Gender: males vs. females	1.909	.753	not significant

N=167; df=4; *p<.004

Research Question 2: Is there a significant difference in mathematics scores between male and female first grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their cohort?

Null Hypothesis 2: There is no significant difference in mathematics scores between male and female first grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their cohort.

Study results indicated no significant difference between test scores of male and female first grade students on the mathematics portion of the Georgia CRCT. Statistical analysis on gender factors for first grade mathematics scores failed to reach the rejection alpha level of .004, indicating that student gender was not a factor for student success. However, student age and Georgia CRCT mathematics scores in first grade were found to be significantly related at χ^2 (4*df*, N=167) = 20.984, p=.000. Null Hypothesis 2 was rejected for Research Question 2. Therefore, student age was a factor in student academic success for first grade students on the mathematics portion of the Georgia CRCT. Table 4.2 shows results for Research Question 2.

Table 4.2

First Grade Mathematics Scores on Georgia CRCT

First Grade	χ^2	Mathematics: p-value	Outcome
Age: oldest vs. youngest	20.984	.000*	significant
Gender: males vs. females	5.532	.237	not significant

N=167; df=4; *p<.004

Research Question 3: Is there a significant difference in reading scores between male and female second grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their cohort?

Null Hypothesis 3: There is no significant difference in reading scores between male and female second grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their cohort.

Study results indicated no significant difference between test scores of male and female second grade students on the reading portion of the Georgia CRCT. Likewise, no significant difference was discovered between test scores of youngest and oldest second graders on the reading portion of the Georgia CRCT. Statistical analysis on both age and gender factors for second grade reading test scores failed to reach the rejection alpha level of .004 and therefore failed to reject the null hypothesis. Null Hypothesis 3 was accepted for Research Question 3. In other words, study results indicate that student age and gender were not considered factors in second grade success on the reading portion of the Georgia CRCT. Table 4.3 shows the results for Research Question 3.

Table 4.3

Second Grade Reading Scores on Georgia CRCT

Second Grade	χ^2	Reading: p-value	Outcome
Age: oldest vs. youngest	5.308	.257	not significant
Gender: males vs. females	3.493	.479	not significant

N=167; df=4; *p<.004

Research Question 4: Is there a significant difference in mathematics scores between male and female second grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their cohort?

Null Hypothesis 4: There is no significant difference in mathematics scores between male and female second grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their cohort.

Study results indicated no significant difference between test scores of male and female second grade students on the mathematics portion of the Georgia CRCT. Statistical analysis on gender factors for second grade mathematics scores failed to reach the rejection alpha level of .004. Likewise, no statistically significant difference was discovered between test scores of youngest and oldest second graders on the mathematics portion of the Georgia CRCT. Statistical analysis on age factors for second grade mathematics test scores failed to reach the rejection alpha level of .004 and therefore failed to reject the null hypothesis. It should be noted, however, that the level of significance in second grade was approached; at χ^2 (4*df*, N=167) = 8.887, p=.064, so that one might consider an emerging pattern among student age within grade levels and mathematics success. Even so, Null Hypothesis 4 was accepted for Research Question 4. Table 4.3 shows results for Research Question 4.

Table 4.4

Second Grade Mathematics Scores on Georgia CRCT

Second Grade	χ^2	Mathematics: p-value	Outcome
Age: oldest vs. youngest	8.887	.064	not significant
Gender: males vs. females	3.620	.460	not significant

N=167; df=4; *p<.004

Research Question 5: Is there a significant difference in reading scores between male and female third grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their cohort?

Null Hypothesis 5: There is no significant difference in reading scores between male and female third grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their cohort.

Study results indicated no significant difference between test scores of male and female third grade students on the reading portion of the Georgia CRCT. Likewise, no significant difference was discovered between test scores of youngest and oldest third graders on the reading portion of the Georgia CRCT. Statistical analysis on both age and gender factors for third grade reading test scores failed to reach the rejection alpha level of .004 and therefore failed to reject the null hypothesis. Null Hypothesis 5 was accepted for Research Question 5. Stated another way, study results show that student age and gender were not considered factors in third grade success on the reading portion of the Georgia CRCT. Table 4.5 shows results for Research Question 5.

Table 4.5

Third Grade Reading Scores on Georgia CRCT

Third Grade	χ^2	Reading: p-value	Outcome
Age: oldest vs. youngest	4.077	.396	not significant
Gender: males vs. females	4.789	.310	not significant

N=167; df=4; *p<.004

Research Question 6: Is there a significant difference in mathematics scores between male and female third grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their cohort?

Null Hypothesis 6: There is no significant difference in mathematics scores between male and female third grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their cohort.

Study results indicated no significant difference between test scores of male and female third grade students on the mathematics portion of the Georgia CRCT. Statistical analysis on gender factors for third grade mathematics scores failed to reach the rejection alpha level of .004. However, student age and Georgia CRCT mathematics scores in third grade were found to be significantly related at χ^2 (4*df*, N=167) = 16.195, p=.003. Null Hypothesis 6 was rejected for Research Question 6. In other words, student age was a factor in student academic success for third grade students on the mathematics portion of the Georgia CRCT. Table 4.6 shows results for Research Question 6.

Table 4.6

Third Grade Mathematics Scores on Georgia CRCT

Third Grade	χ^2	Mathematics: p-value	Outcome
Age: oldest vs. youngest	16.195	.003*	significant
Gender: males vs. females	2.958	.565	not Significant

N=167; df=4; *p<.004

Table 4.7 represents combined study results for Chi Square tests run on student age compared to reading and mathematics scores for each grade level. The null hypothesis for each grade level states no relationship exists between student age and student scores on the reading and mathematics portions of the Georgia CRCT. Each grade level test which compared student age and reading scores failed to reach the rejection alpha level of .004 and therefore failed to reject the null hypothesis. Study results indicate that student age was not a factor in student academic success on the reading portion of the Georgia CRCT.

However, two grade level tests comparing student age and mathematics scores did reach the rejection alpha level of .004. Student age and Georgia CRCT mathematics scores in first grade were found to be significantly related at χ^2 (4*df*, N=167) = 20.984, p=.000. The decision was made to reject the null hypothesis for first grade. Additionally, student age and Georgia CRCT mathematics scores in third grade were found to be significantly related at χ^2 (4*df*, N=167) = 16.195, p=.003. The decision was made to reject the null hypothesis for third grade. It should be noted that while the Chi Square student age and Georgia CRCT mathematics scores comparison in second grade did not reach the rejection alpha level of .004 and were therefore considered not significant, the level of significance was approached at χ^2 (4*df*, N=167) = 8.887, p=.064. In all three grade levels analyzed, the oldest students scored at higher levels than youngest students.

Table 4.7

Student Age Compared to CRCT Reading and Math Scores

Youngest vs. Oldest by Grade Level	χ^2	Reading: p-value	Outcome	χ^2	Math: p-value	Outcome
1st Grade	6.265	.180	Not significant	20.984	.000*	Significant
2nd Grade	5.308	.257	Not significant	8.887	.064	Not Significant
3rd Grade	4.077	.396	Not significant	16.195	.003*	Significant

N=167; df=4; *p<.004

Because of the significant outcomes with age and mathematics seen in Table 4.7, further scrutiny was justified. Table 4.8 represents the crosstab distribution count of 1st grade students by age (youngest or oldest) for the Georgia CRCT mathematics portion, which were found to be significantly related at χ^2 (4*df*,N=167) = 20.984, p=.000.

Table 4.8

First Grade Crosstab Distribution: Age and Mathematics Scores

Age Quartile	CRCT Mathematics Score Ranges					Total
	Level 0	Level 1	Level 2	Level 3	Level 4	
Oldest (n)	0	6	7	10	61	84
Youngest (n)	2	7	12	29	33	83
Total (n):	2	13	19	39	94	167

The difference between the number of youngest students and oldest students within the CRCT Mathematics score ranges for 1st grade increased at each score level, beginning with Level One (a difference of one) through Level Four (a difference of 28). There were a greater number of youngest students at each of the first four levels, while in Level Four (the score range designated for CRCT scores of 850 and above), there were a greater number of oldest students. Almost three-fourths of the oldest students (61 out of 84, or 72.6%) were concentrated at Level Four, compared to less than half of the youngest students (33 out of 83, or 39.7%) at Level Four. When looking at the top two score levels, 84.5% (71 out of 84) of the oldest students were represented, compared to 74.5% (62 out of 83) of the youngest students.

Table 4.9 represents the Crosstab distribution count of 3rd grade students by age (youngest or oldest) for the Georgia CRCT mathematics portion, which were found to be significantly related at χ^2 (4*df*,N=167) = 16.195, p=.003.

Table 4.9

Third Grade Crosstab Distribution: Age and Mathematics Scores

	CRCT Mathematics Score Ranges					
Age Quartile	Level 0	Level 1	Level 2	Level 3	Level 4	Total
Oldest	17	2	15	20	30	84
Youngest	24	15	13	10	21	83
Total:	41	17	28	30	51	167

The difference between the number of youngest students and oldest students within the CRCT Mathematics score ranges for 3rd grade varies across each score level, with the smallest difference at Level Two (a difference of 2) and the largest difference at Level One (a difference of 13). Almost half of the youngest students (39 out of 83, or 46.9%) were concentrated in the first two score levels, while less than one-fourth of the oldest students (19 out of 84, or 22.6%) were represented in the same first two score levels. Most of the oldest students (50 out of 84, or 59.5%) were concentrated in the top two score levels, while slightly more than one-third of the youngest students (31 out of 83, or 37.3%) were represented in the same top two score levels. At Level Four (the score range designated for CRCT scores of 850 and above), 35.7% (30 out of 84) of oldest students were represented, compared to 25.3% (21 out of 83) of youngest students.

Table 4.10 represents combined study results for Chi Square tests run on student gender compared to reading and mathematics scores for each grade level. The null hypotheses for each grade level states there are no relationships between student gender and student scores on the reading and mathematics portions of the Georgia CRCT. Each grade level test in both reading and mathematics failed to reach the rejection alpha level of .004 and therefore failed to reject the null hypothesis. In other words, student test outcomes were not affected by student gender in first, second, or third grade on the reading or mathematics portions of the Georgia CRCT.

Table 4.10

Student Gender Compared to CRCT Reading and Math Scores

Males vs. Females by Grade Level	Reading: χ^2	Reading: p-value	Outcome	Math: χ^2	Math: p-value	Outcome
1st Grade	1.909	.753	Not significant	5.532	.237	Not Significant
2nd Grade	3.493	.479	Not significant	3.620	.460	Not Significant
3rd Grade	4.789	.310	Not significant	2.958	.565	Not Significant

N=167; df=4

Summary

This study focused on six research questions to determine the relationship between student academic success and student age and gender for the Cohort of students in the Carpet County School District. Each of the research questions dealt with student gender as a factor in student academic success, yet results for each of the Chi Square statistical tests comparing student gender to Georgia CRCT scores were found to be not significant. Therefore, this study indicates that student gender is not a factor in student academic success for reading or mathematics in first, second, or third grade.

The second portion of each research question dealt with student age as a factor in student academic success. Research Question 1 questioned the relationship between student age and success for first grade students on the reading portion of the Georgia CRCT. The relationship was not significant; therefore the null hypothesis was accepted, indicating that student age had no significant effect on student test scores on the reading portion of the Georgia CRCT for first grade. Research Question 2 questioned the relationship between student age and success for first grade students on the mathematics portion of the Georgia CRCT. The relationship was significant; therefore the null hypothesis was rejected, indicating that student age did have a significant effect on the mathematics portion of the Georgia CRCT for first grade.

Research Question 3 questioned the relationship between student age and success for second grade students on the reading portion of the Georgia CRCT. The relationship was not significant; therefore the null hypothesis was accepted, indicating that student age had no significant effect on student test scores on the reading portion of the Georgia CRCT for second grade. Research Question 4 questioned the relationship between student age and success for second grade students on the mathematics portion of the Georgia CRCT. The relationship was not significant; therefore the null hypothesis was accepted, indicating that student age had no significant effect on student test scores on the mathematics portion of the Georgia CRCT for second grade. It should be noted, however, that the level of significance was approached at χ^2 (4*df*, N=167) = 8.887, p=.064 for second grade students in Research Question 4, suggesting a possible pattern between student age and mathematics scores when considering the significant results found in grades one and three.

Research Question 5 questioned the relationship between student age and success for third grade students on the reading portion of the Georgia CRCT. The relationship was not significant; therefore the null hypothesis was accepted, indicating that student age had no significant effect on student test scores on the reading portion of the Georgia CRCT in third grade. Research Question 6 questioned the relationship between student age and success for third grade students on the mathematics portion of the Georgia CRCT. The relationship was significant; therefore the null hypothesis was rejected, indicating that student age did have a significant effect on student test scores on the mathematics portion of the Georgia CRCT in third grade.

This study indicates that, for this population, student age was not a factor in student academic success for reading in first, second, or third grade. However, student age was a factor in student academic success for mathematics in first and third grade, and approached the level of significance for success in second grade.

CHAPTER 5

DISCUSSION

Chapter Introduction

This chapter will summarize the findings of this study. The chapter will revisit the problem, purpose, and rationale of the study; discuss methodology and limitations; offer conclusions from the research; and provide discussion, implications for practice, and recommendations for future research.

Statement of the Problem

Educators and parents have been known to hold strong beliefs about academic practices that are unsupported by research. One example is the belief that academic success is related to a student's age at entrance to school or compared to the age of classmates (Grissom, 2004; Lorne, 2001). Some parents "wonder whether they should delay enrollment even when their child seems ready for kindergarten" (Oshima & Donaleski, 2006, p. 212). Numerous studies regarding school entrance age and student success have been published, yet experts do not agree on the extent to which student age affects student success, or if it produces a consistent affect at all (Beattie, 1970; Ede, 2004; Gray, 1985; Griffin & Harvey, 1995; Grissom, 2004; Hedges, 1978; May, Kundert, & Brent, 1995; Meisels, 1995; Quinlan, 1996).

At the time of this study, Georgia's entrance age policy for first grade required the child to be six years old on or before September first of that school year (Georgia Department of Education, 2010e). However, states differ on school entrance age policies, from the August first cut-off date used by Indiana, Hawaii, and Missouri, to the January first cut-off date used by Connecticut and Vermont (Education Commission of the States, 2010). This disagreement among various states and other education experts can lead to confusion for parents, teachers, and education policy makers.

Purpose of the Study

The primary purpose of this study was to investigate the relationship between chronological age and academic success for a cohort of children during their first, second, and third grade school years. Academic success was defined as meeting minimum requirements on the Georgia Criterion-Referenced Competency Tests in both reading and mathematics (Georgia Department of Education, 2010b). The secondary purpose of this study was to determine if gender is related to student academic success. The overarching intent of the study was to add to the body of literature in the field of education where the issue of school entrance age and academic success is still questioned due to mixed findings from previous studies and reports.

Rationale for the Study

Many parents rely on classroom teachers and education policy makers to recommend what is best for their children when they enter the realm of formalized schooling, yet there is still debate among these professionals over what effect school entrance age has on a student's academic achievement (Ede, 2004; Gray, 1985; Griffin & Harvey, 1995; Grissom, 2004; Hedges, 1978; Meisels, 1995; Quinlan, 1996). Gender also seems to have conceptual underpinnings linked to student academic success, yet research studies in the area of academic performance related to student gender have also yielded mixed results (Ede, 2004; Lorne, 2001; Oshima & Domaleski, 2004).

Educators and policy makers should have a broad scope of literature and research studies available to them when they make academic recommendations to parents (Grissom, 2004). The current study will add to the body of literature, allowing a three-year longitudinal perspective which is often lacking in the educational research on student success and age (Grissom, 2004; Oshima & Domaleski, 2006).

Methodology and Limitations

This study employed a causal-comparative research design which compared student scores on a state mandated criterion referenced test to student age and gender. The study sample included all regular education students who remained in the chosen school district for three consecutive years, beginning in first grade, and who took the Georgia CRCT for first, second, and third grades during the allotted time period of the study. Data were then analyzed using SPSS software for proportional statistics to examine relationships between student age, gender, and test scores.

There were three main limitations in the current study. Many researchers (Brown & Wright, 2011; Crnic & Lamberty, 1994; Gullo & Burton, 1992; Valenti, 2009) have stated that preschool experience can improve academic success for students. However, there was no indication of preschool experience in the data set which contained the Georgia CRCT scores, and it was not possible to include preschool experience as a variable in the study. Therefore, this lack of information became one limitation of this study.

Student movement and redistricting within the Carpet County School District which resulted in students changing elementary schools within the district was a second limitation of this study. To remain part of this sample, students must have taken the Georgia CRCT for first grade in 2006, second grade in 2007, and third grade in 2008 while enrolled as students of the district. Any excessive student movement which resulted in a student leaving the Carpet County School District and missing an assessment during the years in question resulted in removal of that student from the sample. Thus, the study is limited because highly transient students were not included.

However, all schools within the district adopted the district's vision, mission, and beliefs statement which included having a unified focus on students. This unified focus included following the same curriculum guides and pacing for each grade level across the district, thereby minimizing curriculum loss for students who changed schools within the district. Therefore, while student movement within the school district caused by redistricting or other forces remained a limitation of this study, the impact may have been minimal.

An additional limitation of this study was related to the sample of the study, specifically student identification within the Cohort. For purposes of this study, individual student data for students who took the Georgia CRCT was reported anonymously and with random student identifiers (rather than Social Security Numbers or student ID numbers). Only each participant's gender, birth date, grade, coding for special programs such as gifted, special education, or English as a second language, and the scores for the Georgia CRCT were disclosed for each year in question. Each participant was assigned a random study number and was tracked by gender, birth date, and special programs coding. Participants who could not be positively tracked from first through third grade were eliminated from the Cohort to ensure the longitudinal aspect of the study design. Although this greatly reduced the number of participants in the Cohort, thereby limiting the scope of the study, such measures helped to maintain the internal validity of the data. However, there is a possibility that some students were removed from the Cohort because their data were incomplete or incorrect, and they were not identified as remaining within the Carpet

County School District for three years. With this in mind, the study results may be considered conservative in nature, and results which include all students, not just those who remain within the same school district for three years, may be even larger.

Major Conclusions

Each of the research questions for this study focused on student age and student gender as factors in student academic success. The results for student age are discussed first, followed by the results for student gender.

Student age. Statistical analysis of the relationship between student age and student academic success for this study found that there was a significant relationship between student age and academic success in the mathematics domain on the Georgia CRCT in grades one and three, and academic success in the mathematics domain for grade two approached the level of significance. In plain terms, student age mattered when it came to mathematics. Specifically, a larger proportion of older students performed at higher success levels on the mandated state assessment than did younger students: 72.6% of the oldest first graders ranked at success level 4 on the CRCT (score of 850 or above) compared to only 39.7% of the youngest first graders at the same success level. In third grade, 35.7% of oldest students ranked at success level 4 on the CRCT (score of 850 or above) compared to 25.3% of youngest third graders at the same success level. If the two highest success levels on the CRCT (levels 3 and 4, equivalent to scores of 831 or above) are combined, then 84.5% of the oldest first graders achieved this level compared to 74.6% of the youngest first graders. In third grade, 59.5% of the oldest students achieved a test score at success levels 3 or 4 on the CRCT (831 or above) compared to 37.3% of the youngest third graders.

This study indicated that student age was a contributing factor to student success on the mathematics portion of the CRCT. These findings are in accordance with some of the educational literature. Langer, Kalk, and Searls (1984), DeMeis and Stearns (1992), Gullo and Burton (1992), Trapp (1995) and Parks (1996) found a positive link between increased student age and improved academic performance. A meta-analysis by La Paro and Pianta (2000) and a research study by Stipek and Byler (2001) also concluded that older children in school classrooms performed better academically than their younger peers. Crosser (1991) found that academic benefits for students who entered school a year older than their peers persisted through ninth grade, but some researchers who agreed on the "…short term academic and behavioral benefits" of delayed school entry could not agree on the long-term benefits (Oshima & Domaleski, 2006, p. 212). It is important to note that the studies mentioned above did not distinguish between the mathematics and reading domains when describing academic success, instead choosing to combine all academic domains into one broad category.

However, this research study indicated that student age did not matter when it came to reading. Statistical analysis of the relationship between student age and student academic success in the reading domain found that there was no relationship between the students' age and their academic success in reading on the Georgia CRCT for students in the first, second, or third grade. That is, the difference between the proportion of student scores on the reading portion of the CRCT for the oldest and youngest students at these grade levels was not sufficient to indicate any relationship between student age and scores. Many researchers in the field of education have failed to find a significant link between student age and academic success for children in the elementary grades (Dietz & Wilson, 1985; DeMeis & Stearns, 1992; May, Kundert, & Brent, 1995; Meisels, 1995; Morrison, 1997; Quinlan, 1996). Wood, Powell, and Knight (1984) agreed, yet set some age boundaries when they stated, "…chronological age of children entering kindergarten within the range of 4 to 6 years, is unrelated to eventual success or failure" (p. 8). Possible reasons for these conflicting findings on student age are considered in the additional conclusions section of this chapter.

Student gender. Statistical analysis of the relationship between student gender and student academic success found that there was no relationship between student gender and academic success in either reading or mathematics on the Georgia CRCT for students in the first, second, or third grade. This finding may surprise some educators and parents, as male children often seem to be the focus of discussions about gender differences in the classroom (Beattie, 1970; Feil, Severson, & Walker, 1998; Gredler, 1980). Some have stated that boys mature at a slower rate than girls, and are therefore less prepared for formalized schooling (Gray, 1985; Ede, 2004). This can affect decisions made by teachers within the classroom when considering grade retention (Tomchin & Impara, 1996) and by parents when considering the appropriate time for their child to enter school, as "…boys are more often redshirted than girls" (West, Meek, & Hurst, 2000, p. 1). This gender perception can show itself in the upper grades as well. Thompson and Cunningham (2000) reported, "Nationally, by high school, the retention rate for boys is about ten percentage points higher than for girls" (p. 3).

The results of this research study refute the study by Oshima and Domaleski (2006) on student gender and academic success. In that study, gender was found to be significant for predicting success in reading in elementary and middle school. While results from this current study indicate that student gender was not a factor in student academic success in either reading or mathematics, this finding is contrary to much of the literature in the field, which states that gender is a factor in student academic success, either in reading, mathematics, or both (Beattie, 1970; Boardman, 2006; Ede, 2004; Gray, 1985; Gredler, 1980). Possible reasons for these findings on student gender are considered later in this chapter.

Additional conclusions. An unexpected finding of this study revolved around the student attrition rate in the Carpet County School District. The term attrition referred to the percentage of students who left the school district at some point during the time period of the study which caused them to miss one or more grade level Georgia CRCT tests. These students were eliminated from the study.

When undertaking this study, the district's average attrition rate for elementary school students was not available, due to a lack of data from the Carpet County School District. In fact, there was no evidence of any data analysis undertaken by the Carpet County School District which might yield student attrition rates for elementary school students. For this study, 46.5% of regular education students were identified as remaining within the school district for three consecutive years in first, second, and third grades during the years in question, thus indicating an attrition rate of 53.5% for the years in question. It should be noted that students who were eligible to receive special services are not considered in this figure, as they were removed from the study sample prior to ensuring student had remained within the county for the three years in question. Therefore, the percentage of students who remained within the district may have varied if students with special services had been added into the student population.

While this attrition rate of 53.5% may seem high, it is similar to the 55% attrition rate for elementary students found in the three year longitudinal study of the Emergency School Aid Act, conducted at a national level (Coulson, 1978). Similarly, in a study analyzing the Success for All program conducted in Maryland, upper elementary school program participants were found to have a 58% attrition rate from fifth grade through eighth grade (Borman & Hewes, 2002).

Additionally, this Cohort of students is representatively similar in size and makeup to elementary school populations for the three years before and after this study within the Carpet County School District (Georgia Department of Education, 2007). During the 2005-2006 through 2007-2008 school years, the Carpet County School District had an elementary school student attrition rate similar to the other school districts across the United States. Implications of this finding are discussed in the following section.

Implications

The results of this research study highlighted the academic advantage for older students on mathematics assessments in first and third grades, but showed no academic advantage based on student age on reading assessments in first, second, or third grades. Study results based on student gender showed no academic advantage in either reading or mathematics for first, second, or third grades. These results raise some interesting questions, possible conclusions, and recommendations for further research.

Why does age matter in mathematics, but not in reading? Perhaps part of the answer lies in the emphasis that educators and parents place on reading skills, causing mathematics skills to take a “back seat” to reading. During the primary grades, a majority of a student’s academic time is spent learning and practicing reading skills (Perlstein, 2010; Perie, 1997). In a study commissioned by the National Center for Educational Statistics (NCES), educators were surveyed about the amount of time they spent teaching academic subject areas within the classroom (Perie, 1997). Data across three different school years between 1988 and 1994 indicated that first grade teachers spent an average of 38.4% of their time teaching reading compared to 15.3% of their time teaching mathematics. Second grade teachers spent an average of 36.4% of their time teaching reading compared to 15.2% of their time spent teaching mathematics. In third grade, teachers spent an average of 33.8% of their time teaching reading compared to 15.7% of their time on mathematics (Piere, 1997). In a more recent study, Perlstein (2010) visited a Maryland school district for an in-depth look at strategies used to increase reading scores on the state mandated yearly assessment for elementary school students. Perlstein (2010) discovered that teachers spent an average of 2.5 hours (150 minutes) per day teaching reading skills but only 1.5 hours (90 minutes) teaching mathematics.

The Carpet County School District follows the state curriculum standards set by the Georgia Department of Education (2008a), implying a greater emphasis on reading than mathematics. The curriculum guides for first through third grades contain between two and three times the number of state standards in reading compared to mathematics (Georgia Department of Education, 2008a). Additionally, placement, promotion, or retention of third grade students in Georgia is contingent upon their test scores for the reading portion of the Georgia CRCT, not their mathematics scores (Georgia Department of Education, 2010f). All of this extra emphasis on reading could allow younger children to receive additional support learning how to read as well as valuable practice time to hone their new skills, thereby allowing them to keep pace with their older peers. Simply put, additional instructional time may trump age related deficits.

In addition to differing levels of focus on reading versus mathematics, there may also be some issues of learning which factor into these results. Learning basic mathematics concepts requires different skills than learning to read, such as abstract thought and spatial perception (Levine, Vasilyeva, Lourenco, Newcombe, & Huttenlocher, 2005). These attributes of mathematics may be more difficult for younger students. Indeed, some mathematical concepts, such as conservation of numbers, are not developmentally appropriate for most children under six years of age (Seefeldt & Wasik, 2002). Some younger children, due to their individual developmental level, might not be ready to take advantage of formal school instruction in mathematics (Grau & DiPerna, 2000).

Does the age advantage persist past third grade? Some researchers have questioned whether initial gains attributable to student age will continue through elementary school into middle and high school (Oshima & Domaleski, 2006). Langer, Kalk, and Searls (1984) used data from the 1979 National Assessment of Educational Progress study to determine a possible relationship between student age and achievement scores for students in the fourth, eighth, and eleventh grades. This study found that the oldest students had "significantly higher achievement" than the younger students in fourth grade (at age nine), but these differences had "disappeared by age 17" (p. 61). Shepard and Smith (1988) also studied student age and academics, and concluded that any academic gains tied to student age disappeared by third grade. In contrast, Crosser (1991) found that the academic advantage for older students lasted through the 9^{th} grade. Lincove and Painter (2006) also studied student age and academic achievement, finding that younger students outperformed older students in both the 10^{th} and 12^{th} grades. Contrasting studies such as these can be confusing to many. It is not clear whether the academic advantages tied to age will continue with students such as those represented in this study. If parents and educators are concerned about initial school success in mathematics and the positive feelings which school success can engender in children toward academics and learning (Warash & Markstrom, 2001), then perhaps it makes sense for parents to want their children to enjoy the academic advantages of age, regardless of whether this advantage persists into middle and high school.

Does a gender bias exist? Based on the results of this study, some parents and teachers may need to examine their own beliefs about the relationship between student gender and academic performance. It may be that parents and teachers expect boys, especially younger boys, to perform at lower academic levels in part due to their classroom behavior as opposed to their actual academic performance in the classroom (Feil, Severson, & Walker, 1998). If parents are basing decisions about holding boys, especially young boys, out of school for an additional year to mature on perceptions which study results suggest are false, these children may be missing the opportunity to begin school at a time commensurate to their peers. Likewise, if teachers are basing grade level retention decisions upon a student's gender under their own false perceptions, then these children risk being held back from their peers unnecessarily.

Similar to studies about student age, research studies into student gender can conflict (Boardman, 2006; Oshima & Domaleski, 2006). One thing is clear, however: boys behave differently in the classroom than girls. Some say that boys read less than girls (Hall & Coles, 1999), and are often louder, more aggressive, and more active than girls (Gartrell, 2006). These behaviors can lead some teachers to equate lack of paying attention to lack of understanding in the classroom (Feil, Severson, & Walker, 1998; Gartrell, 2006) In extensive interviews with teachers of five and six year old children in Australia, Boardman (2006) found that teachers often explained the poor academic performance of their students in terms of boys versus girls, believing that boys, especially young boys, would usually perform at lower levels than their classmates. In a study by Smith and Niemi (2007), using a nationally representative sample, teachers were surveyed about the academic abilities of their students, revealing a teacher bias against smaller (and therefore usually younger) boys. Parents who purposefully delay school entry for their children do so more often for boys than for girls, making their sons some of the oldest in class instead of the youngest (Bellisimo, Sacks, & Mergendollar, 1995; Brent, May, & Kundert, 1996). It is possible that gender is not as much an issue in academic achievement as is age.

Perhaps we are getting two complementary ideas confused, with "young" getting attached to "boys" in statements like this one from a prep teacher (similar to first grade teacher) in Australia: "There are two of the youngest boys in my class who haven't turned six yet, and are possible repeats into prep next year because of academic performance" (Boardman, 2006). In fact, this study suggests that it is age, not gender, that matters, and only for mathematics.

Recommendations for Practice

Find a better way to determine entrance eligibility. Educational researchers (Braymen, 1987; Crnic & Lamberty, 1994; Jenkins, 2003; Ogletree, 1988; Shepard, 1997) agreed that a child's maturational age could differ from their chronological age, and that a child's maturity was often a better predictor of a student's school readiness. In particular, Crnic and Lamberty (1994) made the distinction between students' chronological age and their maturational age, stating that chronological age is related to school readiness, while maturational age is related to learning readiness. Shepard (1997) agreed that emotionally mature children may do better in school compared to younger, less mature children, but stated there are "no valid instruments" to identify these children (p. 86). Morrison (1997) suggested readiness screenings for children entering school, which would take into account the child's maturity. However, Shepard (1997) lamented the lack of probable solutions for testing a child's maturity readiness which could be done on a large scale and with valid results. Educators at local, state, and national levels should be a part of finding a better way to determine school entrance eligibility. Surely a valid, school level assessment instrument can be pioneered which would take into account a child's individual maturity and readiness to learn, instead of simply using chronological age to determine school entrance eligibility.

Make increased mathematics support available for students. This research study concluded that older children have an academic advantage over younger students in mathematics. To help some students "catch up" with their peers, schools should offer younger students additional support in the area of mathematics concepts and skills when needed. Developmentally appropriate mathematics skills instruction and practice would help to provide a solid foundation for younger students to progress toward mastery in the mathematics domain (Seefeldt & Wasik, 2002). In addition, a greater emphasis on mathematics, including increased instructional time, might help balance the current "back seat" approach that mathematics often takes to reading (Perlstein, 2010; Piere, 1997).

Provide parent education. Teachers should educate parents about ways they can help their children at home. This parent education could take the form of formal school letters, pamphlets, PTA meetings, or announcements, as well as informal discussions between teachers, parents, and other school personnel. Parents should be aware that younger children may need additional mathematics practice at home, especially considering the "back seat" mathematics instruction often takes to reading instruction in the classroom. Mathematics practice at home, in the form of games, informal discussions or formal homework assignments can all provide the extra practice that younger children need to be academically successful. Teachers should provide parents with information, ideas, and materials, if possible, to make mathematics practice at home both practical and fun for young children.

Respect parent's choice to redshirt. Some parents may wish to allow their child an extra year to grow and mature before entering school, regardless of any real or imagined academic advantage to the child. Enjoying school and feeling confident in one's abilities can foster positive feelings of self-esteem for children (Warash & Markstrom, 2001), and older students have had more time to gather experiences which can lead to self-confidence. If a parent's main concern for their child's school experience lies in the areas of social growth and building self-esteem, then redshirting may be an effective option. Teachers should be willing and able to educate parents on the advantages and disadvantages of delayed school entry, and then respect the choice of the parents, regardless of which option they choose.

Provide gender sensitivity training. Some teachers expect boys to be less academically capable than their peers (Smith & Niemi, 2007; Zaman, 2008). This can have a negative effect as these students may engage in a self-fulfilling prophecy, and perform to the teacher's low expectations (Tauber, 1998). Zaman (2008) suggested that teacher training programs should include gender sensitivity training for all new teachers. This research would suggest that current teachers also undergo gender training, especially teachers in the lower grades. These teachers would then be able to educate their students' parents about gender issues in the classroom, perhaps leading to a better understanding of the difference between academic performance and student behavior.

Recommendations for Future Research

Take preschool attendance into account. One of the limitations of this study was the lack of student information regarding possible preschool attendance. Attendance in preschool can positively affect student academic performance (Brown & Wright, 2011; Crnic & Lamberty, 1994; Gullo & Burton, 1992; Valenti, 2009). The results of this study suggest that future research which seeks to link student age to academic performance take student preschool experience into account in the research design.

Increase sample size. A second limitation of this study related to the student sample, and method of identifying students who had remained in the Carpet County School District for three years. While the longitudinal nature of the study required that students be tracked over a three year period, the anonymous aspect of the student data made it necessary to discard some of the data which would have otherwise been included in the study. Therefore, future research which would encompass a larger student sample would serve to validate or refute these results. Larger sample populations, specifically in terms of sample size (N value), differing geographic and cultural areas, and a larger span of grade levels, would allow the research findings to be more generalizable to the general student population.

Include students who receive special services. This study attempted to isolate the variables of student age and gender by limiting the student sample to regular education students. However, it is reasonable to wonder what conclusions could be drawn from a research design which included all students in the school, including those who received services for special education, speech, gifted, and English as a second language. Additional research which included these populations would necessitate using different research methods, but results which showed age and academic success correlations for all students, separately and collectively, could be very useful to educators and parents.

Research student age and academic performance in middle and high school. This study focused on the age and academic performance of young children, specifically age appropriate children in first through third grades. One of the questions which arose from this research study asked whether academic advantages for children in the lower grades would persist into middle and high school. While there is some research on this topic (Langer, Kalk, & Searls, 1984; Lincove & Painter, 2006; Shepard & Smith, 1988), longitudinal studies would give a more complete picture. The results would provide parents and educators the information needed to make an informed decision about the academic benefits and drawbacks of relative student age in middle and high school classrooms.

Study student attrition rates. An additional conclusion of this study related to the student attrition rate of first, second, and third grade regular education students in the Carpet County School District. While this attrition rate was similar to other elementary school student attrition rates from various parts of the United States (Borman & Hewes, 2002; Coulson, 1978), the question remains, “Where are these students going, and why?” It would also be important to investigate what the achievement level of these students is compared to the level of students who remain in the same educational placement over a longer period of time. Student movement between districts can negatively affect student achievement and subsequent failing grades may lead to further increased student attrition. A research study to determine the current student attrition rate at each grade level within the Carpet County School District would be valuable to educators and parents, as well as provide a model for other school districts on how to perform similar studies for their own student population. Furthermore, student and parent interviews in addition to the examination of student records to determine why students leave the school district and where they are going would add important data to the body of research on student attrition and achievement.

Conclusion

In an age where students, teachers, and schools are judged based on standardized test scores, it is important to consider the possible advantage an older student might have over a younger one. While study results showed that student gender was not a consideration, student age was a factor for student success for this population, showing that older first and third grade students fared better than their younger counterparts on the mathematics portion of the state mandated test. An educational emphasis on reading instead of mathematics, the developmental level of younger students, and lack of parent education in ways to help younger students succeed in mathematics may all be factors in why younger students do not fare as well as their older peers in the area of mathematics. Schools may be able to close this age gap with a greater emphasis on mathematics, support for younger students, and increased parent education in the area of mathematics. Further research should include study replication with differing student populations and grade levels to ascertain if this student age advantage persists.

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APPENDIX A

REQUEST FOR ACCESS TO ASSESSMENT DATA

Whitfield County Schools
Assessment & Accountability

APPLICATION FOR REVIEW OF ACTION RESEARCH PROPOSAL

Researcher			
Name	M. Jennifer Voyles		
Address	166 Broken Arrow Lane, Cleveland, TN 37311		
E-mail	jennifer_voyles@whitfield.k12.ga.us	Phone	706-694-8812
School	Cohutta Elementary School	College/University	UTC
Grade Level(s)	4th Grade Teacher	Teacher/Classroom	
Approximate # of subjects	Not Sure	Principal's Name	Cindy Dobbins
USE OF STUDY			
X	Doctoral Dissertation	☐	Education Specialist Project
☐	Master's Thesis	☐	Other
Relationship to School/Classroom	none		
Professor/Advisor			
Name	Dr. Vicki Petzko		
Address	615 McCallie Avenue Chattanooga, TN 37403		
E-mail	Vicki-Petzko@utc.edu	Phone	423-425-4111
College/University	UTC	Department	Education

WCS USE ONLY Date received________________ Proposal Number_________________

Approved____ Not Approved____ Date of Decision________________

Proposal Summary
Provide a *brief* summary of your proposed research; including logistics (e.g., how/when will you recruit subjects, collect data, etc.)
I wish to analyze CRCT results from the following years to research the possible link between student success (as determined by CRCT scores) and student age and gender: All Whitfield County students entering first grade in 2006 (Cohort F2006), all students entering first grade in 2007 (Cohort 2007), and all students entering first grade in 2008 (Cohort F2008). I wish to review student CRCT scores for these three cohorts of students for each of their first, second, and third grade academic years, including CRCT scores and any designations for Special Education, Gifted, or ESOL. These designations allow me to remove these subjects from my study to further isolate the variables of age and gender. Further analysis of this data set may be suggested by my methodologist, but I do not anticipate needing any additional data at this time. Thank you.
List any instruments you will use in your research (attach copies of instruments).
None – all data will be pulled from whatever database Whitfield County uses and compiled into an Excel spreadsheet using Anonymous identifiers. Data will then be analyzed using SPSS 15.0 software under the guidance of my dissertation advisor (Dr. Vicki Petzko) and dissertation methodologist (Dr. Ted Miller), both from UTC.

Whitfield County Schools
Assessment & Accountability

FERPA / PPRA Agreement

FERPA

"The Family Educational Rights and Privacy Act (FERPA) (20 U.S.C. § 1232g; 34 CFR Part 99) is a Federal law that protects the privacy of student education records. The law applies to all schools that receive funds under an applicable program of the U.S. Department of Education."

This statement and additional information about FERPA can be found at:

http://www.ed.gov/policy/gen/guid/fpco/ferpa/index.html

The complete Federal Register for FERPA can be found at:

http://www.ed.gov/legislation/FedRegister/finrule/2008-4/120908a.pdf

PPRA

The Protection of Pupil Rights Amendment (PPRA) (20 U.S.C. § 1232h; 34 CFR Part 98) applies to programs that receive funding from the U.S. Department of Education (ED). Although the PPRA language specifically mentions ED funding, Whitfield County Schools applies PPRA guidelines and criteria to all research conducted in the school district regardless of whether research funding comes from ED or another source (including volunteer research). PPRA is intended to protect the rights of parents and students in two ways, the second of which is particularly relevant to action researchers:

> "It seeks to ensure that schools and contractors make instructional materials available for inspection by parents if those materials will be used in connection with an ED-funded survey, analysis, or evaluation in which their children participate; and
>
> It seeks to ensure that schools and contractors obtain written parental consent before minor students are required to participate in any . . . survey, analysis, or evaluation that reveals information concerning:
>
> 1. Political affiliations;
> 2. Mental and psychological problems potentially embarrassing to the student and his/her family;
> 3. Sex behavior and attitudes;
> 4. Illegal, anti-social, self-incriminating and demeaning behavior;
> 5. Critical appraisals of other individuals with whom respondents have close family relationships;
> 6. Legally recognized privileged or analogous relationships, such as those of lawyers, physicians, and ministers; or
> 7. Income (other than that required by law to determine eligibility for participation in a program or for receiving financial assistance under such program)."

This statement and additional information about PPRA can be found at:

http://www.ed.gov/policy/gen/guid/fpco/ppra/index.html

The complete Federal Register for PPRA can be found at:

http://ed.gov/legislation/FedRegister/finrule/2004-2/042104a.pdf

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I have read, understand and agree to abide by the Federal requirements for protecting student confidentiality as provided for in The Family Educational Rights and Privacy Act (FERPA) and The Protection of Pupil Rights Amendment (PPRA).

Signature	Printed Name	Date

APPENDIX B

PERMISSION LETTER FOR ACCESS TO DATA

Whitfield County Schools
Since 1872 *Where Excellence is a Tradition*

TO: M. Jennifer Voyles, University of Tennessee at Chattanooga Doctoral Student

FROM: Audrey M. Williams, Ed.D. Executive Director of Assessment and Accountability

RE: Georgia Criterion-Referenced Competency Test by Birth Date, Gender, Special Education, and ESOL designations from 2006-2008 Main Administrations

DATE: May 24, 2011

Whitfield County Schools has granted permission for M. Jennifer Voyles, the researcher, to continue with a doctoral dissertation proposal of measuring student success (as determined by GaCRCT scores) and student age and gender. The data will be confidential with no social security numbers or student names, etc., and will only contain scores, gender, birthdates, and codes for special services. The data will also consist of Whitfield County students entering first grade in 2006 (Cohort F2006), all student entering first grade in 2007 (Cohort F2007), and all student entering first grade in 2008 (Cohort F2008). The researcher will review student's GaCRCT score for these three cohorts of students for each of their first, second, and third grade academic years, including and any designation for Special Education, and ESOL. These designations will allow the researcher to remove these subjects from study to further isolate the variables of age and gender. Further analysis of this data set may be suggested by researcher's methodologist, but at this time no additional data has been requested.

On the CD provided to the researcher are the Georgia Criterion-Referenced Competency Test score results of reading, English-language arts, and math for the Cohort F2006, Cohort F2007, and Cohort F2008 groups. As third graders each cohort group will also have data for science and social studies. No demographic information is provided to ensure anonymity of each participant.

Please remember the Family Educational Rights and Privacy (FERPA) and the Protection of Pupil Rights Amendment (PPRA) agreements previously signed as you continue your doctoral dissertation research at the University of the Cumberlands. The researcher will ensure appropriate measures are in place to provide appropriate protection of educational confidentiality and privacy of all participants. The location of the physical storage of the data will be located in the researchers' possession. No other person will have access to the data.

If I can be of any further assistance let me know. I can be reached at 706.217.6711 or via email at awilliams@whitfield.k12.ga.us.

South Thornton Avenue • P.O. Box 2167 • Dalton, Georgia 30722-2167 • (706) 278-8070 • FAX (706) 278-5042

APPENDIX C

INSTITUTIONAL REVIEW BOARD REQUEST FORM

FOR IRB USE ONLY
IRB #: ____________
Date Submitted: _______
Date Approved: _______

FORM A:

APPLICATION FOR REVIEW OF RESEARCH INVOLVING HUMAN SUBJECTS

If your research involves protected health information, please also submit Form H to the IRB, refer to (www.utc.edu/irb) for the appropriate forms.

Investigator's Assurance: By submitting this protocol, I attest that I am aware of the applicable principles, policies, regulations, and laws governing the protection of human subjects in research and that I will be guided by them in the conduct of this research.

Title of Research:	Student Academic Success as Related to School Entrance Age and Gender

		Dept	Mail Code	Email
Principal Investigator	M. Jennifer Voyles			M-Voyles@utc.edu
Other Investigator				
Other Investigator				
Faculty Advisor (for student apps)	Dr. Vicki Petzko	SOE		Vicki-Petzko@utc.edu

Please check that all of the following items are attached (where applicable) before submitting the application:

- Any research instruments (any tests, surveys, questionnaires, protocols, or anything else used to collect data)

- All informed consent documents (see www.utc.edu/irb for sample informed consent documents)
- Permission from applicable authorities (principals of schools, teachers of classrooms, etc.) to conduct your research at their facilities
- Appropriate permission and signatures from your faculty advisor (if applicable).
- Please be sure the entire application is filled out completely.

****All student applications must be signed by the faculty advisor then scanned and submitted electronically, OR submitted directly by the faculty advisor.**

All applications should be submitted by email to instrb@utc.edu.

Anticipated dates of research project: May 2011 through July 2011
Please allow 2 weeks for IRB processing from date of submission.
Please be aware that you cannot begin your research until it has been officially approved by the IRB.

Type of Research:
X Dissertation/Thesis
☐ Class Project
☐ Faculty Research (Please see information at the bottom of this form if this research pertains to a grant opportunity)
☐ Other (please explain):

Purpose/Objectives of Research

The primary purpose of this study is to investigate the possible relationship between chronological age and academic success for a cohort of children during their first, second, and third grade school years. Academic success will be defined as meeting minimum requirements on the Georgia Criterion-Referenced Competency Tests in both reading and mathematics (Georgia Department of Education, 2010b). The secondary purpose of this study is to determine if gender, paired with age, is related to student academic success. This question addresses the belief that female children mature at a faster rate than male children, and are thereby less affected by age and early school entrance (Gray, 1985; Ede, 2004). This study will add to the body of literature in the field of education where the issue of school entrance age and academic success is still questioned due to mixed findings from previous studies and reports.

Specific Research Hypothesis: Research Question #1: Is there a significant difference in reading scores between male and female first grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their cohort?

Research Question #2: Is there a significant difference in mathematics scores between male and female first grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their cohort?

Research Question #3: Is there a significant difference in reading scores between male and female second grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their cohort?

Research Question #4: Is there a significant difference in mathematics scores between male and female second grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their cohort?

Research Question #5: Is there a significant difference in reading scores between male and female third grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their cohort?

Research Question #6: Is there a significant difference in mathematics scores between male and female third grade students within the Cohort on the Georgia Criterion-Referenced Competency Tests (CRCT) as the oldest and youngest members of their cohort?

Relevant Background and Rationale for the Research:

Many parents rely on classroom teachers and education policy makers to recommend what is best for their children when they enter the realm of formalized schooling. Despite this, there is still debate among these professionals over what effect school entrance age has on a student's academic achievement (Ede, 2004; Gray, 1985; Griffin & Harvey, 1995; Grissom, 2004; Hedges, 1978; Meisels, 1995; Quinlan, 1996). The underlying theoretical framework encompassed in this ongoing debate and examined in this study relate to student age and gender. DeMeis and Stearns (1992), Gullo and Burton (1992), Trapp (1995), and Parks (1996) all found a positive link between delayed entry into school (age of the student at school entry), and improved academic performance. These authors recommended delaying a child's entrance into school as a possible way to improve academic performance. Grissom (2004) also found a positive relationship between age and academic success for some of the older children in his study, but argued "against modifying entrance age policies, delaying school entry…or retaining students to improve academic achievement" (p. 1) based on results with students deemed overage. Grissom (2004) found that students who were older yet still age appropriate to their peers did better academically than their younger classmates, but students who were overage from previous retentions and other factors actually performed worse academically than their peers. Wood, Powell, and Knight (1984) also disagreed with changing entrance age policies, but for a different reason, stating "chronological age of children entering kindergarten within the range of 4 to 6 years is unrelated to eventual success or failure" (p. 8). May, Kundert, and Brent (1995), Meisels (1995), and Quinlan (1996) also studied age and student success, and found no link between increased student age at school entry and improved academic performance.

Gender also seems to have conceptual underpinnings linked to student academic success. Lorne's (2001) longitudinal study on school readiness factors, including age and gender, reported the gender difference between students considered at high readiness and low readiness for school to be insignificant. In contrast, Ede (2004) stated that "gender needs to be considered, as it plays a role in kindergarten performance" (p. 207). Oshima and Domaleski (2004) reported that "gender was a significant predictor for reading, but not for mathematics" (p. 215) when studying students in grades kindergarten through eight. Clearly, research studies in the area of student gender related to academic performance have also yielded mixed results.

Educators and policy makers should have a broad scope of literature and research studies available to them when they make academic recommendations to parents (Grissom, 2004). Further research in the area of student success and school entrance age would add to the body of literature in the field of education. In addition, the longitudinal nature of this study will allow the researcher to examine test score data on individual students over a three year period, a perspective which is often lacking in the research on student success and age (Grissom, 2004; Oshima & Domaleski, 2006).

Methods/Procedures:

A research design will be formulated using a causal-comparative research approach. **Please note: Test scores will be reported to the researcher anonymously;** at no time will any identifying information other than student gender, birth date, and coding for Special Education, Speech, or Gifted programs be on any test score data. **The researcher will not have access to student names, I.D. numbers, social security numbers, or any other identifying information.** The researcher has obtained permission from the school district superintendant to access this information from the Assessment and Accountability department (see attached letter). The researcher will examine the Georgia CRCT scores of each study participant on the reading and mathematics portions of the test, and classify these scores within score ranges. Participants will then be labeled by gender for males and females.

Students in first, second, and third grade take the Georgia CRCT in three academic areas: reading, language arts, and mathematics. Student scores from the reading and mathematics portions of the exam will be analyzed for this study. Student test scores from the Georgia CRCT are reported with numerical values corresponding to three levels of performance: Does Not Meet the Standard, Meets the Standard, and Exceeds the Standard (Georgia Department of Education, 2010a). Students scoring below 800 on the Georgia CRCT, resulting in a designation of Does Not Meet the Standard, will be labeled as non-successful. Students scoring 800 or above on the Georgia CRCT, resulting in a designation of Meets the Standard, or Exceeds the Standard, will be designated as successful. Analysis will be conducted using a chi square test for proportional statistics for tests outcome within each separate grade level and separate subject area.

Describe Sample: The district is not named in the study; instead using the pseudonym Carpet County School District. The Carpet County School District had a student enrollment of approximately 13,000 in 2009, according to the Georgia Department of Education (2007). The sample for this study will be a group of students who remained in Carpet County Schools for three consecutive years and were assessed on the reading and mathematics portions of the first grade Georgia CRCT in the spring of 2006, the second grade Georgia CRCT in the spring of 2007, and the third grade Georgia CRCT in the spring of 2008. These students will be referred to as the Cohort. Students in the study will be included regardless of race or ethnicity, but students from this participant pool will be excluded from the study if they received Gifted services, Special Education services, Speech services, or English as a Second Language (ESL) services any time during the three years. These students will be excluded in an attempt to isolate the variables of age and gender, rather than existence of a disability, English speaking ability, or English language acquisition, factors that can distort academic success and unduly affect the primary research questions (Grissom, 2004; May, Kundert, & Brent, 1995; Sweeney, 1995). In addition, students who had birthdates making them eligible to enroll in school the previous year will be labeled "overage" and excluded from the study. The researcher will be unable to determine the reason these students did not enroll during their first year of school eligibility, and no reliable analysis can be conducted if information such as possible retention or purposeful school delay cannot be obtained.

Approximate Number of Subjects: 400

Subjects Include (check if applicable):

Minors (under 18)	X
Involuntarily institutionalized	☐
Mentally handicapped	☐
Health Care Data/Information	☐

IF YOU HAVE CHECKED THE BOX PERTAINING TO HEALTH CARE DATA, BE SURE YOU HAVE COMPLETED ANY NECESSARY HIPAA FORMS AS WELL.

Informed Consent:
All research must be conducted with the informed consent (signed or unsigned, as required) **of all participants:**

Prior to data collection, the researcher will petition for approval from the Executive Director of Assessment and Accountability for the Carpet County School District. **Approval Attached.**

Incentives: What incentives will be offered, if any?

NONE.

Risks/Benefits to Participants and Precautions to Be Taken:
NO RISKS. The researcher will only analyze pre-existing data.

In your opinion, do benefits outweigh risks? X Yes ☐ No

Privacy/Confidentiality:

The data sought is pre-existing data with non-identifying "dummy" numbers in place of student ID numbers; at no time will the researcher have access to any student identifying information. Student test scores will be reported to the researcher from the Executive Director of Assessment and Accountability for the Carpet County School District in the form of an Excel spreadsheet and the researcher will not have access to any student information including permanent records or other identifying information. Only the researcher (M. Jennifer Voyles), the Dissertation Chair (Dr. Vicki Petzko, University of Tennessee at Chattanooga) and the Methodologist (Dr. Ted Miller, University of Tennessee at Chattanooga) will have access to this data.

Signatures: ** If submitted by a faculty member, electronic (typed) signatures are acceptable. If submitted by a student, please print out completed form, obtain the faculty advisor's signature, scan completed form, and submit it via email. Only Word documents or PDF files are acceptable submissions.

M. Jennifer Voyles	5/10/11
Principal Investigator or Student	Date
Faculty Advisor (for student applications)	Date

If this research pertains to a grant opportunity:

Grant submission deadline:
Funding Agency and ID Number:

Students:
Graduate ☐ Undergraduate ☐

APPENDIX D

INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

MEMORANDUM

TO: Jennifer Voyles
Dr. Vicki Petzko

IRB # 11-086

FROM: Lindsay Pardue, Director of Research Integrity
Dr. Bart Weathington, IRB Committee Chair

DATE: May 27, 2011

SUBJECT: IRB # 11 – 086: Student Academic Success as related to School Entrance Age and Gender

The Institutional Review Board has reviewed and approved your application and assigned you the IRB number listed above. You must include the following approval statement on research materials seen by participants and used in research reports:

The Institutional Review Board of the University of Tennessee at Chattanooga (FWA00004149) has approved this research project # 11-086.

Please remember that you must complete a Certification for Changes, Annual Review, or Project Termination/Completion Form when the project is completed or provide an annual report if the project takes over one year to complete. The IRB Committee will make every effort to remind you prior to your anniversary date; however, it is your responsibility to ensure that this additional step is satisfied.

Please remember to contact the IRB Committee immediately and submit a new project proposal for review if significant changes occur in your research design or in any instruments used in conducting the study. You should also contact the IRB Committee immediately if you encounter any adverse effects during your project that pose a risk to your subjects.

For any additional information, please consult our web page http://www.utc.edu/irb or email instrb@utc.edu

Best wishes for a successful research project.

VITA

Margaret Jennifer Voyles graduated from Collegedale Academy in 1994, and entered the Chattanooga business community. She soon turned her focus toward education, and attended the University of Tennessee at Chattanooga, where she graduated with a degree in Early Childhood Development in 2002. She earned a Master's of Educational degree with an emphasis in Educational Curriculum from Central Michigan University in 2004.

Mrs. Voyles is currently teaching fourth grade in a rural elementary school in Whitfield County, Georgia. She enjoys working with her students as serving on the school's Design Team. Additionally, Mrs. Voyles is the school's Director of the After School Care program.

Mrs. Voyles is presently a doctoral candidate in the Learning and Leadership Program at the University of Tennessee at Chattanooga. She plans to graduate in December, 2011. Mrs. Voyles looks forward to spending her time traveling, playing with her children, and having conversations that don't revolve around her dissertation work.