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Factors Impacting Success in Ninth Grade Algebra I for High School Students

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ABSTRACT

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The implementation of the Common Core State Standards (CCSS, 2013), No Child Left Behind Act of 2001, and the Race to the Top initiative of 2009 has placed a greater emphasis on high stakes testing. A renewed emphasis on math education for all students and their ability to succeed in high school mathematics place new challenges on today's classroom teachers. Although the belief is that with new standards and best teaching strategies students will improve their test scores, there are multiple factors that can serve as deterrents to the success in mathematics for at-risk high school students (Balfanz, 2009). The purpose of this research is to examine the relationship of at-risk indicators attendance, family composition, socioeconomic status (as measured by free and reduced priced meals), grade retention, special education status, number of discipline referrals, students who are English language learners (ELL), and gender with student performance in high school mathematics. Using archived data from the student management system of a rural county school in Northeast Tennessee, data were gathered for 412 high school freshmen attending the county's 4 high schools. There were 8 research questions with corresponding null hypotheses. Each research question was analyzed with a series of independent t-tests or Pearson correlation coefficient tests. All data were analyzed at the .05 level of significance. Findings from the data indicated a significant difference in the mean scores on the algebra I end of course (EOC) assessment with 5 at-risk factors. Mean scores for students from two-parent families were higher than students from single-parent families. Mean scores for

students not from low socioeconomic status were higher than students from low socioeconomic status. Mean scores for students that had not been retained where higher than students that had been retained. Mean scores for students that did not receive special education services were higher than students that did receive special education services. Mean scores for female students were higher than male students. Findings for the data also indicated negative relationships between the students' score on the end of course assessment and the number of days absent from school and the number of discipline referrals received.

DEDICATION

The work in this study is dedicated to my family. Like most doctoral candidates, my completion of this journey to a successful completion would not be possible without the support from many individuals who have provided me with resources, patience, and understanding throughout this process. Although there are many, no one deserves more credit to my success then my wife Robin. Through the many hours that she has spent taking care of our family as I pursued this degree, standing by me through some tough times, and nursing me back to health after my heart attack and its complications, I dedicate this to her, my partner in life and my best friend. I could spend many hours talking about the ways I have come to depend on her and I would hope that everyone can someday experience the same type of feelings for the special person in your life as I have for her. I would also like to say that I am very proud of her own accomplishments. She is a world class teacher and a wonderful mother.

I would also like to dedicate this to my children Julia, Ben, Alexandria, and Emily. I am very proud to say that all of them are wonderful children and it has been my honor, privilege, and pure joy to raise them over the last 30 or so years. I would hope that this work would inspire them to continue to pursue their dreams and dedicate their lives not only to their own success but the success of others as well.

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Robin, thank you for your patience and understanding during my years in education. You have always allowed me to follow my dreams. I can only hope that I can return the favor someday.

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CHAPTER 1

INTRODUCTION

Since 2001 a renewed emphasis on math education for all students has been driven by the No Child Left Behind Act (NCLB, 2001), the reform efforts of the National Council of Teachers of Mathematics (NCTM, 2014), the creation and adoption of the Common Core State Standards (CCSS, 2013), and the Individuals with Disabilities Education Act (IDEA, 2004) and its reauthorization. Aligning with new standards and levels of accountability, there has been an upward trend in student performance on math assessments. According to the National Assessment of Educational Progress (NAEP), despite improvements in overall scores, there continues to be large achievement gaps for subgroup populations. This is especially true in mathematics where only 36% of the nation's eighth graders scored proficient or better on the NAEP assessments in 2013.

When students enter the ninth grade, many are not prepared to begin study of advanced mathematics. This also may lead to the feeling that school has no meaning or purpose (Bottoms, 2008). Balfanz (2009) stated "It is during the middle grades that students either launch toward achievement and attainment or slide off track and placed on a path of frustration, failure, and, ultimately early exit from the only secure path to adult success" (p. 13). Attendance, family composition, socioeconomic status, grade retention, disability status, discipline referrals, and students who are English language learners (ELL) during middle school are linked to students' poor performance in mathematics (Balfanz, 2009).

Kominski, Jamieson, and Martinez (2001) studied personal and family factors as indicators of poor academic performance. Family composition, socioeconomic status, grade

retention, disability status, attendance, and discipline referrals were identified as important indicators. Students who are English language learners often face difficulties in mathematics because of the lack of language skills development prior to their high school years (Cummins, 2000). Absence or truancy from school may be the beginning of a trend towards lifelong problems (Cummins, 2000). Students with excessive absences fall behind in academics and often require remedial courses or special education services. Family and personal problems need to be addressed and interventions implemented. According to Kominski et al. (2001) addressing attendance, family composition, socioeconomic status, grade retention, disability status, discipline referrals, and those students who are English language learners can make the difference in a successful future not only in mathematics but in all areas of the students' education experience.

Statement of Problem

The purpose of this research is to examine the relationship of at-risk indicators attendance, family composition, socioeconomic status (as measured by free and reduced priced meals), grade retention, special education status, number of discipline referrals, those students who are English language learners (ELL), and gender to student performance in high school mathematics. Despite improvement in overall scores in math, some children continue to fall behind and show little academic success in other subject matter. This is especially true for subgroup populations. Large percentages of low-income students, English language learners, and students with disabilities score below basic performance on the National Assessment of Educational Progress (NAEP) assessments (U.S. Department of Education, 2010). In 2011 and 2013 fourth grade students with disabilities scored significantly lower than their grade level

peers on the national assessment in mathematics, with more than 50% of these students failing to reach proficiency (National Center for Education Statistics, 2013).

According to Balfanz (2009) early elementary years of a child's education can be a crucial time in the student's academic and emotional development and should be monitored closely. In addition, home factors play a role in determining success and need to be addressed as well. Understanding the needs of an individual child as early as possible will promote a more successful future. Many states choose third and fourth grade as pivotal years in the evaluation of individual student's mathematics skills (Balfanz, 2009).

This study is an examination of the relationship of attendance, family composition, socioeconomic status, retention prior to high school, disability status, discipline referrals, English language learners, and gender to ninth grade mathematics success as defined by achievement scores on the end of course (EOC) assessment for algebra I during the students ninth grade year. According to the Tennessee Department of Education a review of the last 3 years of EOC data in algebra I for the state of Tennessee revealed that 47.4% of the students scored proficient in 2010, 53.5% in 2011, and 61.7% in 2012. This study is an examination of the relationship of those factors that may contribute to an individual student's success or failure in high school mathematics.

Research Questions

The following questions were used to guide the nonexperimental quantitative research design:

Research Question 1: Is there a significant relationship between a student's score on the algebra I end of course (EOC) assessment and the number of days the student is absent from school?

Research Question 2: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students from single-parent families and ninth grade students from two-parent families?

Research Question 3: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students from families of low socioeconomic status and ninth grade students from families that are not low socioeconomic status?

Research Question 4: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students who have been retained prior to the ninth grade and ninth grade students who have not been retained prior to the ninth grade?

Research Question 5: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students who receive special education services and ninth grade students who do not receive special education services?

Research Question 6: Is there a significant relationship between a student's score on the algebra I end of course (EOC) assessment and the number of discipline referrals the student receives in school?

Research Question 7: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students who are English language learners (ELL) and ninth grade students who are not English language learners (ELL)?

Research Question 8: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade female students and ninth grade male students?

Limitations and Assumptions of Study

This study is limited by the appropriateness of the theoretical framework in determining the relationship of at-risk indicators attendance, family composition, socioeconomic status, grade retention, disability status, discipline referrals, English language learner (ELL) status, and gender with student performance in high school mathematics. For the purpose of this study subjects were limited to high school students who were in the ninth grade during the 2012-2013 academic school year and who were enrolled in a Tennessee high school that reported to the state report card. It is assumed that the methodology adequately addressed the research questions. It is also assumed that the statistical tests were appropriate and possessed the necessary power to detect differences in the variables if differences are present. This study is also limited by the usefulness of the results to the stakeholders.

This study is delimited to ninth grade students who were enrolled in algebra I in a school system in Northeast Tennessee. The participating school system was chosen due to its convenience for the researcher. This study is specific to the system included and may not be generalizable to other populations or other systems.

Definitions of Terms

The following definitions provide explanations for terms specific to this study.

1. Achievement Gap: The difference between the academic performance of students in various subgroups, particularly the subgroups of gender, ethnicity, socioeconomic status, and disability status on end of year assessments (Tennessee Department of Education, 2013).

2. At-risk: Students who have a greater chance of dropping out or failing school (Tennessee Department of Education, 2013).
3. Disability: A child with a disability means a child evaluated in accordance with Section 300.304 through 300.311 as having mental retardation, a hearing impairment, a speech or language impairment, a visual impairment, a serious emotional disturbance, an orthopedic impairment, autism, traumatic brain injury, and other health impairment, a specific learning disability, deaf-blindness, or multiple disabilities, and who, by reason thereof, needs a special education and related services (United States Department of Education, 2013).
4. Economically Disadvantaged: This is when a member of a household meets income eligibility guidelines for free or reduced-priced school meals (Tennessee Department of Education, 2013*)*.
5. Individualized Education Plan (IEP): A written plan created for a student with disabilities by the student's teachers, parents or guardians, the school administrator, and other interested parties. The plan is tailored to the student's specific needs and abilities and outlines attainable goals (Tennessee Department of Education, 2013).
6. Learning Disabilities: A disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculation, including, conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia (United States Department of Education, 2013).

7. No Child Left Behind: A federal mandate that provides school choice, flexibility, and accountability in order to lessen the achievement gap so that no child will be left behind (United States Department of Education, 2013).
8. Nontraditional family: For the purpose of this study, nontraditional is the makeup of the family unit as related to the care and or custody of a child. Nontraditional family composition may include a two-parent household, single-parent household, foster parent or kinship provider (United States Department of Education, 2013).
9. Two-Parent Family: This is a term used to define a family group consisting of a pair of adults and their children. This is in contrast to a single-parent family, to the larger extended family, and to a family with more than two parents. Two-parent families typically center on a married couple and may have any number of children.

Significance of Study

This study examines the relationship that attendance, family composition, socioeconomic status, grade retention, special education status, number of discipline referrals, English language learner status, and gender have with a student's success in mathematics. The researcher seeks to add to the previous research in this area. Crucial to a student's academic success is the identification of any factor that can inhibit the student's success in the classroom.

The researcher seeks to identify those factors that have a relationship to student academic achievement in mathematics and provide insight into strategies that can help the student overcome factors that may be detrimental to the student's academic success. Further, this study may provide data to base professional learning opportunities in school districts to address specific concerns about student's success in mathematics.

Overview of Study

The study is organized into five chapters. Chapter 1 includes the introduction, the statement of the problem, the limitations of the study, the definition of terms, the research questions, significance of the study, and an overview of the study. Chapter 2 contains a review of literature related to school and family factors that can be detrimental to the individual student's success in high school mathematics. The review includes sections on truancy, family composition, socioeconomic status, grade retention, disability status, discipline referrals, students who are English language learners, and gender. The methodology used in the study is detailed in Chapter 3. The description includes the population, research questions, procedures used for research, data collection, and the procedures for data analysis. Chapter 4 reports the findings of the data analyses. Chapter 5 provides a summary of findings, conclusions, and recommendations for further research related to this study.

CHAPTER 2

REVIEW OF LITERATURE

There is growing concern that American students are not mathematically prepared to compete in an ever-increasing global economy and mounting fear that countries such as China and Japan will overtake America as the major economic force because their youth receive better education than ours, especially in mathematics (Garfunkel, 2007). According to Garfunkel (2007) concerns about mathematical education "is not simply about economic competitiveness or getting higher scores on international comparisons, rather it is about equipping our children with the necessary tools to be effective citizens and skilled members of the workforce in the 21st century" (p. 186). The purpose of this study was to evaluate whether the factors of attendance, family composition, socioeconomic status, grade retention, special education status, number of discipline referrals, English language learner status, and gender have a relationship to the successful completion of algebra I in high school as determined by the individual student's performance on the end of course (EOC) exam. The purpose of this literature review was to describe the factors that impact success in ninth grade algebra I for high school students.

Attendance

Poor attendance has been one of the most evident causes for students experiencing academic failure during high school. According to Bridgeland, Dilulio, and Morison, (2006) it is obvious that no matter how effective teachers are, if students are not attending school, they have no chance to learn. Bridgeland et al. (2006) reported that 59% to 65% of respondents were chronic absentees the year before dropping out of school. Students described a pattern of refusing to wake up, skipping class, and taking 3-hour lunches with each absence making them

less willing to go back to school. These students had long periods of absences and were sometimes referred to the truant officer, only to be brought back to the same environment that led them to become disengaged. Of these students, 43% said they missed too many days of school and could not catch up. Students who dropped out during their freshman year had an average absenteeism rate of 65%. Sophomore dropouts had a freshman absentee rate of 36%; this increased to 61% their sophomore year by the time they dropped out. Juniors who dropped out during their 11th grade year had an absenteeism rate of 59%; this was preceded by their sophomore year with a 33% rate. Seniors who dropped out had an absentee rate their junior year of 45% followed by 63% the year they dropped out.

According to Swanson (2009) absenteeism has been a persistent problem since the beginning of formalized schooling in America. A student's excessive absences from school are of significant concern for school districts as well as law enforcement. Absenteeism from school can be associated with an increase in the crime rate in local neighborhoods (Swanson, 2009). As the nation has taken on the challenge of public education reform, it has emphasized an approach to school accountability. The No Child Left Behind Act of 2001, the reauthorization of IDEA in 2004, and the recent Race to the Top initiative of the Obama administration, have increased pressure on school and district administrators to closely monitor student attendance. According to Swanson (2009) over the last decade an increased emphasis on school attendance has been placed on school administrators to ensure students' exposure to vital instruction time.

According to Bazemore, Stinchcomb, and Leip (2004) unexcused absence is defined as a student's unlawful absence from school without parental knowledge or consent and has been identified as a serious social issue in need of increased attention for many years. With attendance being of upmost importance and increased awareness being placed on students'

attendance (Milliken, 2007), many school districts continue to report staggering absenteeism rates to the point that absenteeism has been broadly characterized as a nationwide problem with serious individual and family level consequences.

There tends to be wide variation across states and within states across school boards and school districts concerning how attendance policies and derivative laws and regulations are interpreted (George, 2011). For example, "some districts calculate unexcused absences on a per period basis, while others distinguish only among entire school days" (George, 2011, p. 14.). These varying interpretations make it difficult to compare reported attendance rates across states and across school districts within states (Sundius & Farneth, 2008).

According to Baker, Sigmon, and Nugent (2001) school administrators, teaching professionals, and parents agree that absenteeism is a serious problem in today's schools and can result in both short-term and long-term problems. State boards of education are charged with releasing statistical data on attendance rates obtained from individual school districts at year's end. Such statistical data are known to be imprecise; however; while attendance data of some type are available throughout the country, the lack of uniformity across school districts limits the use to be made of such data in the analysis of the problem of absenteeism (Henry, 2007).

Characteristics of the Excessive Absenteeism Student

There are numerous characteristics associated with excessive absenteeism. While some characteristics have been identified unique to a particular research study and to a particular subpopulation of students, generalized patterns of association have been reported related to the gender, the age, the socioeconomic status, and the race and ethnicity of students. Sum et al. 2003 reported findings on the four areas.

Gender. *S*tudies uniformly report higher absenteeism rates for males than females, but females are twice as likely as males to be absent with parental consent. Female students with excessive absences are said to demonstrate lower antisocial behavior than truant males, while males tend to perceive the school experience more negatively than truant females, a factor thought to contribute to the higher rates of male absenteeism.

Age. Studies examining attendance characteristics based on age reveal that as student age increases, there is a concurrent increase in student school avoidance behavior, with the upper grades in high school exhibiting the highest rates of absenteeism for both males and females.

Socioeconomic status. Examining attendance characteristics based on socioeconomic status reveals that students with excessive absences tend to come from economically disadvantaged home situations. It is well established that single-parent households are another important family setting variable of consequence.

Race. Racial and ethnic minority students have higher reported absenteeism rates than white students in virtually every study published.

Predictors of Excessive Absenteeism Behavior

Henry (2007) found that the utility of identifying predictors of absenteeism behavior derived from the likelihood that poor attendance behavior does not begin the first day a student is absent from class, but rather that such school avoidance behavior tends to develop early on in a chronically absent student's school career. Students who are defined as chronically absent late in their academic tenure often exhibit recognizable characteristics early on, starting as early as primary school. Predictors of absenteeism can be detected through student observation within or outside of the school setting, through observing or having knowledge of a student's family life, or having familiarity of the community within which the student resides or attends school. Being

knowledgeable of predictors of absenteeism behavior allows school administrators and teaching staff to identify at-risk students early for absenteeism prevention and behavioral intervention. Early prevention and intervention efforts are essential in preventing poor school attendance from leading to poor school performance (Henry 2007).

Causes of Excessive Absenteeism

Absenteeism behavior is typically grouped into four separate categories with respect to student-specific variables, school-specific factors, family-specific setting characteristics, and community-specific influences (Henry & Huizinga, 2007; Kearney, 2008). In addressing excessive absence behavior, interventions and prevention programs are directed principally towards one or another of these areas. According to George (2011) since the 1980s the longstanding view that the attendance problem lies within one single domain (i.e., the schools) has been broadly challenged, and new assertions have been made in many forums that such simplistic thinking places severe constraints on understanding the complex way in which absenteeism behaviors develop, ultimately, impeding the ability of either schools or juvenile justice systems to address the problem of school avoidance effectively.

It is now widely understood that the attendance problem is most typically multidimensional in nature, with many possible contributing factors coming into play (George, 2011). Absenteeism exists within a context of inter-action effects including interactions between the traits of the student, the experienced school setting, the family support structure, and the broader community setting.

Outcomes of Excessive Absenteeism

Excessive absences from school pose significant short-term and long-term challenges for the school-avoiding student and pose difficult problems for the student's school, family, and community (George, 2011; Henry, 2007; Smink & Heilbrunn, 2005). Individuals working with students with excessive absences tend to embrace, either directly or indirectly, the idea that absenteeism has far-reaching implications with severe consequences for both childhood and adult outcomes as well as for society as a whole (Bazemore et al., 2004; George, 2011; Henry, 2007).

An individual's socioeconomic status is an important variable to examine when considering attendance (Snyder, Tan, & Hoffman, 2006). Low socioeconomic status is correlated with both poor school performance and with attendance. According to KewalRamani, Gilbertson, Fox, and Provasnik (2007) three theories have been offered to explain the relationship between low socioeconomic status and excessive absenteeism. First, poverty has been implicated in the delayed mental, physical, and psychological development of children. Second, poverty has also been implicated in children's lack of access to quality education and out-of-school learning opportunities.

Schools in low income areas often report low levels of academic achievement on the part of their students, and they report high rates of absenteeism (Bailey & Dziko, 2008). Third, poverty has been implicated in children's difficulty to consistently attend or remain enrolled in school. Whether the result of remaining at home to care for sick or unsupervised siblings or dropping out of school to obtain employment, research indicates that children who come from a low socioeconomic background often engage in excessive absenteeism at least in part because of their poverty status (KewalRamani et al., 2007).

Family Composition

Familial Barriers

Over the last half century the family structure in America has changed dramatically. What was once considered a traditional two-parent family consisting of the child's biological mother and father is now less prevalent in today's society. The potential for academic success is stifled by living in a disruptive home prior to foster placement, kinship placement, or a single-parent home. Poverty, substance abuse, and family violence prevent acceptable behavior and academic growth. Dealing with abuse and neglect has long lasting effects on children's self-esteem and potential. Children in foster care have a greater propensity of failure due for family situations endured prior to foster care (Miller, Pinderhughes, Young, & Ferguson, 2002).

According to Nowak-Fabrykowski and Piver (2008) foster children show feelings of insecurity and the need for attachment. Behavior ranges from challenging to accommodating when dealing with foster parents or educators. Foster children deal with emotional struggles that most children never face, yet they are expected to attend school daily and perform to high standards.

Kinship is a common term used to identify members of a and their contribution to the wellbeing of an individual. In regards to the student of a disruptive family, it represents those individuals who take care of the child instead of their biological parents. According to the United States Department of Health and Human Services (2014) the number of children in kinship care continues to grow each year. Grandparents represent the majority of kinship care. Children in kinship care with grandparents are more likely to repeat a grade and be placed in special education than children being raised in two-parent homes even though the children have similar

academic potential (Cuddeback, 2004). Kinship parents receive less training and support than foster parents allowing for the possibility of being overwhelmed. Cuddeback (2004) wrote that children raised by grandparents experience fewer behavior problems than children in single-parent families; however, kinship children are not performing to the standard of children raised in two-parent homes. More behavior issues, problems completing homework assignments, and weaker scores occur in kinship care than children in the two-parent family.

Lieras (2008) asserted that family structure is linked to behavior and academic problems in children. Stress indicators such as socioeconomic status, employment, and personal circumstances affect the home environment of single mothers. Higher education and gratifying employment promote a more stable environment for children. With the destruction of the American family, children are at-risk for academic failure not only because of school factors but home factors.

The number of nontraditional families, including single-parent families and step-families, in America has been steadily increasing. Estimates are that at least half of all children today will spend some time in a single-parent family before they reach age 18 (Amato, 2005). Single-/step-parenting is viewed as one risk factor that can lead to unsuccessful adolescent academic outcomes. Studies have identified possible educational problems suffered by children from single/step-parent homes.

Family setting and background plays a vital role in strengthening or devastating a student's academic performance. Peaceful and favorable environment within the home has a significant effect on the student's academic performance. Family setting is the basic institution for the future of the students. According to Amato (2005) family is the most important socializing agent that molds the child in society.

Perhaps the most profound change in the American family over the past 5 decades has been the decline in the number of children growing up in households with both biological parents (Amato, 2005). In 1960, 88% of all children lived with two parents, compared to 68% in 2007 (U.S. Census Bureau, 2008). In 1960, 5% of all children were born to unmarried mothers. That figure rose to 38.5% in 2006. Demographers have estimated that, overall, one child in two will spend some portion of his or her childhood in a single-parent family (Ventura & Bachrack, 2000).

Studies show that children raised in families with two continuously married parents tend to perform better on cognitive, emotional, and behavioral outcomes than children living in other family forms (Amato, 2005). Amato (2005) asserted that the changes in family structure over the last 50 years have affected child and adolescent well-being. In 2002 nearly 7 million children between the ages of 12 and 18 repeated a grade. Based on this figure, estimates show that if the share of two-parent families had remained unchanged between 1980 and 2002, some 300,000 fewer teens would have repeated a grade. Some 750,000 fewer students in 2002 would have repeated a grade if the share of two-parent families remained at the level it was in 1960.

Social science research over the past decades suggested that family structure affects children's school outcomes from preschool to college (Schneider, Atteberry, & Owens, 2005). Some of the variations in school performance could be explained, in part, by the differences in family resources such as time and money, family dynamics, and parental characteristics that are associated with the various family forms. These are mediating factors or mechanisms through which family structure affects schooling outcomes. Family structure may also exert a direct influence independent of mediating factors. Depending on the outcome, family structure's total

effect may consist of one or more mediating influences or a combination of both direct and mediating influences (Glenn & Sylvester, 2006).

A number of early-childhood outcomes contribute to children's eventual school readiness. Potentially important early-childhood outcomes vary by family structure. According to Osborne, McLanahan, and Brooks-Gun (2004) children from cohabiting mothers tended to exhibit more aggressive, withdrawn, and anxious or depressive behavior than children born to married mothers. Aggressive and withdrawn behaviors often were attributed to income differences between the mothers.

Artis (2007) wrote that studies show that reading to young children aids their literacy development. Toddlers and preschool-age children in married-parent families are read to more often than peers in nonintact families. One study of 11,500 kindergartners living with two parents or parent figures reported, accounting for parental education and income, children living with married parents averaged higher reading achievement test scores than peers living in cohabiting or step-parent families.

According to Cavanagh, Schiller, and Riegle-Crumb (2006) the family structure and its importance to academic achievement has been reported to be the single most important factor in determining the success in a child's academic career. Research emphasizes this reporting that first-graders whose mothers were married when they were born are less likely to engage in disruptive behavior with peers and teachers than those whose mothers were single or cohabiting at the time of their birth. Children aged 3 to 12 who live in intact families have higher average math scores than peers whose mothers live in cohabiting relationships (Hofferth, 2006). Children aged 7 to 10 who live in two-parent family settings tend to score higher on reading tests than peers who have lived in other family structures (Carlson & Corcoran, 2001). The predominant

family structure of a school's student population appears to be linked to the individual science and math scores of eighth graders. Ninth graders whose mothers were married when they were born are more likely to complete an algebra course than are peers whose mothers were single when they were born (Cavanagh et al., 2006).

The level of parental involvement varies by family structure, and the relationship between parental involvement and educational outcomes depends on the family context as well (Winquist & West, 2001). Research shows that compared to high school students from intact families, those from single or stepparent families reported less parental involvement in their school work, supervision, and parental educational expectations, which, in turn, affected school outcomes.

The home environment in which children are raised plays a role in schooling outcomes. For example, in a study of middle-class families, elementary students whose parents offered them math and science learning materials showed greater inclination toward and interest in math and science activities (Jacobs & Bleeker, 2004). Parental expectations of achievement, particularly adolescents' perceptions of such expectations, appear to strengthen their actual motivation and ability in school (Marchant, Paulson, & Rothlisberg, 2001).

Social science research over the last few decades indicates a strong relationship between family structure, parental involvement, and children's educational outcomes, with enduring influences from early childhood to young adulthood. Family policy intersects critically with education policy. Fortifying the intact family structure may lead to improvements in individual student outcomes as well as the American education system as a whole. Policies that strengthen healthy marriage and stable family formation may bolster child well-being, including school

outcomes, both at the individual and aggregate levels (United States Department of Health and Human Services (2014).

Socioeconomic Status

Each year students attend schools that represent a variety of socioeconomic backgrounds. Socioeconomic status refers to the level of education, income, and professionalism of an individual or group. Although students of higher and lower socioeconomic statuses both attend school, the effect of lower socioeconomic status on student achievement is well documented. Students of a lower socioeconomic status often face additional challenges including a number of learning resources, difficult learning conditions, and poor motivation that negatively affect their academic performance (Aikens & Barbarin, 2008).

Learning Resources

Families with a lower socioeconomic status are more likely to struggle with providing adequate support for their children's academic needs. Limited financial resources make it difficult for parents to develop a successful learning environment in the home. Parents in a low socioeconomic household cannot afford reading materials, technology, and tutors for their children. When children do not have a positive learning environment at home, it negatively affects their academic achievement level in school.

School Environment

School environment often plays an important role in academic achievement for low socioeconomic status children. Teacher turnover, limited resources, and low academic

performance are all characteristics of schools in lower socioeconomic communities. Consequently, highly-qualified teachers often avoid such schools by committing to more affluent school communities, leaving low socioeconomic status children with teachers who often lack expertise in their subjects (Aikens & Barbarin, 2008).

Academic Achievement

Lower socioeconomic status students historically have difficulty with language skills and struggle with reading. In comparison to higher socioeconomic status children, they are not as proficient when completing mathematical tasks such as word problems or addition and subtraction. As schools become aware of low student performance, students are often assigned to lower school tracks. Consequently, students on the lower end of the socioeconomic spectrum are forced to take lower level courses or vocational courses that do not necessarily prepare them for higher education. Lower socioeconomic status ultimately contributes to lower academic performance and slower rates of academic progress (Aikens & Barbarin, 2008).

Theory and Research

Children raised in poverty are much less likely to have their emotional needs met than their more affluent peers. According to Keegan-Eamon and Zuehl (2001) low-income parents are more likely to be overwhelmed by low self-esteem, depression, and a sense of powerlessness and inability to cope. These feelings may get passed along to their children in the form of insufficient nurturing, negativity, and a general failure to focus on children's needs. A study of emotional problems of children of single mothers found that the stress of poverty increases depression rates among mothers, which results in an increased use of physical punishment.

Children themselves are also susceptible to depression; research shows that poverty is a major predictor of teenage depression (Denny, Fleming, Clark, & Wall, 2004).

Gregory and Rimm-Kaufman (2008) asserted that socioeconomic status has adverse effects on student success due to lack of exposure and support. According to Gregory and Rimm-Kaufman (2008) early childhood poverty can set students on negative achievement trajectories with few opportunities for deflection toward higher achievement. Children have fewer opportunities and cultural exposure. They often face violent behavior in the home and exposure to unsafe neighborhoods. Parents living in poverty are normally single, unemployed, and have little formal education (Gregory & Rimm-Kaufman, 2008).

According to Vogel (2008) the duration of poverty, whether long-term or short-term, is of importance. Short-term poverty produces more behavioral problems than children in long-term poverty. Children in poverty deal with adversity that hampers their ability to develop emotionally, socially, and academically. They face uncertainties at home, unsteady income, possible relocation, the potential for dropping out of school, and continuing a life of poverty. The National Center for Children in Poverty reported intense effects on children when poverty was experienced early in life. Poverty is not only income related but also creates unstable home life and parental stress.

The achievement gap between children of different socioeconomic conditions continues to widen. Children living in poverty often have teachers who are not highly qualified and do not challenge them academically (Gregory & Rimm-Kaufman, 2008). The percentage of at-risk children with academic delays is higher in less affluent neighborhoods. With larger class size and achievement deficits, teachers are required to give additional attention to underachievers, which may slow the learning pace.

Students bring inequalities to the classroom beyond their control including their parent's educational background. Kahlenberg (2006) stated that high levels of poverty in school may hinder a child's education. Kahlenberg further stated that research showed low income children perform better in a middle class setting. Middle class schools promote the importance of education, better behaviors in the classroom, and more parent involvement. The opportunity for low poverty children to attend middle class schools provides them with a more effective education. The cognitive abilities of children are jeopardized by poverty at an early age due to lack of exposure to appropriate earning experiences (Chudgar & Luschei, 2009).

According to Davis-Kean (2005) income and parent education are linked to child achievement. If parents do not promote education, children will not see the importance. Family background plays a large role in a student's academic success. Families with higher socioeconomic status tend to provide their children with more educational resources and in turn their children achieve greater success (Davis-Kean, 2005).

Grade Retention

According to Anderson, Jimerson, and Whipple (2005) grade retention refers to the practice of keeping students at the same grade level for an additional year. The rationale behind retention is that it gives low-achieving students an extra year to catch up to the grade-level standard. As part of an increasing emphasis on standards and accountability, many districts are making decisions about grade retention based on student scores on district or state standardized tests. While eliminating social promotion has considerable intuitive and political appeal, it has also raised important concerns, partly because prior studies have shown that students do not

appear to benefit from being retained in grade and, indeed, that retention may increase their risk of dropping out of school (Anderson et al., 2005).

According to Greene and Winters (2006) grade retention has often been advocated and adopted in conjunction with the use of testing to end social promotion. A test-based promotion policy typically uses standardized tests as the main criterion to make high-stakes decisions about whether a student should be promoted to the next grade. Such promotion policies are very different from traditional teacher-initiated retention, under which retention decisions are typically based on the assessments of teachers and parents. While teachers may use test scores as the basis for retaining students in grade, their decisions are influenced by many additional sources of information such as student attendance, grades, and behavior, as well as intangible factors such as their own attitudes toward retention and their perceptions of the students. As a result, teacher-initiated retention decisions are likely to be more subjective (Allensworth, 2005; Greene & Winters, 2006).

Opponents of grade retention argue that prior research has shown that grade retention disproportionately affects low-income and minority children and is associated with low self-esteem, problem behaviors, and an increased risk of dropping out of school. Relative to students who are promoted, retained students are more likely to be male, younger than their peers, of low socioeconomic status, and from single-parent families. They are also more likely to have lower social skills and poorer emotional adjustment, more problem behaviors (such as inattention and absenteeism), more school transfers, poorer health, and disabilities. Parents of retained students are more likely to have lower intelligence quotient scores and lower levels of cognitive functioning, lower educational levels, lower occupational levels, less commitment to parenting responsibilities for their children's education, lower expectations of their children's educational

attainment, and less involvement in school (Anderson et al., 2005). Compared with their peers, retained students also appear less likely to pursue postsecondary education and more likely to have poorer employment outcomes in terms of earnings. Findings on social, emotional, attitudinal, and behavioral outcomes among the retained students compared with their promoted peers appear mixed, with some studies reporting positive outcomes and others finding insignificant or even negative results (Xia & Glennie, 2005).

Critics of grade retention contend that it fails to benefit children academically in the long run, hurts children's self-esteem, leads to behavioral problems often associated with being over-age for grade, has a correlative relationship with dropping out of school, and incurs significant financial costs of having children repeat a grade (Anderson et al., 2005; Eide & Showalter, 2001; Xia & Glennie, 2005).

Age at Retention

Conventional wisdom holds that students retained at a younger age tend to benefit from an additional year in the same grade. Children in early grades (typically, kindergarten or first grade) are often retained on the grounds of behavioral problems stemming from socio-emotional immaturity. The academic effects of retention in kindergarten or first grade, does not support this notion. In general, the majority of research shows that, contrary to popular belief, retention during kindergarten or first grade usually fails to improve academic performance and often does not have positive effects on student achievement in the long run (Hong & Bing Yu, 2007; Wu, West, & Hughes, 2008).

Hong and Bing Yu (2007) found that grade retention was associated with gender, race, socioeconomic status, age for grade, student mobility, family and parental characteristics, cognitive abilities, prior academic achievement, prior behavioral and socioemotional

development, disabilities, and student health. With respect to student demographics, studies showed that retained students were more likely to be male, minority, of lower socioeconomic status, and younger than their peers in the same grade. Specifically, boys were found to be much more likely to be retained than girls (Hong & Bing Yu, 2007).

In comparison with their promoted peers, retained students were found to fare poorly on cognitive and academic measures, including early academic standing (Alexander, Entwisle, & Dauber, 2003), IQ scores or cognitive test scores (Blair, 2001; Liddell & Rae, 2001), and academic achievement prior to retention (Hong & Bing Yu, 2007).

Retained students often received lower ratings on socio-emotional and behavioral indicators than their promoted peers prior to retention. On average, retained students had lower social skills, poorer emotional adjustment, and more problem behaviors before retention. They tended to have a lower self-concept, to display lower confidence, and to be less self-assured and socially competent. They were usually rated less favorably by teachers on classroom conduct, peer relations, and school adjustment and were often reported to exhibit higher levels of inattention, absenteeism, and behavior problems (Alexander et al., 2003; Hong & Raudenbush, 2005).

Alexander et al. (2003) asserted that retention alone was ineffective in raising student achievement. Studies that reported positive or mixed findings focused on short-term effects, used same-grade comparisons, or evaluated retention policies that included additional, supportive components. While retained students may appear to make significant gains during the retention year, improvements are often not big enough to bring them to the same performance level as the promoted students (Alexander et al., 2003). Academic gains found in the short term among

retained students disappeared several years later and many retained students eventually fell behind again (Roderick & Nagaoka, 2005).

Behavioral Outcomes

Similar to socio-emotional outcomes, conventional belief holds that retained students are more prone to problem behaviors. However, behavioral effects of retention are inconclusive. Studies show that retained students score lower than promoted students on measures of social, emotional, and behavioral adjustment (Anderson et al., 2005).

The most common types of behavioral outcomes are problem behaviors, inattention, absenteeism, aggression, substance use, and delinquency. Effects of retention on problem behaviors included acting out, anxiety, rebelliousness, and externalizing and internalizing actions (Beebe-Frankenberger, Bocian, MacMillan, & Gresham, 2004; Hong & Bing Yu, 2008). Aggression towards teachers, administrators, and other students were identified by teachers in those students who had been retained versus nonretained students (Jimerson & Ferguson, 2007).

Propensity to Drop Out of School

Opponents of grade retention policies often cite the high rate of dropping out of school among retained students as one of the most important arguments against such policies. Students retained for one or more grades are more likely to drop out of school than their promoted peers (Guevremont, Roos, & Brownell, 2007; Jacob & Lefgren, 2007). Studies show grade retention to be one of the strongest predictors of dropping out as compared to other student, family composition, and school characteristics, such as gender, race, academic achievement, student misbehavior, attendance, school transfers, socioeconomic status, parental education, and school location (Ou & Reynolds, 2008). The risk of dropping out among retained students is estimated to be 14% to 50% higher than among students who are not retained (Allensworth, 2004; Jacob &

Lefgren, 2007), while the risk was 90% higher for students who had been retained twice (Jimerson, Anderson, & Whipple, 2002).

According to Jacob and Lefgren (2007) grade retention is associated with gender, race, socioeconomic status, age for grade, student mobility, family and parental characteristics, prior academic achievement, prior behavioral and socioemotional development, and student health. Converging evidence suggests that grade retention alone is not an effective intervention strategy for improving academic and longer-term life outcomes.

Special Education Status

The No Child Left Behind (NCLB) law took effect in 2002. It affects what students are taught, the tests they take, the training of their teachers, and the way money is spent on education. While the primary funding for programs specifically focused on supporting students with disabilities through the Individuals with Disabilities Education Act, the reauthorization of IDEA increased support for the inclusion and improved outcomes of students with disabilities. One of the provisions of the legislation provides help to ensure that teachers and leaders are better prepared to meet the needs of diverse learners. While the bill has seen some success in closing the learning gaps that existed prior to the act, there continues to be concern for those students with learning disabilities (National Center for Education Statistics, 2013).

The higher standards and expectations for all students in mathematics and continually large achievement gaps for students with learning disabilities (LD) and other subgroup populations (National Center for Education Statistics, 2013) has led to an increased emphasis on math research. Particular emphasis has been placed on the skills, content, and instructional practices that create strong math education for struggling learners (Witzel, 2005).

Characteristics of Students with Math Disabilities

There are two different subgroups of students with learning disabilities, those with only difficulties in math and those who also struggle with reading or attention related disabilities (such as attention deficit hyperactivity disorder) (Geary, 2003). Regardless of whether or not students struggle in other academic areas, the computational and problem solving strengths and weaknesses are consistent among students with learning disabilities who struggle in math. Students with learning disabilities experience difficulty with both the procedural and conceptual aspects of mathematics. As problems become more difficult and involve more operations (fractions and algebra), students with learning disabilities begin making more procedural errors and often fail to detect errors once they have been made. Areas such as algebra and fractions that involve multiple computations and procedures are among the most difficult for students with math disabilities (Jordan, Miller, & Mercer, 1999). The abstract nature of both skill areas contributes to the difficulty.

The conceptual learning of mathematics refers to the understanding of the underlying ideas or concepts that make up algorithms. As students enter higher level math courses such as algebra, these conceptual understandings become more abstract (Witzel, Mercer, & Miller, 2003). Abstract thinking requires a person to think beyond what he or she can see or touch. This is particularly difficult for students with learning disabilities. Emphasis on teaching the precursor skills to algebra using concrete manipulatives can help to support this abstract understanding (Witzel, 2005). When students develop strong conceptual ideas, the essence of mathematical learning, they are more likely to become accurate in their procedures used to solve problems (Geary, 2003).

As students begin to learn the rules and operations for various problem types they

must also be able to generalize the solutions to other similar and more complex problem types. This too is a difficult task for both students with and without learning disabilities (Fuchs & Fuchs, 2003). Research indicates that students with learning disabilities have narrow schemas, or conceptual frameworks, in which to connect or relate novel problems compared to their peers (Fuchs, Fuchs, Finelli, Courey, & Hamlett, 2004). In order for students with learning disabilities to develop stronger conceptual frameworks to increase transfer of skills; and to advance the procedural understandings of mathematics, teachers must increase the use of effective, research-based, instruction in math.

Jones, Zirkel, and Barrack, (2008) wrote that there is a large discrepancy between the achievement of regular education students and students with disabilities. Students with disabilities are more at-risk for school failure and not graduating from high school. Effective communication, appropriate Individualized Education Plans (IEP), transition programs, focus on learning styles, accumulation of data, incentive programs, mentors, inclusion, and remediation are a few interventions to close the achievement gap. The key to school success for students with disabilities, specifically learning and emotional difficulties, is early identification and research-based strategic intervention. The earlier a disability is identified, the greater chance of academic success. In order to improve the learning opportunities of children with disabilities, educators must have knowledge and training on abnormal behaviors, differentiation of instruction, and how to monitor student progress (O'Shaughnessy, Lane, Gresham, & Beebe-Frankenberger, 2003).

According to the National High School Center (2012) over the last decade, the number of students with learning disabilities has improved compared to previous years. In 2011, 2,165,467 students ages 14–21 (1,793,363 ages 14–17) were served under the Individuals with Disabilities Act, a decrease of 65,037 students since 2009. From 2008 to 2009 the number of students

identified as having learning disabilities decreased by 14%. In 2009, 22% of students with learning disabilities dropped out of high school, down from 40% in 1999.

Studying at-risk indicators can provide early quality intervention to enhance learning. It takes effective planning and teaching to provide strategic opportunities for success. According to Murawski and Hughes (2009) the use of *Response to Intervention* (RTI) to identify students with disabilities provides a proactive approach to intervention. Putting thorough instruction in place gives students a stronger chance of success. Through the use of RTI, the educational curriculum is provided to all students. A marriage between special education and RTI will provide a cohesive educational intervention for student success. Without appropriate training and classroom intervention, a child with disabilities is more at-risk for school failure. Students with disabilities drop out of school at an alarming rate. Drop-out rates of students with disabilities are twice as high as students in regular education. Special education students tend to score in a lower percentile on accountability testing. When students are disengaged from school and experience failure, the possibility of dropping out of school seems the best choice. Students with disabilities who drop out of school is a serious concern to educators. Educators must provide academic opportunities and support for students with disabilities. When students are in an environment conducive to learning, chances of success are much improved (O'Shaughnessy et al., 2003).

Discipline Referrals

Many students attending public schools exhibit discipline problems such as disruptive classroom behavior, vandalism, bullying, and violence. Tobin, Lewis-Palmer, and Sugai, (2002) asserted that schools have at-risk students enrolled on a daily basis and have the opportunity to

identify and provide interventions that help eliminate negative outcomes. Typically, schools wait until students fail or accrue multiple office discipline referrals before addressing the problems. Early intervention could decrease the harmful effects risk factors pose to young children that could eventually lead them to violence and crime. Early identification of students who have distinct characteristics that might make them prone to behavioral problems is essential to reduce the likelihood of subsequent behavior issues. The use of office discipline referrals has been the primary source of data used to monitor the effectiveness of school-wide discipline plans and identify students who may require more supports and interventions. Walker, Cheney, Stage, and Blum (2005) conclude office discipline referrals are effective for identifying students at risk for developing behavioral problems.

The relationship between academics and behavior continues to grow and increases when students enter middle and high school. Children who performed poorly academically during elementary school are more likely to engage in delinquency, violence, and substance abuse during adolescence (Fleming, Harachi, Cortes, Abbott, & Catalano, 2004). The relationship between academic achievement and disruptive behavior appears to be the most intense with students who exhibit external behaviors, such as fighting, noncompliance, and other outward disruptive behaviors (McIntosh, Flannery, Sugai, Braun, & Cochrane, 2008; Nelson, Brenner, Lane, & Smith, 2004).

McIntosh et al. (2008) stated there are three causes that accounts for the relationship between academic achievement and disruptive behaviors. The first cause may be underlying attention issues. The suspected attention deficits may interfere with the student's learning ultimately leading to disruptive behaviors. Next, a pre-existing behavior issue may be present that may restrict the student's access to the learning environment. McIntosh et al. (2008) found

that when students disrupt the educational environment, they stop teaching from occurring, thereby preventing their own learning. Finally, the third cause may be the student's low academic abilities that might prompt disruptive behaviors to escape academic tasks. Over time the behaviors will continue to escalate in an effort to escape the demands of the learning environment. McIntosh et al. (2008) described the cycle of behavior a coercive cycle of academic and behavioral failure in which a student with low academic skills engages in disruptive behaviors to escape from the academic task. Over one third of teachers in a national survey indicate that disruptive behavior impedes their ability to teach (Osher, Bear, Sprague, & Doyle, 2010; Osher, Kendziora, & Chinen, 2008; Planty, 2009).

Family, school, and community factors have also been linked to school exclusion (Achilles, McLaughlin, & Croninger, 2007). Children of low socioeconomic family status have been over represented among disciplinary referrals (Achilles et al., 2007; Skiba, 2002; Townsend, 2000). Inner city schools with concentrated poverty appear to be a risk factor for suspension among students in urban schools.

According to Achilles et al. (2007) aggressive children have tendencies to be retained, be identified as special education students, and display inappropriate behavior. Young students are expected to comply with school rules and understand social rules even though many have had no prior experience from which to model. Academic achievement suffers when children are unable to focus on a task. They act out impulsively and become increasingly frustrated. The inability to form social relationships and problem solve leads to success. Classroom environments can agitate maladaptive behavior though inappropriate comments and behavior management. Children experiencing behavior problems when they enter school tend to be experiencing

continued behavior problems 2 years in the future (Thomas, Bierman, Thompson, & Powers, 2008).

Disciplining students, particularly those with chronic or serious behavior problems, is a long-standing challenge for educators. They must balance the needs of the school community and those of the individual student. At the heart of this challenge is the use of punitive versus supportive disciplinary practices. Though increasingly common in recent years, reliance on punitive approaches to discipline, such as zero tolerance policies, has proven largely ineffective, even counterproductive. This holds true both for general education students and those with disabilities. Current research and legislation discipline practices ensure the safety and dignity of students and staff, preserve the integrity of the learning environment, and address the causes of a student's misbehavior in order to improve positive behavioral skills and long-term outcomes.

In recent years many schools have adopted a zero tolerance approach to school discipline that usually entails the expulsion or suspension of students as an automatic consequence of serious acts of misconduct, particularly the possession of weapons or drugs. Unfortunately, an increasing number of schools apply a zero tolerance approach to behaviors that do not necessarily threaten the safety or welfare of others. Furthermore, harsh consequences are invoked automatically, irrespective of the severity of the misbehavior or the circumstance involved, and without consideration of the negative impact of these consequences on the welfare of the offending student or on the overall climate of the school (Skiba & Knesting, 2001).

Several researches (Skiba & Knesting, 2001; Skiba & Sprague, 2008) found that suspension, expulsion, and other punitive consequences are not the solution to dangerous and disruptive student behaviors. In fact, evidence indicates that dangerous students do not become less dangerous to others when they are excluded from appropriate school settings; quite often

they become more so. Youth who are not in school and not in the labor force are at exceedingly high risk of delinquency and crime (Skiba & Knesting, 2001; Skiba & Sprague 2008).

According to Skiba and Knesting (2001) zero tolerance policies usually do not increase school safety. Too often these same policies rely too heavily on suspension and expulsion, practices that neither improve school climate nor address the source of student alienation are related to a number of negative consequences, including increased rates of school dropout and discriminatory application of school discipline. Zero tolerance policies also restrict access to appropriate education, often exacerbating the problems of students with disabilities and achievement difficulties, and thereby increasing the probability that these students will not complete high school.

Positive discipline strategies are research-based procedures that focus on increasing desirable behaviors instead of simply decreasing undesirable behaviors through punishment. They emphasize the importance of making positive changes in the child's environment in order to improve the child's behavior. Such changes may entail the use of positive reinforcement, modeling, supportive teacher-student relations, family support, and assistance from a variety of educational and mental health specialists (Skiba & Sprague, 2008).

When children receive office discipline referrals, they can often simultaneously exhibit a multitude of issues including academic and behavioral problems. These problems rarely exist in isolation, and in combination they put students in more dramatic risk of school failure (Mclntosh et al., 2008). Thus, the relationship between academic performance and problem behaviors provides concern because of their documented interaction. Students with early behavior difficulties are at greater risk for developing academic problems and students with early

academic difficulties are at greater risk for developing problems in social behavior (Mclntosh, Horner, Chard, Boland, & Good, 2006).

Equally important in an environment conducive to learning is effective classroom management. Luiselli (2005) wrote that classroom disruptions can easily turn a perfect learning environment into chaos. There are multiple reasons students act out and disrupt the learning process. Problems such as violence, vandalism, bullying, and similar behaviors create an unsafe learning environment, undermine instruction, and pose a threat to the school population. Furthermore, early onset of discipline problems in school children predicts later maladjustment. Children who demonstrate antisocial behavior at young ages are more likely than their nonaggressive classmates to exhibit antisocial behaviors as adults (Luiselli, 2005). The primary behaviors in which students are sent to the office and sometimes suspended are defiance, insubordination, and disobedience (Shah, 2012).

According to Sugai and Horner (2002) special education students make up only 9% to11% of the school population but are responsible for more than 50% of schools' discipline problems. IDEA requirements stipulate that schools must look closely at the methods by which it disciplines special education students. Schools traditionally have used aversive measures such as zero tolerance, more security, surveillance cameras, and expulsions to deal with special education students' discipline. These practices, though uncomplicated to administer, do nothing to change the behavior and, subsequently, have a propensity to make the behavior worse (Sugai, & Horner, 2002). Armed with this information, schools are adopting discipline programs directed at changing disruptive behavior and creating a more positive learning environment.

For many years schools have struggled with special education student discipline problems and how to best manage these students during the school day (Sugai, 2007).

In fact, long-term expulsions and suspensions deny a special education student the benefits of classroom instruction and, simply, give the classroom teacher a break from the disruptive student (Lassen, Steele, & Sailor, 2006). Typically, the students causing the disruptions, and being removed from academic instruction, are those who already are academically challenged (Lassen et al., 2006).

Sugai (2007) wrote that the concerns of parents and the need for improving student achievement are creating a demand for effective discipline programs. This demand for approaches that effectively respond to discipline problems in schools has caused a prevalence of school discipline programs, purporting to bring about change and a significant reduction in student discipline issues and consequently increasing school order and effectiveness. Much of the research available for many of these approaches is limited and, therefore, not conclusive to the results when related to achievement and discipline referrals for special education students.

English Language Learners

Cummins (2000) asserted that learners' home languages can play a crucial role in their learning of mathematics. Students need a high degree of proficiency in at least one language in order to make satisfactory progress at school. Cummins also proposes that students with strength in two or more languages will outperform their peers, while those without a high degree of proficiency in any language will underachieve. Cummins's ideas have been demonstrated in the field of mathematics by research involving students who are English language learners in Australia. In this research the link between low proficiency in all languages and mathematical underachievement is particularly clear and may explain some minority groups'

underperformance in mathematics. There is also some evidence that students with strengths in two languages do better in mathematics than other students (Clarkson, 2007).

According to Hoffman and Sable (2006) it usually takes an ELL student more than 1 year to develop conversational language and 5 to 7 years to develop sufficient academic language to learn in English. ELL students may have problems with mathematics language because it uses technical terms including homophones and synonyms. The English language structures such as word order and syntax are sometimes different from the student's native language. In addition, the teacher may be using idioms, figurative language, and regional dialects that can confuse the ELL.

ELL students need more time to decipher and understand the language involved with a mathematics concept or word problem. Sometimes mathematics terms, phrases, or abstract ideas have no direct translation to the student's native language. Therefore, it is difficult for the student to stay at the same pace in the classroom as a native English speaker. Without a rich mathematics vocabulary, the ELL will need more time to keep up with native English speakers. Every new term they learn must be embedded in familiar contexts, and this takes time when working in a second language (Hoffman & Sable, 2006).

Written word problems present a unique challenge to ELL students and teachers alike. ELL students who have had formal education in their home countries generally do not have mathematical difficulties; hence, their struggles begin when they encounter word problems in a second language that they have not yet mastered. Vocabulary instruction is essential to effective math instruction. Not only does it include teaching math-specific terms such as percent or decimal, but it also includes understanding the difference between the mathematical definition of a word and other definitions of that word (Hoffman & Sable, 2006). Teachers may need to be

sensitized to the challenge ELL students face when reading word problems and learning mathematics. In an attempt to contextualize math, writers have used concepts that may be culture-specific; therefore, they are not part of the ELL students' schema knowledge and not transparent enough to allow students to guess in context.

Over the past 2 decades, demographics have become vitally important to education policy makers at all levels (Zumwalt & Craig, 2005). According to the National Center for Education Statistics (2013), in 2008, some 21% of children ages 5 – 17 (or 10.9 million) spoke a language other than English at home, and 5% (or 2.7 million) spoke English with difficulty. Hoffman and Sable (2006) reported that in the 2003-2004 school year, approximately 3.8 million ELL students were enrolled in U. S. classrooms or 11% of the school aged population in the United States that year.

Although a large percentage of English language learners are of Hispanic descent in many regions of the U.S., ELL students are a diverse group of individuals. ELL students differ in their cultural background, approach to schooling, families' emphasis on the importance of education, and their abilities to combine their home language with the English language. Unfortunately, with the exception of the more historical diverse communities, ELL students are most often grouped together because of funding and support for this diverse group of students. Services are mandated under the Civil Rights Act of 1964.

In determining the individual needs of an ELL student, school systems within the United States are governed by the individual state's guidelines from its department of education in determining the student's proficiency in English (Duran, 2008). It can also be inferred that each state has published proficiency assessment material based on the state's educational standards

and goals. Currently there is not a standard format for assessing an ELL students' proficiency level in English across all 50 states.

The language of mathematics creates many difficulties that ELL students may not have the strategies to resolve. This may partially explain why teachers comment that teaching word problems is one of the most difficult tasks in the elementary school curriculum. In addition to language dependence in mathematics, these students also have to overcome nonlinguistic difficulties, cultural differences, and instructional implications in their understanding of word problems. Besides, students' attitudes about their abilities as mathematics problem solvers have received considerable attention from researchers in recent years.

Given the increase in the number of culturally and linguistically diverse students in American schools, it is vital for teacher education programs to address the needs of ELL students in their courses. Mainstream general education teachers who did not previously experience this student population in their classes are now seeing high numbers of ELLs among their students. Therefore, all teachers, not just specialist English as Second Language (ESL) or bilingual professionals, should be prepared to work with ELLs (Lucas & Grinberg, 2008). Statistics available from the National Clearinghouse for English Language Acquisition (NCELA, 2009) show that more than 10% of the K-12 student population across the United States is comprised of ELLs, which accounts for over five million students in our schools.

Gender

The question of gender differences in mathematics achievement, attitudes, and affect is a continuing concern as scientists seek to address the underrepresentation of women at the highest levels of science, technology, mathematics, and engineering (Halpern et al., 2007; National Academy of Sciences, 2006). Stereotypes that girls and women lack mathematical ability persist

(Hyde, Lindberg, Linn, Ellis, & Williams, 2008). According to Bhana (2005) stereotypes about female inferiority in mathematics stand in distinct contrast to the actual scientific data reported in previous studies. This discrepancy is particularly problematic because such negative stereotypes can impair math test performance and cause anxiety via stereotype threat (Blascovich, Spencer, Quinn, & Steele, 2001).

Ganley and Vasilyeva (2013) found that females tend to be more anxious towards mathematics than males. It has been shown that anxiety may impact mathematical performance due to the relationship between anxiety and working memory. Ganley and Vasilyeva (2013) stated:

"Individuals with high anxiety would perform less efficiently on tasks requiring working memory resources because their worrisome thoughts interfere with working memory, making them unable to fully utilize their working memory capacity for task performance" (p. 2).

Recent studies show that "males continue to outperform females on measures of mathematical performance, especially on more difficult items" (Ross, Scott, & Bruce, 2012, p. 278-279). However, there is also evidence that the gender gap in performance is declining and that gender patterns are different among different countries. One study found that the gender gap in mathematical achievement in the United States was smaller than previously, but the gap grows larger as the students get older (Ross et al., 2012).

When parents believe the general stereotype that boys are better at mathematics than girls, they consequently apply the stereotype to their own children. These beliefs, in turn, affect a child's own self-perceptions about mathematics and this then affects their mathematical ability (Gunderson, Ramirez, Levine, & Beilock, 2012). Parents also affect their children's attitudes by

their expectations and encouragement. The prevalence of the math-gender stereotype can have direct consequences for women. Good, Rattan and Dweck (2012) stated:

"negative stereotypes may have the power to disrupt more than performance; they may also carry a strong message that certain groups are less valued or accepted. That is, the gender stereotype in mathematics, when made salient, may lead women in particular to feel less like accepted members of the mathematics community and thus to have a lower sense of belonging to mathematics" (p. 701).

Mathematics and science careers are often stereotyped as male domains (Steele, 2003). According to Steele (2003) although children may view boys and girls as being equal in mathematical ability, they nonetheless view adult men as being better at mathematics than adult women. These stereotypes are of concern for several reasons. First, in the language of cognitive social learning theory, stereotypes can influence competency beliefs or self-efficacy; correlational research does indeed show that parents' and teachers' stereotypes about gender and mathematics predict children's perceptions of their own abilities, even with actual mathematics performance controlled (Bouchey & Harter, 2005).

Findings from a recent analysis of data from state assessments of mathematics performance provide evidence that the gender gap in mathematics performance in the U.S. has indeed diminished (Hyde et al., 2008). Gender-biased classroom practices, for example calling on females less often for answers during math instruction, may negatively impact females' self-esteem, confidence in mathematical ability, and interest in a career in science, technology, engineering, and mathematics (STEM) fields (American Association of University Women, 1992).

Classroom climates that empower females and boost confidence in mathematical ability are important, given studies that show females have lower expectations for math performance than males starting in elementary school and persisting into middle school (Mullis et al., 2000; Stipek & Granlinski, 1991). These results are underscored by recent analyses of standardized assessments that show that gender differences in math performance are related to the gender equality within a given country. Gaps in performance by gender diminish among more gender-equal countries (Guiso, Monte, Sapienza, & Zingales, 2008). These results have implications for educational environments that are male dominated or those that are gender biased (Donohue, 2008). Fear of failure may negatively impact female performance in math. Such fear has been shown to lead to females putting less effort into studying math and becoming less engaged in the educational experience.

Student performance in mathematics is linked to opportunities to enroll in different types of mathematics courses, with more complex skills garnered from completion of increasingly difficult coursework (National Center for Education Statistics, 2013). For instance, 13 year olds who completed algebra scored higher on national level assessments than peers who completed only prealgebra or regular mathematics. Additional benefits include an increased likelihood of college enrollment and degree attainment as well as skills and abilities that can be applied to future learning outside of a mathematics classroom (Adelman, 2006).

National trends reveal an increase in overall performance on mathematical related assessments among K-12 students (Ingels & Dalton, 2008). However, results also indicate mixed conclusions in regards to achievement by gender at the K-12 level depending on the assessment tool used (Campbell, Hombo, & Mazzeo, 2000). At the undergraduate level, there is a clear pattern of fewer females than males pursuing undergraduate degrees in science,

technology, engineering, and mathematic (STEM) fields that require advanced mathematical skills (National Science Foundation, 2008). Examining the trends among males and females in math performance at various age levels provides insight into the environmental factors that negatively impact the performance of females in mathematics (National Science Foundation, 2008).

A variety of environmental factors can make a difference in females' math performances. Interventions to raise interest in STEM careers and bolster self-confidence among females in STEM disciplines that are introduced to students in middle school rather than waiting until the final years of high school can increase interest in male dominated science and math careers. This includes mentoring programs and programs or initiatives that outline what professionals do and how they accomplish their work in careers that require mathematical application such as engineering (Cunningham, 2007).

End of Course (EOC) Assessments

The No Child Left Behind Act (NCLB) enacted in 2002 required states to administer tests in reading, mathematics, and science at least once to students in grades 10 through 12 and to use these tests to identify schools meeting and not meeting Adequate Yearly Progress (AYP). States are using various tests to meet these requirements, with most focusing on comprehensive tests typically given in the 10th grade. Currently, 12 states use or report plans to use end of course assessments to meet NCLB testing and AYP requirements (Center on Education Policy, 2013). Nationwide, high school assessments have been around for well over 3 decades in various forms. State laws on the grades and subjects tested vary, but using assessments for accountability has traditionally driven what content gets tested at the high school level. A newer trend is using high

school assessments to measure student readiness for postsecondary education and job training (Olson, 2007).

Standards-based comprehensive assessments and standards-based end of course assessments, while sharing some similarities, can also be quite different in how they are implemented at the state level (Lloyd, 2007). End of course assessments are attractive to states because they align directly to curriculum standards and courses students need to take for graduation. According to the Center on Education Policy (2013) end of course exams are also more sensitive to instruction than are grade-level survey exams because they are taken right after a student has completed a course and can provide teachers with relevant information about students' understanding of the content, enabling teachers to adjust instruction for subsequent classes accordingly. In addition, end-of-course tests serve as a way to ensure consistency and rigor in classrooms within and across states, so that all students are exposed to a rigorous curriculum.

According to the Center on Education Policy (2008) criticism of high school graduates' lack of readiness for college and work has led a number of states to raise high school graduation requirements particularly in terms of the number and rigor of courses students must pass. Yet states have found that without a common end-of-course measure, it is impossible to ensure that a course labeled Algebra I holds students to the same expectations statewide. States cite a variety of reasons for supplementing or replacing existing high school assessments with end-of-course exams such as increase in academic rigor, measure grade-level expectations, improve alignment of curriculum with standards, let students know what will be expected of them, and hold students accountable across their high school career (Center on Education Policy, 2008).

Hamilton et al. (2009) defined common assessments as "assessments administered in a routine, consistent manner across a state, district or school" (p. 46) and included annual statewide accountability tests, interim assessments, benchmark assessments, and end of course (EOC) assessments. Such assessments are critical in providing data that can be compared across subjects, classrooms, and buildings. Hamilton et al. (2009) concluded by urging districts to adopt common assessments based upon five key reasons: (a) teachers should use data to evaluate their instructional decisions as part of an ongoing cycle of student improvement (p. 10); (b) teachers should show students how to examine their own achievement data in order to set and reach learning objectives (p. 19); (c) schools should establish a clear vision for school-wide data use, emphasizing collaboration across and within subjects and grades in order to identify problems and find best practices (p. 27); (d) districts should provide support via professional development and time for collaboration in order to cultivate a data-driven culture within the school (p. 33); and (e) districts should develop and maintain a district-wide data system that can be can accessed in a timely manner (p. 39).

End of course assessments measure the learning outcomes all students must attain to succeed in college and careers. Each assessment includes problem-based questions embedded in both academic and real-world contexts that are accessible and relevant to high school students. These real-world problems require practical applications of concepts, theories, principles, and process (Fisher & Frey, 2007). According to the Tennessee Department of Education (2013) end of course (EOC) tests refer to state required, standardized exams administered at or near the completion of a term of instruction. The appeal of this approach is likely related to several factors. Perhaps foremost is the view that an assessment explicitly tied to a specific course and administered very near completion of the term will improve the connection between standards

and instruction. Such an approach may also permit the development of a focused assessment that provides a more reliable and valid measure of student achievement with respect to the key knowledge and skills associated with each course. While EOC tests certainly offer great promise, they are not without challenges. Many of the proposed uses of EOC tests open new and often complex issues related to design and implementation (U.S. Department of Education, 2013).

Although test results are only one measure of student achievement, they have become increasingly important in assessing student learning. In 2007-2008 Tennessee used the Tennessee Comprehensive Assessment Program to measure achievement in reading/language arts, math, social studies, and science in grades 3 through 8, writing in grades 5 and 8, and end of course assessments in key subject areas. In addition, some schools chose to give a norm-referenced version of the Tennessee Comprehensive Assessment Program or TCAP to students in kindergarten and grades 1 and 2 in order to compare the performance of those students to their peer's nationwide (Tennessee Department of Education, 2013). Tennessee test results provide an indication of whether students are making progress toward mastery of state content standards. Students who score poorly on the TCAP may not be promoted to the next grade level or could face other actions such as mandatory extra help. All end of course assessments are required to count as at least 15% of a student's final course grade. According to the Education Commission of the States (2010) since the passage of the federal No Child Left Behind Act in 2002 every state has put in place testing and standards in core subjects to comply with the law. Schools are required to test students annually in reading and math in grades 3 through 8 and at least once in grades 10 through 12. Students must also be tested in science in at least one grade in elementary, middle, and high school. Each state chooses its own test and standards of proficiency. Schools

that do not show that students are making Adequate Yearly Progress toward achieving proficiency are subject to federal sanctions including loss of federal funds, providing free tutoring, allowing students to transfer to another school, and if all else fails, a complete restructuring of the school.

CHAPTER 3

METHODOLOGY

Family and social factors play a role in the academic success of children. The purpose of this research is to examine the relationship of at-risk indicators (attendance, family composition, socioeconomic status (as measured by free and reduced priced meals), grade retention, special education status, number of discipline referrals, students who are English language learners ELL), and gender with student performance in high school mathematics. Included in Chapter 3 are sections on research design, population, data collection, and data analysis. The research design describes the statistical methods and the objectives to be studied. Data collection and data analysis describe how data were prepared, the collection process, the presentation, and the analysis of data.

Research Questions and Null Hypotheses

The following questions were used to guide the nonexperimental quantitative research design:

Research Question 1: Is there a significant relationship between a student's score on the algebra I end of course (EOC) assessment and the number of days the student is absent from school?

Ho1: There is no relationship between student scores on the algebra I end of course (EOC) assessment and the number of days the student is absent from school.

Research Question 2: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students from single-parent families and ninth grade students from two-parent families?

Ho2: There is not a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students from single-parent families and ninth grade students from two-parent families.

Research Question 3: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students from families of low socioeconomic status and ninth grade students from families that are not low socioeconomic status?

Ho3: There is not a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students from families of low socioeconomic status and ninth grade students from families that are not low socioeconomic status.

Research Question 4: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students who have been retained prior to the ninth grade and ninth grade students who have not been retained prior to the ninth grade?

Ho4: There is not a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students who have been retained prior to the ninth grade and ninth grade students who have not been retained prior to the ninth grade.

Research Question 5: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students between students who receive special education services and ninth grade students who do not receive special education services?

Ho5: There is not a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students who receive special education services and those ninth grade students who do not receive special education services.

Research Question 6: Is there a significant relationship between a student's score on the algebra I end of course (EOC) assessment and the number of discipline referrals the student receives in school?

Ho6: There is not a significant relationship between a student's score on the algebra I end of course (EOC) assessment and the number of discipline referrals the student receives in school.

Research Question 7: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students who are English language learners (ELL) and ninth grade students who are not English language learners (ELL)?

Ho7: There is not a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students who are English language learners (ELL) and ninth grade students who are not English language learners (ELL).

Research Question 8: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade female students and ninth grade male students?

Ho8: There is not a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade female students and ninth grade male students.

Population

The participating public school system, located in Northeast Tennessee, consisted of 15 schools: 4 high schools, 1 middle school, and 10 elementary schools. The 2012-2013 student population was 5,714. The population of this study consisted of 412 ninth grade students from the high schools located across the participating county. The number of ninth grade students on free and reduced priced meals varied by school from a low of 57.7% to a high of 91.9%. White

students made up 95.9% of the student population. The percentage of special education students not including speech and language impaired ranged from 11.3% to 24.3%. This study targeted 412 students over a 10-year period. Data were collected on kindergarten students beginning with the academic year 2003-2004 following the same students through the ninth grade in 2012-2013.

Data Collection

After receiving approval from East Tennessee State University's Institutional Review Board, data were collected. Permission to collect data was also received from the participating school system's Director of Schools. Archived data were obtained through the system's computer information system, STAR_Student, which is part of the Statewide Student Management System (SSMS). This system provided information concerning the students' attendance, family composition, socioeconomic status (as measured by the free and reduced lunch program), grade retentions prior to the ninth grade, disability status, discipline referrals, English language learner status, and gender. The database provided extensive school history for all children in the school system. Scores on the algebra I end of course assessment (EOC) was used to determine the students' success in mathematics in this study.

Data Analysis

Descriptive and inferential statistics were used to analyze the eight research questions. The null hypotheses under research question 1 and research question 6 were analyzed with a Pearson correlation coefficient design. The Pearson correlation coefficient (r) assesses the degree that quantitative variables are linearly related in a sample. Each individual or case must

have scores on two quantitative variables. The significance test for *r* evaluates whether there is a linear relationship between the two variables in the population.

The null hypotheses under research questions 2, 3, 4, 5, 7, and 8 were analyzed with an independent-samples *t* test design. The independent-samples *t* test evaluates the difference between the means of two independent groups. With an independent-samples *t* test, each case must have scores on two variables, the grouping variable and the test variable. The *t* test evaluates whether the mean value of the test variable for one group differs significantly from the mean value of the test variable for the second group. This research used a nonexperimental quantitative methodology. All data from this research were analyzed using the IBM-SPSS. Each research question in this study had a corresponding null hypothesis. A significance level of .05 was used for all data.

Summary

The relationship of eight factors: attendance, family composition, socioeconomic status (as measured by free and reduced priced lunch), grade retention, special education status, number of discipline referrals, English language learner status, and gender to students' academic performance on the algebra I end of course (EOC) assessment was investigated. Specifically, I attempted to determine if any of these factors had a detrimental impact on the students' success in high school mathematics. Chapter 3 reported on the methodology for this quantitative study. The design of this study was nonexperimental and the data collected were from the participating county's student management system (STAR_Student). Included in this chapter was a discussion of the research design, research questions and null hypotheses, data analysis, population, and data collection methods.

CHAPTER 4

RESULTS

The purpose of this research was to examine the relationship of at-risk indicators attendance, family composition, socioeconomic status (as measured by free and reduced priced meals), grade retention, special education status, number of discipline referrals, English language learners (ELL), and gender with students' performance in high school mathematics. The number of subjects in this study was 412 ninth grade students from a public school system in Northeast Tennessee. Archived data provided by the school system were obtained through the system's student management system STAR_Student including algebra I end of course (EOC) assessment data for the 2012-2013 school-year. Each student was identified by a 4-digit number assigned by the system's data base administrator to protect the anonymity of the students.

Research Question 1

Research Question 1: Is there a significant relationship between student scores on the algebra I end of course (EOC) assessment and the number of days the student is absent from school?

Ho1: There is not a significant relationship between student scores on the algebra I end of course (EOC) assessment and the number of days the student is absent from school.

A Pearson correlation coefficient was computed to test the relationship between student attendance and student scores on the algebra I end of course (EOC) assessment for ninth grade students. The results of the correlational analysis revealed a moderate negative relationship between the number of days that a student is absent from school ($M = 13.92$, $SD = 14.32$) and the student's score on the algebra I end of course (EOC) assessment ($M = 79.53$, $SD = 15.74$) and a statistically significant correlation $r(410) = .30$, $p < .001$. Therefore, Ho1 was rejected. In

general the results suggest that students who are excessively absent from school tend to have lower scores on the algebra I end of course (EOC) assessment. Figure 1 displays the bivariate scatterplot.

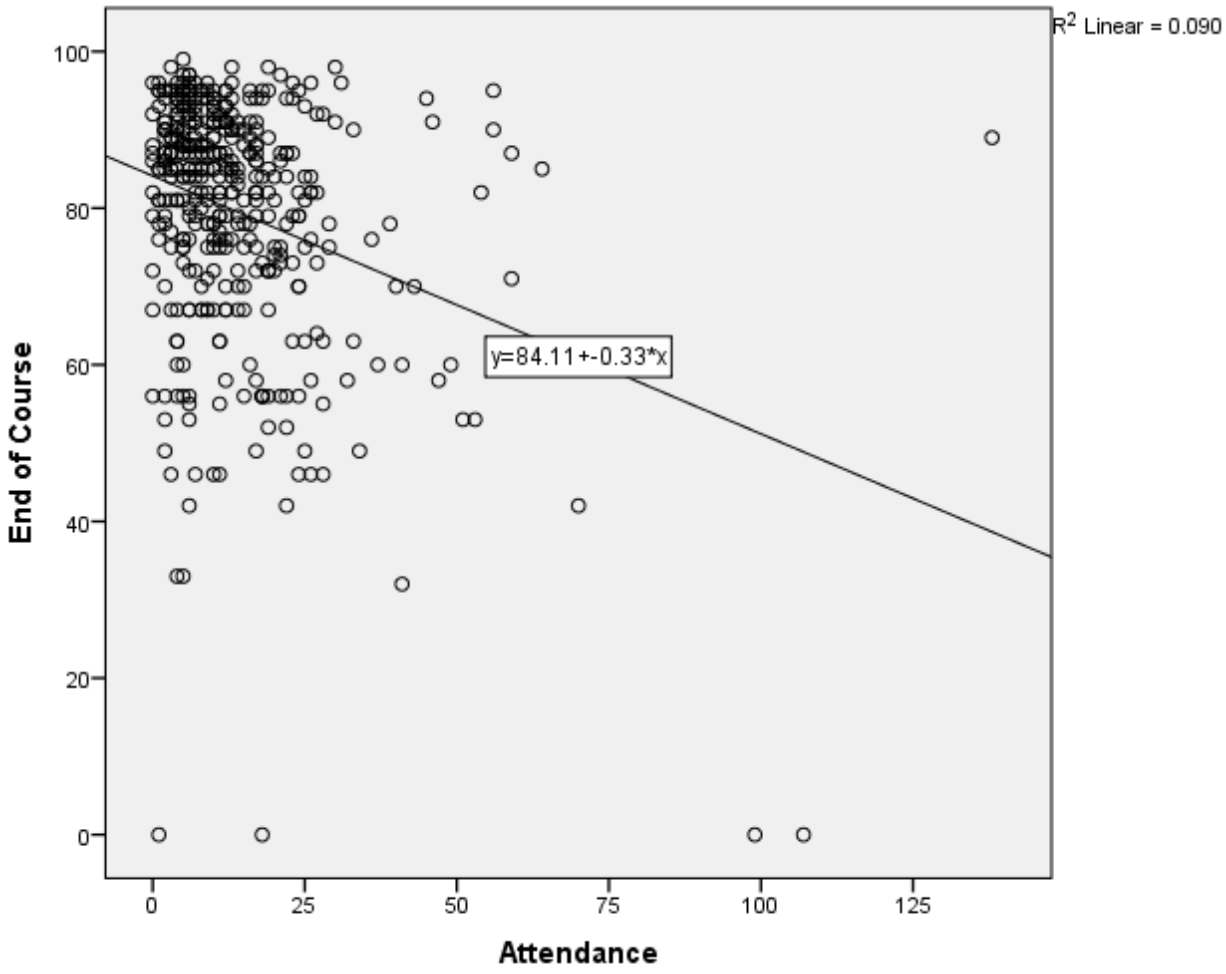


Figure 1. Distribution of Scores for All Ninth Grade Students on the Algebra I End of Course (EOC) Assessment and the Number of Days Absent from School.

Research Question 2

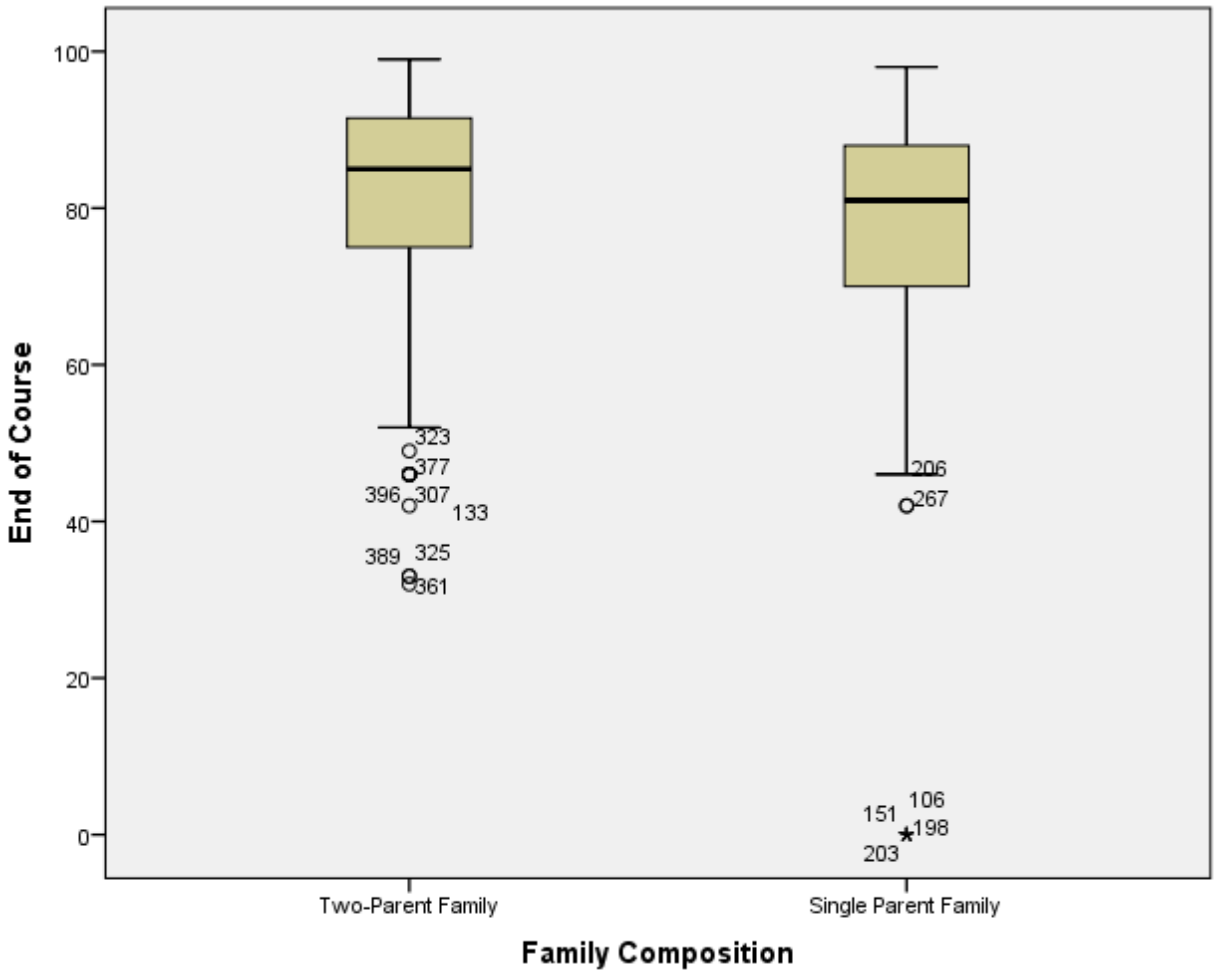
Research Question 2: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students from single-parent families and ninth grade students from two-parent families?

Ho2: There is not a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students from single-parent families and ninth grade students from two-parent families.

An independent-samples *t* test was conducted to evaluate whether the mean score of ninth grade students who are from two-parent families score higher on the algebra I end of course (EOC) assessment as opposed to ninth grade students from single-parent families. The score on the algebra I end of course (EOC) was the test variable and the grouping variable was the family composition for the student. The test was significant, $t(410) = 3.31$, $p < .001$. Therefore, Ho2 was rejected. The η^2 index was .03, indicating a small effect size. Students from two-parent families (M = 81.20, SD = 13.92) on average scored higher on the algebra I end of course (EOC) assessment than students from single-parent families (M = 75.69, SD = 18.78). The 95% confidence interval for the difference in means was 2.24 to 8.79. The means and standard deviations for all students by family composition are presented in Table 1. The distributions of scores for the two groups are displayed in Figure 2.

Table 1: *Means and Standard Deviations for All Students by Family Composition and the 95% Confidence Interval*.

Student Group	N	M	SD	Confidence Interval
Two-parent Families	287	81.20	13.92	2.24 to 8.79
Single-parent Families	125	75.69	18.78	



Note: o = an observation between 1.5 to 3.0 times the interquartile range
* = an observation which is more than 3.0 times the interquartile range

Figure 2. Distribution of Scores for All Ninth Grade Students on the Algebra I End of Course (EOC) Assessment and Family Composition.

Research Question 3

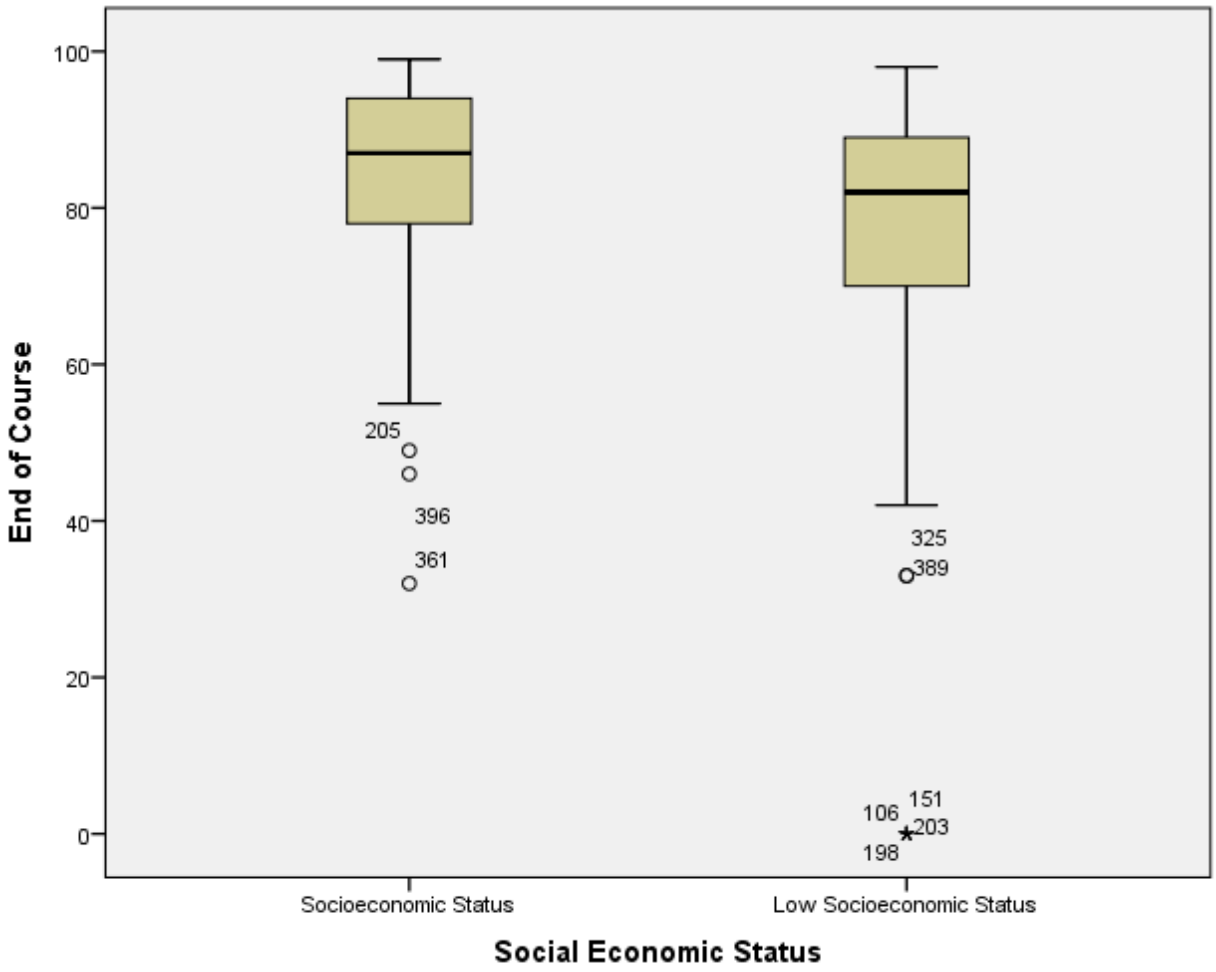
Research Question 3: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students from families of low socioeconomic status (as determined by free and reduced priced lunch) and ninth grade students from families that are not low socioeconomic status?

Ho3: There is not a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students from families of low socioeconomic status (as determined by free and reduced lunch) and ninth grade students from families that are not low socioeconomic status.

An independent-samples *t* test was conducted to evaluate whether the mean score of ninth grade students who are not from low socioeconomic families (as determined by free and reduced priced lunch) score higher on the algebra I end of course (EOC) assessment as opposed to those students from low socioeconomic families. The score on the algebra I end of course (EOC) assessment was the test variable and the grouping variable was socioeconomic status based on those students who receive free or reduced priced lunch. The test was significant, $t(410) = 4.15$, $p < .001$. Therefore, Ho3 was rejected. The η^2 index was .04 indicating a medium effect size. Nonsocioeconomic disadvantaged students (M = 84.21, SD = 12.13) on average scored higher on the algebra I end of course (EOC) assessment than those students from low socioeconomic families (M = 77.40, SD = 16.73). The 95% confidence interval for the difference in means was 3.59 to 10.04. The means and standard deviations for all students by socioeconomic status are presented in Table 2. The distributions of scores for the two groups are displayed in Figure 3.

Table 2: Means and Standard Deviations of All Students by Socioeconomic Status and the 95% Confidence Interval.

Student Group	N	M	SD	Confidence Interval
Not Free or Reduced Lunch	129	84.21	12.13	3.59 to 10.04
Free or Reduced Lunch	283	77.40	16.73	



Note: o = an observation between 1.5 to 3.0 times the interquartile range
* = an observation which is more than 3.0 times the interquartile range

Figure 3. Distribution of Scores for All Ninth Grade Students on the Algebra I End of Course (EOC) Assessment and Socioeconomic Status.

Research Question 4

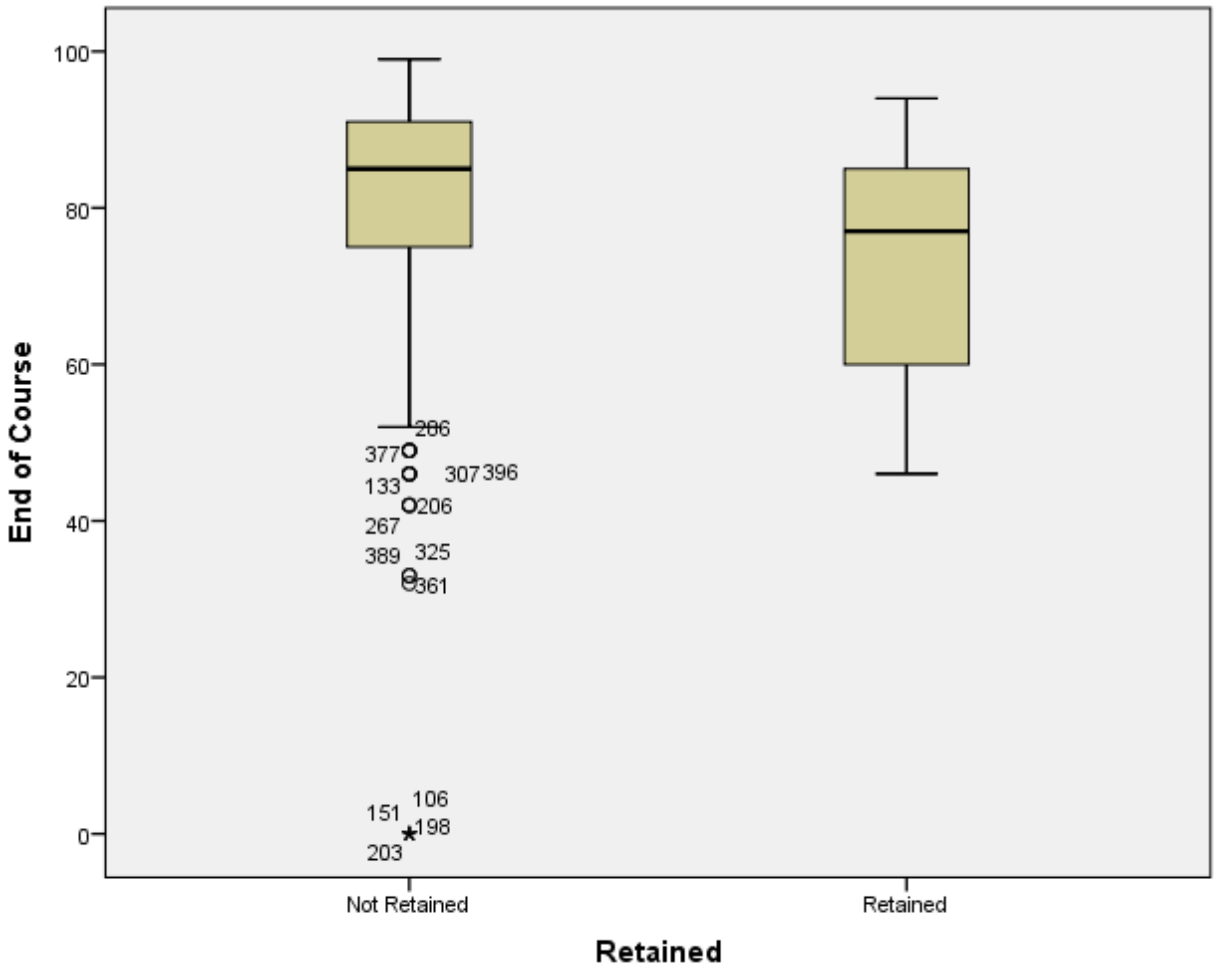
Research Question 4: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students who have been retained prior to the ninth grade and ninth grade students who have not been retained prior to the ninth grade?

Ho4: There is not a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students who have been retained prior to the ninth grade and ninth grade students who have not been retained prior to the ninth grade.

An independent-samples *t* test was conducted to evaluate whether the mean score for ninth grade students who not had been retained prior to the ninth grade score higher on the algebra I end of course (EOC) assessment compared to those ninth grade students who had been retained prior to the ninth grade. The score on the algebra I end of course (EOC) assessment was the test variable and the grouping variable was the retention status of the student. The test was significant, $t(410) = 3.48$, $p = .001$. Therefore, Ho4 was rejected. The η^2 index was .03, indicating a small effect size. Students who had not been retained prior to the ninth grade ($M = 80.56$, $SD = 15.68$) on average scored higher on the algebra I end of course (EOC) assessment than those student who were retained prior to the ninth grade ($M = 72.67$, $SD = 14.51$). The 95% confidence interval for the difference in means was 3.44 to 12.36. The means and standard deviations for all students by retention status are presented in Table 3. The distributions of scores for the two groups are displayed in Figure 4.

Table 3: Means and Standard Deviations of All Students by Retention Status and the 95% Confidence Interval.

Student Group	N	M	SD	Confidence Interval
Students not Retained	358	80.56	15.68	3.44 to 12.36
Retained Students	54	72.67	14.51	



Note: o = an observation between 1.5 to 3.0 times the interquartile range
* = an observation which is more than 3.0 times the interquartile range

Figure 4. Distribution of Scores for All Ninth Grade Students on the Algebra I End of Course (EOC) Assessment and Retention.

Research Question 5

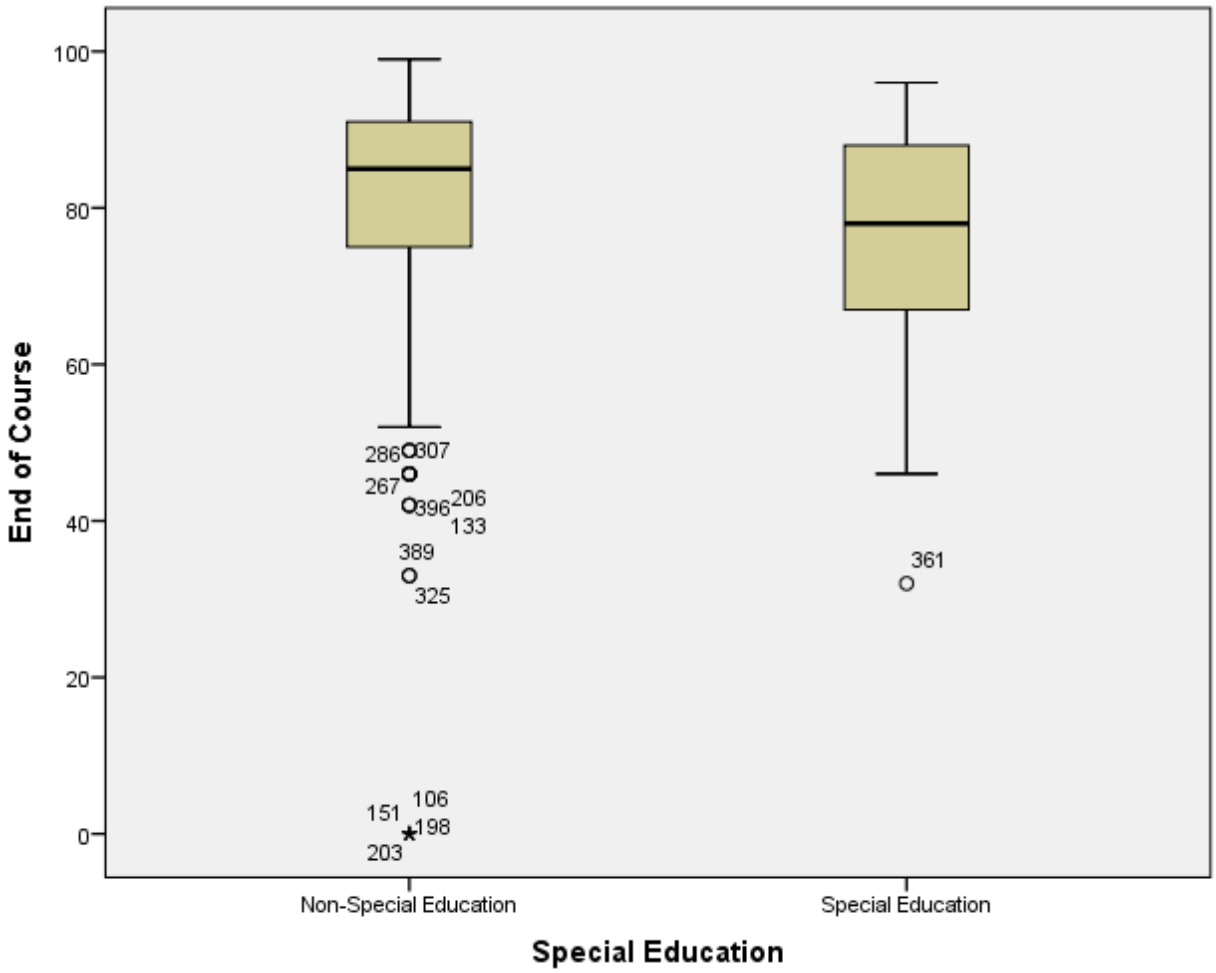
Research Question 5: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students who receive special education services and ninth grade students who do not receive special education services?

Ho5: There is not a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students who receive special education services and ninth grade students who do not receive special education services.

An independent-samples *t* test was conducted to evaluate whether the mean score of ninth grade students who do not receive special education services differ from the mean score of ninth grade students who receive special education services. The score on the algebra I end of course (EOC) assessment was the test variable and the grouping variable was the special education status. The test was significant, $t(410) = 2.30$, $p = .022$. Therefore, Ho5 was rejected. The η^2 index was .01, indicating a small effect size. Nonspecial education students (M = 80.30, SD = 15.82) on average scored higher on the algebra I end of course (EOC) assessment than students who receive special education services (M = 75.43, SD = 14.77). The 95% confidence interval for the difference in means was .71 to 9.03. The means and standard deviations for all students by special education services are presented in Table 4. The distribution of scores for the two groups is displayed in Figure 5.

Table 4: Means and Standard Deviations of All Students by Special Education Services and the 95% Confidence Interval.

Student Group	N	M	SD	Confidence Interval
No Special Education Services	347	80.30	15.82	.71 to 9.03
Special Education Services	65	75.43	14.77	



Note: o = an observation between 1.5 to 3.0 times the interquartile range
* = an observation which is more than 3.0 times the interquartile range

Figure 5. Distribution of Scores for All Ninth Grade Students on the Algebra I End of Course (EOC) Assessment and Special Education Status.

Research Question 6

Research Question 6: Is there a significant relationship between a student's score on the algebra I end of course (EOC) assessment and the number of discipline referrals the student receives in school?

Ho6: There is not a significant relationship between a student's score on the algebra I end of course (EOC) assessment and the number of discipline referrals the student receives in school.

A Pearson correlation coefficient was computed to test the relationship between student discipline referrals and student scores on the algebra I end of course (EOC) assessment for ninth grade students. The results of the correlational analysis revealed a negative relationship between the number of discipline referrals that students receive from school ($M = .19$, $SD = .66$) and the students' scores on the algebra I end of course (EOC) assessment ($M = 79.53$, $SD = 15.74$) and a statistically significant correlation $r(410) = -.14$, $p = .006$. Therefore, Ho6 is rejected. In general, the results suggest that students who have discipline referrals tend to have lower scores on the algebra I end of course (EOC) assessment. Figure 6 displays the bivariate scatterplot.

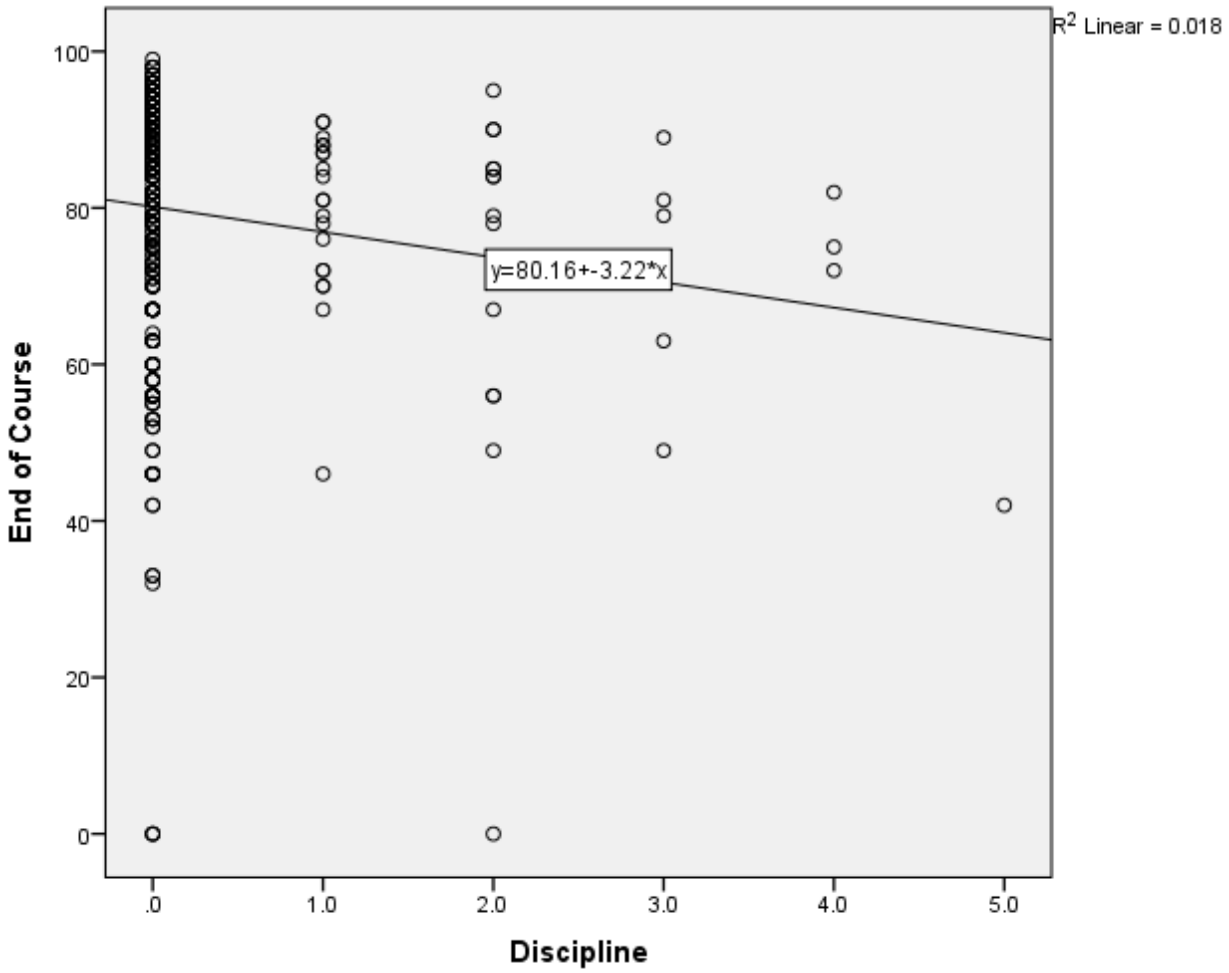


Figure 6. Distribution of Scores for All Ninth Grade Students on the Algebra I End of Course (EOC) Assessment and the Number of Discipline Referrals.

Research Question 7

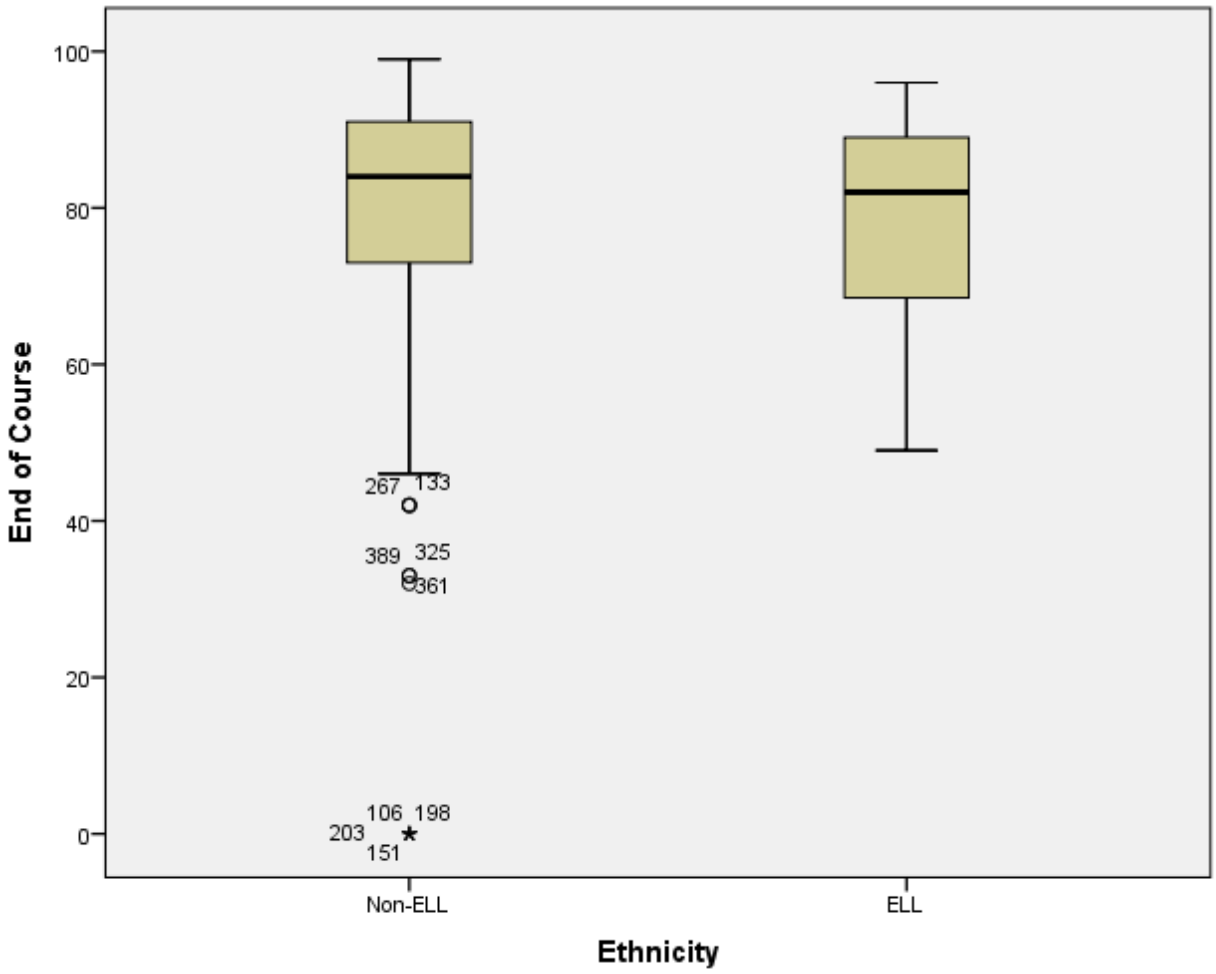
Research Question 7: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students between students who are English language learners (ELL) and ninth grade students who are not English language learners (ELL)?

Ho7: There is not a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade students who are English language learners (ELL) and ninth grade students who are not English language learners (ELL).

An independent-samples *t* test was conducted to evaluate whether the mean score of ninth grade students who are non-English language learners (ELL) score higher on the algebra I end of course (EOC) assessment as opposed to ninth grade students who are English language learners (ELL). The score on the algebra I end of course (EOC) assessment was the test variable and the grouping variable was the students' ELL status. The test was not significant, $t(410) = .31$, $p = .759$. Therefore, Ho7 was retained. The η^2 index of $< .01$ indicated a small effect size. Students who are non-English language learners (M = 79.57, SD = 15.76) on average did not score higher on the algebra I end of course (EOC) assessment than students who are English language learners (M = 78.09, SD = 15.90). The 95% confidence interval for the difference in means was -7.99 to 10.95. The means and standard deviations for all students by English language learner status are presented in Table 5. The distributions of scores for the two groups are displayed in Figure 7.

Table 5: Means and Standard Deviations of All Students by English Language Learner Status and the 95% Confidence Interval.

Student Group	N	M	SD	Confidence Interval
Non-ELL Students	401	79.57	15.76	-7.99 to10.95
ELL Students	11	78.09	15.90	



Note: o = an observation between 1.5 to 3.0 times the interquartile range
* = an observation which is more than 3.0 times the interquartile range

Figure 7. Distribution of Scores for All Ninth Grade Students on the Algebra I End of Course (EOC) Assessment and Ethnicity.

Research Question 8

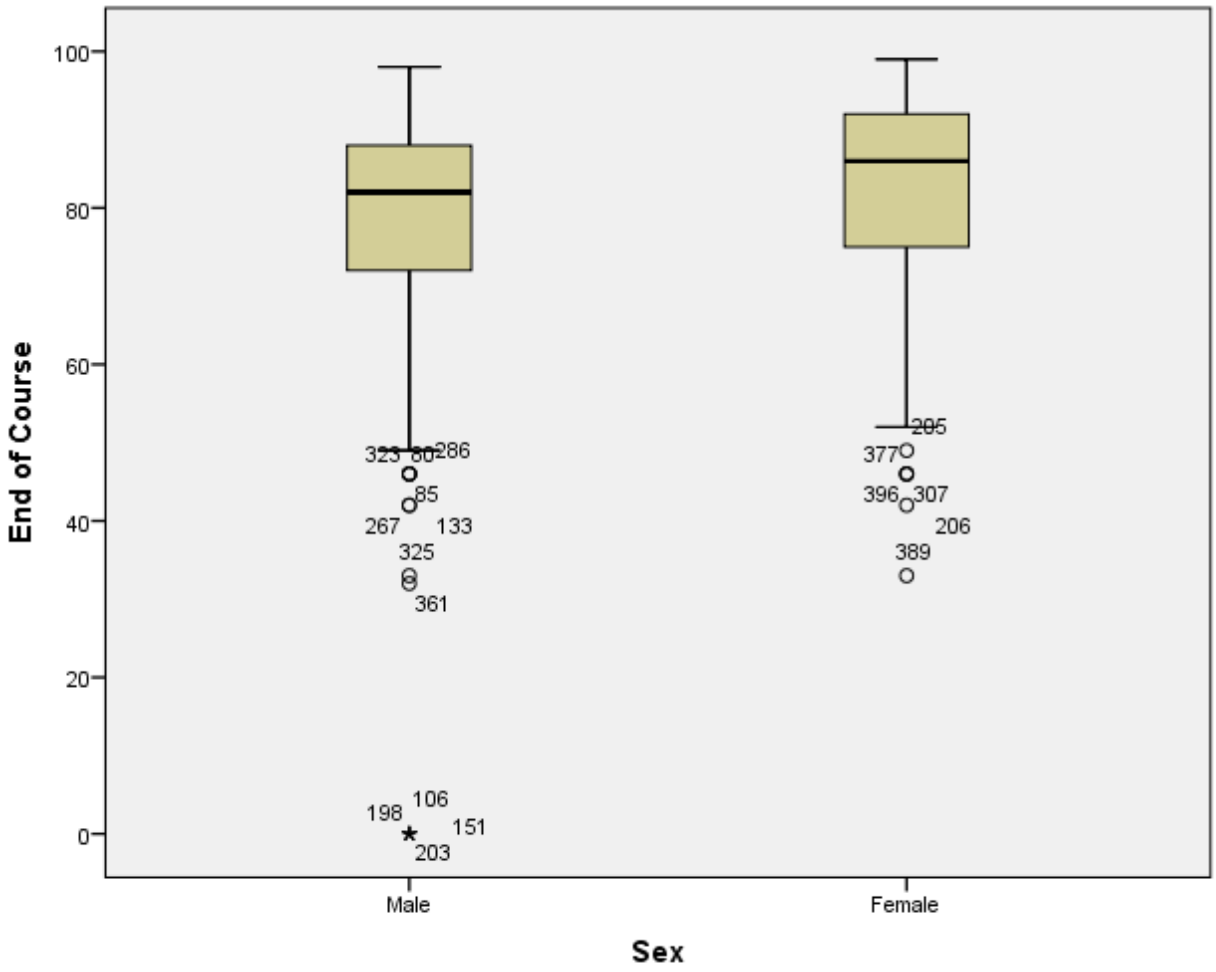
Research Question 8: Is there a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade female students and ninth grade male students?

Ho8: There is not a significant difference in the mean score for the algebra I end of course (EOC) assessment between ninth grade female students and ninth grade male students.

An independent-samples *t* test was conducted to evaluate whether the mean score for the algebra I end of course (EOC) assessment of ninth grade female students differ from the mean score of ninth grade male students. The score on the algebra I end of course (EOC) assessment was the test variable and the grouping variable was the gender of the student. The test was significant, $t(410) = 2.76$, $p = .006$. Therefore, Ho8 was rejected. The η^2 index was .02 indicating a small effect size. Male students (M = 77.48, SD = 17.37) on average scored lower on the algebra I EOC assessment than female students (M = 81.72, SD = 13.49). The 95% confidence interval for the difference in means was -7.27 to -1.22. The means and standard deviations for all students by gender are presented in Table 6. The distribution of scores for the two groups is displayed in Figure 8.

Table 6: Means and Standard Deviations of All Students by Gender and the 95% Confidence Interval.

Student Group	N	M	SD	Confidence Interval
Male Students	213	77.48	17.37	-7.27 to -1.22
Female Students	199	81.72	13.49	



Note: o = an observation between 1.5 to 3.0 times the interquartile range
* = an observation which is more than 3.0 times the interquartile range

Figure 8. Distribution of Scores for All Ninth Grade Students on the Algebra I End of Course (EOC) Assessment and Gender.

CHAPTER 5

SUMMARY, CONCLUSIONS, IMPLICATIONS

Chapter 5 contains the findings, conclusions, and recommendations for readers who may use the results as a resource when considering the implementation of professional development opportunities for teachers or the selection of intervention strategies to address the factors that influence academic success in high school mathematics. The purpose of this study was to examine the relationship of attendance, family composition, socioeconomic status (as measured by free and reduced priced meals), grade retention, special education status, number of discipline referrals, English language learners (ELL), and gender with student performance in high school mathematics. Data were analyzed on a cohort of 412 ninth grade students following them from kindergarten through the ninth grade. Descriptive data were gathered to provide a baseline of any significant patterns of behavior that could influence their success in mathematics at the high school level. Statistical data were analyzed on the ninth grade students to determine their success on the algebra I end of course (EOC) assessment. The analysis was based on eight research questions. A Pearson correlation coefficient was conducted to determine if there was a relationship between attendance and the students' score on the algebra I end of course (EOC) assessment. A Pearson correlation coefficient was also conducted to determine if there was a relationship between the number of discipline referrals that students receive and the students' scores on the algebra I end of course (EOC) assessment. An independent-samples *t* test was conducted to determine if there were differences in family composition, socioeconomic status (as measured by free and reduced meals), grade retention, special education status, English language learner status, and gender and the students' performance on the algebra I end of course (EOC) assessment.

Summary of Findings

The statistical analyses reported in this study were guided by the eight research questions presented in Chapter 1 and clarified in Chapter 3. In Chapter 3 each of the eight research questions, along with their corresponding null hypotheses, were presented for this study. The dependent variable for each of the analysis was the students' scores on the algebra I end of course (EOC) assessment. The independent variables were attendance, family composition, socioeconomic status (as measured by free and reduced priced meals), grade retention, special education status, number of discipline referrals, English language learners (ELL), and gender. The .05 level of significance was used to test all eight null hypotheses.

There was a moderate negative relationship ($p < .001$) between the student's number of days absent from school and the student's performance on the algebra I end of course (EOC) assessment. The mean number of days absence from school was 13.92 and the mean score on the algebra I end of course (EOC) assessment was 79.53.

There was a significant difference between the mean scores of the ninth grade students from two-parent families and the mean scores of the ninth grade students from single-parent families. The mean score on the algebra I end of course (EOC) assessment for ninth grade students from two-parent families was 81.20 compared to 75.69 for ninth grade students from single-parent families.

There was a significant difference between the mean scores of the ninth grade students who did not receive free or reduced lunch and those ninth grade students who did receive free and reduced lunch. The mean score on the algebra I end of course (EOC) assessment for the ninth grade students who did not receive free or reduced lunch was 84.21 compared to 77.40 for those ninth grade students who did receive free or reduced lunch.

There was a significant difference between the mean scores on the algebra I end of course (EOC) assessment of the ninth grade students who were not retained prior to the ninth grade and the ninth grade students who were retained prior to the ninth grade. The mean score on the algebra I end of course (EOC) assessment for the ninth grade students who were not retained prior to the ninth grade was 80.56 compared 72.67 for ninth grade students who were retained prior to the ninth grade.

There was a significant difference between the mean scores on the algebra I end of course (EOC) assessment of the ninth grade students who did not receive special education services and ninth grade students who received special education services. The mean score on the algebra I end of course (EOC) assessment for the ninth grade students who did not receive special education services was 80.30 compared 75.43 for ninth grade students who did receive special education services.

There was a negative relationship ($p = .006$) between the students' number of discipline referrals and the students' scores on the algebra I end of course (EOC) assessment. The mean number of discipline referrals was .19 and the mean score on the algebra I end of course (EOC) assessment was 79.53.

There was not a significant difference between the mean scores on the algebra I end of course (EOC) assessment of the ninth grade students who were not English language learners (ELL) and ninth grade students who were English language learners (ELL). The mean score on the algebra I end of course (EOC) assessment for the ninth grade students who were not English language learners (ELL) was 79.57 compared 78.09 for ninth grade students who were English language learners (ELL).

There was a significant difference between the mean scores on the algebra I end of course (EOC) assessment of ninth grade male students and ninth grade female students. The mean score on the algebra I end of course (EOC) assessment for ninth grade male students was 77.48 compared 81.72 for ninth grade female students.

Conclusions

There are many factors that contribute to students' success in school and their desire to be successful in their individual goals in life. This study examined factors that contribute to a student's success in high school mathematics. The role of students' family in their lives is of utmost importance to the individual student's success in high school. Often parents do not see the importance of education and fail to provide the necessary encouragement that is needed to have success in school. Regular attendance may have a positive relationship with student achievement. This study showed a significant positive relationship between excessive school absences and success in algebra I end of course (EOC) assessments. The findings were in agreement with Henry (2007) who reported students with excessive absences are more likely to lack the necessary skills to be academically successful in school.

The make-up of family composition has changed significantly over the last 3 decades. Many students are living in a nontraditional household with single parents, foster parents, or in kinship care. The findings of this study were consistent with Lieras (2008) who asserted that family structure is linked to behavior and academic problems. The results of this study showed a significant positive difference in the mean score of those students in two-parent homes compared to students from single-parent families. Furthermore, this study found that the factor of family

composition is likely to continue to be a significant contributor to the academic success of students and was in agreement with the writings of Amato (2005).

The schools in this study had a free and reduced meal rate average of 72%. This study showed a significant negative difference in the mean scores on the algebra I end of course (EOC) assessment of those students from low socioeconomic families (as measured by free and reduced priced meals) and those students who were not. This finding was in agreement with Gregory et al., (2008) who reported a widening achievement gap of children living in poverty.

Research for this study showed varying results of grade retention prior to the ninth grade. Some research supported retention to give students a year to mature and gain academic skills, while other research found that grade retention contributed to behavior problems and academic failure. Wu et al. (2008) acknowledged grade retention had a negative impact on student success. This study showed grade retention has a negative impact on student academic performance in mathematics. The mean scores on the algebra I end of course (EOC) assessment of those students who were not retained prior to the ninth grade were significantly higher than those students who were retained prior to the ninth grade.

Advanced mathematical concepts can pose difficulties for those students with disabilities. The findings of this study were consistent with Jordan et al. (1999) who reported that when mathematical problems become more difficult and involve more operations, students with learning disabilities make more procedural errors and fail to detect those errors. This study showed a significant negative difference in the mean score of those students who received special education services and those students who did not receive special education services.

Students live in diverse environments, many of which do not place a strong emphasis on academics, regular school attendance, or appropriate behavior. A student's behavior in school

can be influenced by academic failure, instability at home, or mistreatment from other students. Identifying behavior problems early on is one way of understanding and helping children deal with their actions. The results of this study showed a significant negative relationship between discipline referrals and success in mathematics. The mean score of those students with no discipline referrals were significantly higher than those students with discipline referrals.

Understanding language and the mathematical concepts particularly associated with mathematical word problems can create difficulty in understanding mathematics in high school. This study however did not show a significant difference in the mean scores of those students who were English language learners and those students who were not.

According to Halpern (2007) the question of gender differences in mathematics achievement, attitudes, and affect has been a continuing concern as scientists seek to address the under representation of women at the highest levels of science, technology, mathematics, and engineering. However this study was in agreement with Bhana (2005) and showed that mean scores on the algebra I end of course (EOC) assessment for female students were significantly higher than male scores.

Recommendations for Practice

The findings and conclusions of this research have established a foundation for the following recommendations for assisting school systems, teachers, and administrators with the planning and improvement of programs that support academic success in high school mathematics:

1. This study found a significant relationship between attendance and success in high school algebra I mathematics. To ensure students are successful in high school mathematics, educators need to look closely at school attendance. Looking at the effectiveness of the

present attendance policy and its enforcement would be beneficial. Attendance policies need to be incorporated that hold parents accountable when students are not in school. When looking at attendance, educators need professional development opportunities on the early warning signs of excessive absenteeism. Educators or appropriate personnel need to make daily contact with parents of children with excessive absences. Remediation programs to assist students in making up missed work would be of benefit.

2. This study found a significant relationship between family composition and success in high school algebra I mathematics. Establishing guidance and counseling programs in career paths for these students who do not receive effective guidance from their families would provide a foundation for future career decisions by the student. Encouraging participation in parent involvement programs would be an asset to the parents in understanding the opportunities for career guidance that exist for their children.
3. This study found a significant relationship between socioeconomic status (as determined by free and reduced priced meals) and success in high school algebra I mathematics. Poverty is an often overlooked area in education because it is so common place in today's society. Understanding poverty and its impact of academic success should be a mandatory focus of schools. Professional development for all staff members concerning poverty and its effects on academic achievement should be available before the beginning of the school year. Early intervention could prove beneficial throughout the school year.
4. This study found a negative relationship between behavior in school and success in high school algebra I mathematics. Schools need consistent school-wide behavior plans to support and encourage appropriate behavior. Providing students with a mentor throughout the year would be beneficial in establishing appropriate behavior and career

guidance. Counseling services need to be provided for students who experience behavior problems. Anger management and peer mediation should be incorporated into the school curriculum. Early identification and intervention would prove beneficial not only to the individual student but the overall effectiveness of the school.

Recommendations for Future Research

The results of this study indicate that there are factors that impact the success in ninth Grade algebra I for high school students. The following are recommendations for future research that may add to the body of research on factors that impact the success of ninth grade students in algebra I:

1. Truancy programs designed to address excessive absences and interaction with court services should be researched for effectiveness. Additional research is needed on family involvement and its effect on school attendance.
2. Further research should be conducted on school-wide behavior programs that implement positive behavior strategies that address the needs of students struggling with behavior problems in school. Research should also be conducted on school-wide behavior programs that reinforce and reward acceptable behavior in all students.
3. For those school systems whose English language learner population continues to expand, research into the most effective teaching strategies for understanding mathematical concepts would prove beneficial to those students who struggle with understanding the English language.
4. The foundations for proper behavior, good citizenship, and career planning begin in the family setting. As the number of children living in nontraditional family settings

continues to grow, research into interventions designed to provide guidance to the individual student in these areas would provide valuable guidance to teachers and school administrators in addressing these areas.

5. This study examined eight factors to determine the relationship of these factors to a student's score on the algebra I end of course (EOC) assessment. The study examined the factors and their impact individually. Further research should be conducted to examine the impact on algebra I end of course (EOC) assessment scores using multiple factors.
6. An alternative research method could reveal some of the physiological and emotional issues that students incur while facing some of the factors examined in this study. Further research should be conducted in this area using a qualitative research method.

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APPENDIX: IRB Approval Letter

East Tennessee State University
Office for the Protection of Human Research Subjects • Box 70565 • Johnson City, Tennessee 37614-1707
Phone: (423) 439-6053 Fax: (423) 439-6060

June 23, 2014

James "Mike" Lamie
Zjml2@goldmail.etsu.edu

Dear Mike,

Thank you for recently submitting information regarding your proposed project "Factors Impacting Success in 9th Grade Algebra 1 for High School Students."

I have reviewed the information, which includes a completed Form 129.

The determination is that this proposed activity as described meets neither the FDA nor the DHHS definition of research involving human subjects. Therefore, it does not fall under the purview of the ETSU IRB.

IRB review and approval by East Tennessee State University is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities are human subject research in which the organization is engaged, please submit a new request to the IRB for a determination.

Thank you for your commitment to excellence.

Sincerely,
Chris Ayres
Chair, ETSU IRB

Accredited Since December 2005

VITA

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Education:

Public Schools, Erwin, Tennessee

B.S. Computer Science, East Tennessee State University
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