THE RELATIONSHIP BETWEEN BODY MASS INDEX, FITNESS, SELF-EFFICACY AND THEIR PREDICTION ON CRITERION-REFERENCED COMPETENCY TEST SCORES FOR EIGHTH GRADE STUDENTS IN NORTH GEORGIA

by

Julie Hale

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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ABSTRACT

This study sought to determine the relationship between body mass index (BMI), physical fitness, self-efficacy, and their possible prediction on scores from the Georgia Criterion Referenced Competency Test (CRCT) for eighth grade students in north Georgia. The participants were 183 eighth grade students in three north Georgia middle schools enrolled in physical education during the fall of 2013. Scores from the students' BMI, FitnessGram®, General Self-Efficacy Test (GSES), and results from the Georgia CRCT were compiled and analyzed to give a better understanding of their predictive relationship. Students complete CRCT tests every school year between third and eighth grade, and these scores were gathered from the sample population during the 2013-2014 school year. In the fall of 2013, students completed the GSES (Schwarzer & Jerusalem, 1995), which includes questions that measure extraversion, neuroticism, action orientation, hope for success, and fear of failure. Assisted by trained physical education teachers, all physical education students recorded BMI scores and FitnessGram® results. This quantitative correlational design determined the relationship between the variables BMI, fitness, self-efficacy, and academic success as measured by the Georgia CRCT scaled scores on the Reading, Language Arts, and Math tests. Multiple Linear Regressions (*R*) examined the direction and strength of the linear relationships. Results indicated that three predictor variables (aerobic capacity, curl-ups and push-ups as reported from FitnessGram®) explained a significant prediction on Reading, Math, and Language Arts Georgia CRCT test scores for eighth grade students in north Georgia. In addition self-efficacy predicted a significant prediction on the Language Arts Georgia CRCT test scores.

Keywords: body mass index, self-efficacy, academic achievement, FitnessGram®

Acknowledgements and Dedication

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List of Abbreviations

Adequate Yearly Progress (AYP)

Body Mass Index (BMI)

Centers for Disease Control and Prevention (CDCP)

Conditional Standard Error of Measurement (CSEM)

Coordinate School Health (CSH)

Creating Opportunities for Personal Empowerment (COPE)

Criterion Referenced Competency Test (CRCT)

General Self-Efficacy Test (GSE)

Georgia Department of Education (GaDOE)

Institutional Review Board (IRB)

No Child Left Behind (NCLB)

National Institute of Health (NIH)

Nutrition Program for Woman, Infants and Children (WIC)

Statistical Package for the Social Sciences (SPSS)

World Health Organization (WHO)

Zone of Proximal Development (ZPD)

CHAPTER ONE: INTRODUCTION

Obesity is a growing problem for many individuals in the United States (CDCP, 2010). The Institute of Medicine (2012) has reported that schools in the United States have begun to address the issues associated with overweight and obese students through health and physical education classes; however, the percentage of students classified as overweight or obese has only stabilized, not decreased.

Compounding the deleterious effects of the problem, multiple researchers found that adolescents suffered psychosocial difficulties related to obesity (Browman, 2003; Drukker, Wojciechowski, Feron, Menglers, & Van, 2009; Sawyer et al., 2006). Children who suffer from obesity may develop a negative self-image, experience the disapproval of peers and mentors, and suffer embarrassment amongst other children. This often contributes to a negative learning environment in schools (Altrichter, Feldman, Posch, & Somekh, 2008; Castelli, Hillman, Buck, & Erwin, 2007; Fox & Edmunds, 2000).

Understanding the relationships between Body Mass Index (BMI), fitness, self-efficacy, and academic success, as measured by the Georgia Criterion-Referenced Competency Test (CRCT), among eighth graders in rural north Georgia middle schools will provide students and educators with insight into the challenges of obesity and negative self-image on academic success as measured by high stakes testing performance.

Background

Obesity is recognized as a leading problem within the United States (CDCP, 2010). Weight and body image problems that negatively influence the physical and mental health of adults are becoming a serious problem for children. Works of art such as figurines, statues, and paintings demonstrate that obesity was historically recognized as part of society amongst the

wealthy (Woodhouse, 2008). Scientists even theorized that obesity was an unpleasant occurrence as early as Paleolithic humans (Beller, 1977; Bray, 2007). Studies to understand obesity are not new, but rather hundreds of years in the making. In the late 1700s, Quetelet noted that ratios could be established for idea of "average" using the square height and a measure for fatness, which was later identified as the body mass index (BMI) and is a measure still used today (Beller, 1977). Unlike the simple height and weight types of measurements, BMI is a number calculated from a person's weight and height (CDCP, 2010). BMI is designed to accommodate different body and bone structures to ensure a more accurate reading of whether an individual is underweight, average, overweight, or obese.

Obesity is defined by the Centers for Disease Control and Prevention (CDCP) (2010) as an adult having a BMI of greater than 30%. Today, BMI is the typical measurement used in medicine to indicate a need to address weight and create health programs for individuals with higher BMI ratings. High BMI ratings in children are becoming a serious concern for physicians, and these BMI levels are a contributing factor in adolescent health issues in the United States (CDCP, 2010). BMI is recognized and used by a number of United States and worldwide organizations such as The World Health Organization, National Institute of Health (NIH), and the CDCP. The CDCP recognizes BMI as an effective assessment tool that can be used as an alternative method for measuring body fat because it is easy to perform and considerably less costly than other direct measures of body fat, such as dual energy x-ray absorption (DXA) and underwater weighing methods ("Healthy Weight," 2010). However, the CDCP does not recognize the BMI measurement as the only diagnostic tool to calculate health risks, and recommends a healthcare provider use multiple measures to make the final diagnostic decisions such as interventions, caloric intake, and physical activity levels. BMI is simply a

number that may ignore an individual's waistline and varying densities of fat, muscle and bone (CDCP, 2010).

Legislation passed policy in 2010 that all public schools use a method to measure the fitness and BMI of all students in grades K-8. Public school systems throughout Georgia use BMI as a measurement to assess optimal body weight and mass as recommended by FitnessGram®. Developed by the Cooper Institute, FitnessGram® was adopted by most states to carry out this policy. BMI is included as a part of the requirements for FitnessGram® because of its importance for the health and well-being of adolescents. FitnessGram® supports the use of BMI as a reliable method to measure body composition. The researcher went to all three districts in north Georgia to determine what method is used at the school level, and they all used the height and weight calculation BMI. Four reasons were given by each school as to why BMI is used as a best measurement in public schools: (a) invasive nature of touching a student with skin-fold test, (b) time involved in assessing each student at the sites, (c) inadequate training of physical education teachers to take measurements using skin-fold calipers, and (d) cost of hand-held body fat analyzers.

The relationship between BMI and academic achievement was analyzed during three studies (Achan, Kikafunda, Olunka, Malde, & Tylleskar, 2008; Baxter, Quinn, Tebbs, & Roya, 2013; Sigurdardottir, 2010). Achan, Kikafunda, Olunka, Malde, and Tylleskar (2008) and Sigurdardottir (2010) found that BMI was positively correlated with academic achievement. In another study, Baxter, Quinn, Tebbs, and Roya (2013) determined that BMI was not a factor in academic achievement.

The World Health Organization (WHO) (2012) reported that nearly 40 million children under the age of five were overweight in 2010. The organization concluded that being obese or

overweight are two preventable variables in a person's life that can negatively affect mental as well as physical functioning. While ancient clinical observations suggested that obesity was associated with sudden death, the life insurance industry can be credited for correlating the association between body weight and premature death (WHO, 2012).

Psychological studies support a strong relationship between depression and decreased self-efficacy in obesity at all ages (Annesi, 2011). Bandura, Patorelli, Barbaranelli, and Capara (1999) conducted a longitudinal study linking depression and self-efficacy and their effect on academic performance. The study indicated that perceived low self-efficacy leads to low academic performance, which leads to depression. Not all studies agree that obesity is strictly related to depression; however, multiple studies (Reeves, Postolache, & Snitker, 2008; Wardle, Williamson, Johnson, & Edwards, 2006) agree that mental and physical health directly interact in the make-up of all individuals and affects their ability to be successful and live long and healthy lives (Benson, Williams, & Novick, 2013).

Numerous studies have examined why the rates of obesity have increased in the last decade (Ogden, Lamb, Carroll, Flegal, & National Center for Health Statistics, 2010). Increased evidence suggests that being overweight directly influences longevity and increases health and mental issues (Hao, Nelson, Yu, Li, & Fok, 2003). A sedentary lifestyle and the intake of processed foods lead to becoming overweight and obesity (Jacobs, 2006). Due to the increased need to obtain academic success as regulated by No Child Left Behind, recess and physical education are not primary focuses for students (Belansky et al., 2009; Trost & Van der Mars, 2010). The decrease in physical activity in schools, which resulted from an increased emphasis on academic achievement, has been linked to the steady rise in obesity rates in children and has increased the number of studies linking exercise to academic success (Ahariad et al., 2007). Two

studies (Frensham, 2012; Hiliman, Buck, Themanson, Pontifex, & Castelli, 2009) positively link physical education and school nutrition to students' cognitive abilities and academic achievement. These studies suggest that students with better nutrition and increased exercise achieve increased academic success. Ashmore, Friedman, Reichmann, and Musante (2008) determined a correlation between obesity and depression or self-efficacy. Wilson, Latimer, and Meloff (2009) even found that obesity itself was a direct influence on academic achievement. Few studies evaluated obesity with self-efficacy as contributing factors in student academic success.

Self-efficacy refers to the self-confidence to behave in a particular manner so that positive results will occur (Bandura et al., 1999). High and low self-efficacy differ in terms of feeling, thinking, and acting. People with high self-efficacy can adapt to uncertainty, distress, and conflict (Bandura, 1997). They respond to challenges by setting higher goals for themselves and persevere when others may give up. They are optimistic about their future, and setbacks are considered a learning experience rather than a failure (Schwarzer & Jerusalem, 1995). Actions for people who have high self-efficacy are planned and analyzed prior to taking the action (Bandura, 1997). Once an action has been pursued, continued effort and persistence becomes part of the process in obtaining the desired positive outcome. Motivation for completing a task is high in people with high self-efficacy. In contrast, people who possess low self-efficacy may experience depression, anxiety, nervousness, and a sense of failure or doom (Schwarzer & Jerusalem, 1995). They feel inadequate or incapable of completing any task, so in response to these feelings they do not attempt the action in the first place.

Self-efficacy can be used to predict behavior in various health-related situations. There is a plethora of information indicating that self-efficacy is a key component in weight loss and

fitness (Chambliss & Murray, 1979). Bandura (1977) observed a positive correlation between increased self-efficacy and participation in exercise. Many obese students have such low self-esteem that they lack the motivation to engage in any activity that will improve their body image (Teixeira, Silva, Mata, Palmeria, & Markland, 2012).

Three studies link higher levels of self-efficacy in students to higher levels of academic performance (Edman & Brazil, 2009; Jenson, Petri, Day, Truman, & Duffy, 2011; Tabassam & Grainger, 2002). Ratey (2008) speculated that increased blood flow and oxygen to the brain stimulated hormones such as norepinephrine and endorphin, which may increase levels of self-efficacy. These hormones produce feelings of overall happiness and reduce anxiety (Shiel & Stoppler, 2008). Ratey (2008) shared the experiences of several physical education teachers at an Illinois school in his book, *Spark.* Ratey (2008) conducted an experiment where students met before school, engaged in rigorous physical activity, and kept accurate measurements of their heart rates. These same students took national norm-referenced tests and scored better than their peers (Ratey, 2008).

Many obese adolescents become obese adults and face the same highly stigmatized and multiple forms of prejudice from teachers, peers, and parents in educational and work settings (Brownell, Puhl, Schwartz, & Rudd, 2005). This discrimination may come in many different forms in educational and job arenas. Forms of discrimination in the educational setting could include peer rejection on the playground or be as extreme as a teacher weighing a child and announcing his or her weight in front of peers (Brownell et al., 2005). As an obese adolescent progresses through high school and seeks employment, he or she is more likely to be denied employment, as research has shown (Cardinal & Melville, 2007).

There are many well-known health-related issues caused by obesity, including diabetes

and heart conditions. The influence of self-efficacy is documented in cases of education and in weight management. To uncover the relationships between these four items—BMI, fitness, self-efficacy, and academic success—the present study sought to determine the relationship among these variables. Further, it sought to predict academic success as measured by high-stakes tests based upon a combination of students' BMI, fitness, and self-efficacy.

Problem Statement

The CDCP (2010) reported that one-third of Americans are obese. Obesity is defined as an excess of body fat that accumulates to the point that it affects mental and physical health (Keller, 2008). Students who are obese experience mental and emotional problems, such as anxiety, depression, low self-esteem, and low self-efficacy that often result from weight-based teasing from peers (Krukowski et al., 2009). Procter, Clarke, Ransley, and Cade (2008) and Trost and Van der Mars (2010) found that physical activity and obesity predicted academic performance. To date, few studies link academic success as measured by high-stakes tests to the combined effect of BMI, fitness, and self-efficacy.

School systems offer a myriad of individual interventions for learning disabled students, attention deficit disordered students, and students who have emotional and behavioral disorders (Fairbanks, Sugai, Guardino, & Lathrop, 2007; VanDerHeyden, Witt, & Gilbertson, 2007); however, programs to address those who are overweight and obese, fitness, and self-efficacy are not included components of academic success. Consequently, this study sought to identify the relationship between obesity, fitness, self-efficacy, and their use as predictors for academic success as measured by the Georgia CRCT on eighth grade students in north Georgia.

Purpose Statement

The purpose of this correlational multiple regression study was to determine the

relationship between BMI, fitness, self-efficacy and their use as predictors of academic success as measured by the Georgia Criterion-Referenced Competency Test (CRCT) for eighth grade middle school students in rural north Georgia. A quantitative method was selected to gather data. Data were statistically analyzed (Gall, Gall, & Borg, 2007) using IBM Corp (2012) SPSS 21. Data included BMI, fitness scores from the biannually administered FitnessGram® program, self-efficacy surveys as measured by the General Self-Efficacy Test (GSES), and academic scores on the Reading, Language Arts, and Math tests of the seventh grade Georgia CRCT. The correlational research design was the best fit for this study, as it requires that the researcher seek a correlation between two or more variables, collect data at one time from all participants, and enter only one score for each variable. Reporting of the data analysis includes direction and strength of the correlation and allows the researcher to draw conclusions from the statistical tests (Creswell, 2007).

The predictor variables assigned to this research were a measure of obesity as defined by BMI measurements and fitness data gathered by using the FitnessGram® analysis design and a composite score from the GSES. The outcome variable is defined as academic performance on the Reading, Language Arts, and Math tests of the Georgia CRCT (Georgia Department of Education, 2012).

FitnessGram® was developed by the Cooper Institute (1992) nearly 20 years ago in an effort to utilize criterion-referenced statistics to assess students' fitness levels. The GSES scale, developed by Schwarzer and Jerusalem **(**1995), is designed to evaluate a general sense of perceived self-efficacy. Scaled scores from three academic subtests of the Georgia CRCT were used as a measure of academic progress. The Georgia CRCT is a high-stakes multiple-choice test taken in grades three through eight in the state of Georgia to measure competency on state-

mandated content. The Georgia CRCT is considered a high-stakes test because students must pass the Reading, Language Arts, and Math tests in grades three, five, and eight to be promoted to the next grade.

Significance of the Study

This study is significant because it contributes to the literature regarding the relationship between BMI, fitness, self-efficacy, and their prediction of academic success of eighth grade middle school students as measured by the Reading, Language Arts, and Math tests of the Georgia CRCT. Previous studies evaluated either BMI and self-efficacy or BMI and academic success or self-efficacy and academic success, but none evaluated how these four measures relate to one another. Results from this study will help educators, decision makers, parents and students understand the relationship between BMI, fitness, self-efficacy, and academic success. Ultimately, this understanding may assist educators in developing and implementing interventions that will increase academic success by addressing issues associated with BMI, fitness, and self-efficacy. Knowledge obtained from this study will contribute to filling gaps in the literature.

Puder and Munsch (2010) emphasized that students understand the importance of physical activity, healthy eating habits, and methods to increase self-efficacy. A study by Aktop (2010) indicated that a decrease in physical education for students contributes to attitudes detrimental to self-efficacy. Rancourt and Prinstein (2010) found that it is imperative that educators and policymakers know the negative role that obesity plays in self-efficacy so they can make the best choices to improve the academic experience for every student.

By exploring a predictive relationship among BMI, fitness, and self-efficacy to academic success, the researcher hopes to increase understanding of the issues related to obesity, fitness,

self-efficacy, and academic success on high-stakes tests. By increasing awareness about the relationships between BMI, fitness, self-efficacy, and academic success, educators and parents will become more aware of how academic success on high-stakes tests relates to a student's weight, fitness, and self-efficacy. Additionally, policymakers and administrators will better understand the relationships between fitness and academic success and use this understanding to develop policies and provide support to students who may require additional services. Educators in other schools can use the methods developed for this study to determine what correlations exist in their student populations and target students who have traits that limit academic success on high-stakes tests. Ultimately, understanding the relationship between BMI, fitness, self-efficacy, and academic success can create a full picture for developing better programs in schools.

Research Question and Null Hypotheses

Contingent on the information discussed in the problem statement and purpose statement, this correlational design generated the following research question and null hypotheses:

RQ1: Is there a predictive relationship from the measures of BMI, fitness, and self-efficacy on academic achievement scores of eighth grade students?

$H_0$1: There is no predictive linear relationship from the measures of BMI, aerobic capacity, push-ups, curl-ups, sit and reach, and self-efficacy on academic Reading achievement scores of eighth grade students.

$H_0$2: There is no predictive linear relationship from the measures of BMI, aerobic capacity, push-ups, curl-ups, sit and reach, and self-efficacy on academic Language Arts achievement scores of eighth grade students.

$H_0$3: There is no predictive linear relationship from the measures of BMI, aerobic

capacity, push-ups, curl-ups, sit and reach, and self-efficacy on academic Math achievement scores of eighth grade students.

Identification of Variables

Georgia required all public schools in the 2011-2012 school year to administer a fitness assessment using FitnessGram® for all students enrolled in grades one through 12. Measures of BMI, aerobic capacity, strength, endurance, and flexibility are included as part of the FitnessGram® program. As recommended and described by FitnessGram®, BMI and fitness score data were collected by trained physical education teachers in the fall of 2013 from eighth grade middle school students enrolled in physical education classes in three middle schools in north Georgia. Assessment results were reported to the students' guardian or parent and to the Georgia Department of Education (GaDOE, 2011). Assessments were reported to the students' guardians or parents and to the Georgia Department of Education (GaDOE, 2011).

Predictive Variables

BMI. The three predictive variables in this study were BMI, fitness, and self-efficacy. According to the Centers for Disease Control and Prevention (2010a), "Body Mass Index (BMI) is a number calculated from a person's weight and height. BMI provides a reliable indicator of body fatness for most people and is used to screen for weight categories that may lead to health problems" (p.1). According to the CDCP (2010a), there are four levels defined by BMI calculation:

Underweight = < 18.5

Normal Weight = 18.5-24.9

Overweight = 25-29.9

Obese = > 30

The three schools in the study used the same method to determine the BMI for each student. Each student recorded his or her weight in pounds and his or her height in inches. The student then divided his or her weight in pounds by his or her height. There are various websites for calculating BMI using this method. Students calculate their BMI scores at the beginning and again at the end of each school year in grades K-12.

Fitness. According to the U.S. Department of Health and Human Services (2000), physical fitness is defined as "a set of attributes that people have or achieve that relates to the ability to perform physical activity" (p. 8). Fitness scores used in this study include an aerobic capacity measurement, muscular strength endurance score, and a flexibility measurement. The aerobic capacity can be measured by a one-mile walk/run, walk test, or a PACER test. The PACER test involves gradual increased speed for a short-distance. Muscular strength, endurance, and flexibility are measured by curl-ups, push-ups, and shoulders stretch or sit and reach test. The researcher used scores from the one-mile walk/run, curl-ups, push-ups, and sit and reach test from each of the three middle schools.

Self-efficacy. The third predictive variable in this study was self-efficacy. Self-efficacy refers to one's self-confidence to behave in a particular manner so that positive results will occur (Bandura, 1977). The purpose of the General Self-Efficacy Scale (GSES) is to assess optimistic self-beliefs needed to handle a variety of difficult demands in life (Schwarzer & Jerusalem, 1995). This is a psychomotor survey consisting of 10 items, which require approximately 4 minutes to complete. This survey was used in 23 countries over the last 20 years. In numerous samples, Cronbach's alphas ranged from .76 to .90, with the majority in the high .80s, which according to Cohen (1988) is a reliable measure. The criterion-related validity, as noted in various correlation studies, displayed positive coefficients for favorable emotions, dispositional

optimism, and work satisfaction. Negative coefficients were found in individuals experiencing depression, anxiety, stress, burnout, and health complaints (Schwarzer & Jerusalem, 1995). This survey was administered in the fall of 2013 to every eighth grade student in three north Georgia middle schools.

Outcome Variable

The outcome variable as applied to this study was the scaled scores on the Reading, Language Arts, and Math tests of the Georgia Criterion-Referenced Competency Tests (CRCT) for eighth grade students enrolled in physical education during the fall of 2013 from three north Georgia schools.

The CRCT measures content knowledge on reading comprehension, language usage, math, science, and social studies. The CRCT was introduced to Georgia state classrooms in the spring of 2000. It is given at the end of the year to all students in grades three through eight and uses selected-response items to assess how well students acquired Georgia standards (GaDOE, 2011). Students' scores are reported as a scale score to achieve comparability (ETS, 2002). Converting raw scores and statistically adjusting them onto a common scale to accommodate for differences in difficulty produces reliable and valid scores to achieve comparability. Performance levels are provided to the student after assessment as Does Not Meet Standard (scale score below 800), Meets Standard (scale score of 800-849), or Exceeds Standard (scale score above 850); these are the same scoring outcomes for all content testing areas (GaDOE, 2012).

Cronbach's alpha and the conditional standard error of measurement (CSEM) measured the reliability of the CRCT (Wallace, 2010). Cronbach's alpha scores indicate that all the scores are an accurate representation of a student's performance and range between .85 - .93. The

CESM measures the "cut scores," or the raw scores of each subscale. The formula and procedure for determining this reliability is taken from Hambleton and Swaminathan (1985). The raw subscales scores were found to be reliable and valid by the Georgia Department of Education (GaDOE, 2011).

The Reading, Language Arts, and Math tests of the Georgia CRCT were chosen for this study because these tests are currently used to assess schools' Adequate Yearly Progress (AYP). A cornerstone for No Child Left Behind (NCLB) is that schools demonstrate progress through state mandated tests. The purpose of the CRCT is to evaluate the quality of education each student receives throughout the state of Georgia.

Definitions

The following definitions are listed to give the reader a better understanding of key terms.

1. *Adolescent* - An adolescent is a person between the ages of 13 and 18. This age is considered a period of development (Mackay & Duran, 2007). This research focused on adolescents between the ages of 13 and 15 who were in the eighth grade and enrolled in physical education during the fall of 2013.
2. *Academic achievement* - A level of success determined by a student's acquisition of the state's curriculum and measured by the state assessment test (GaDOE, 2012).
3. *Body Mass Index* - A number calculated from a person's height and weight (CDCP, 2012).
4. *Common Core Standards* - A set of common standards implemented from kindergarten through twelfth grade that are rigorous and research-based to prepare young people for college (GaDOE, 2011).

5. *Exercise* - Any type of physical activity that utilizes repetitive motions to increase cardiovascular endurance, muscular strength, or muscular endurance (Evans & Burghardt, 2008).
6. *Overweight* - Any weight that exceeds the recommended weight levels for one's height (CDCP, 2010a). A person with a BMI of 25.0 to 29.9 is considered overweight. The CDCP defines overweight as having a BMI at or above the 85th percentile and lower than the 95th percentile for children the same age and sex.
7. *Obesity* - Weight that far exceeds the recommended health for one's height (CDCP, 2010a). A person with a BMI of 30 or above is considered obese based upon CDCP growth charts (CDC, 2010a). The CDCP defines obesity as having a BMI at or above the 95th percentile for children the same age and sex.
8. *Physical education* - A course taken at the school setting from kindergarten through twelfth grade that encourages students to engage in healthy lifestyle activities (National Association for Sport and Physical Education, 2007).
9. *Physical fitness* - The ability to execute physical activities with vigor and alertness (CDCP, 2010a). Physical fitness attributes include cardiovascular endurance, muscle strength and endurance, flexibility, balance, reaction time, and body composition (CDCP, 2010a).
10. *Resting Heart Rate* - The amount of beats one's heart beats at rest for a minute. Average resting heart rates are from 60 to 80 beats per minute (CDCP, 2010a).
11. *Rural* - An environment that is low in population and relies on many natural resources to sustain its citizens. This environment typically lacks industrial structures (U.S. Department of Agriculture, 2008).

12. *Self-efficacy* - Self-efficacy refers to one's self-confidence to behave in a particular manner so that positive results will occur (Bandura, 1977).
13. *Target heart rate* - The rate at which one's heart needs to beat in order for the body to burn calories. The formula for this is 206.9 - (.67 x age) = maximum heart rate (CDCP, 2010a).

Physical education teachers in each of the three middle schools in North Georgia entered BMI percentiles, FitnessGram® data, and GSES survey scores into prepared Excel spreadsheets. These spreadsheets were sent to the system test coordinator who entered each student's scaled scores on the Reading, Language Arts, and Math sections of the Georgia CRCT. Prior to emailing the spreadsheet to the researcher, all individual and personally identifiable information was removed. Spreadsheet data were analyzed using SPSS 21 software from the IBM Corporation (2012).

Assumptions and Limitations

Assumptions are important aspects of a study, and can help identify minor changes that may need to be made if a study is repeated (Gall et al., 2007). Assumptions associated with this study are as follows: First, physical education teachers took accurate measures of fitness scores exactly as how it was described by FitnessGram® protocol. Secondly, respondents answered the questions to the General Self-Efficacy Scale survey truthfully, and homeroom teachers administered the surveys accurately. Next, students and physical education teachers recorded their body mass index measurements accurately and truthfully. Further, it was assumed that students performed to their best abilities when they took the Georgia CRCT. Lastly, the scores followed a normal distribution for fitness.

Limitations are characteristics of the study that influenced the interpretation of the results

(Gall et al., 2007). Limitations in this correlational study were as follows: Should the study be repeated, different populations may produce different results (population validity). A second limitation would be the failure of students to have completed all data the researcher collected. Next is inaccurate administration of variable tests (instrumentation). Another limitation is when students leave the school system or drop out of physical education classes (experimental mortality or attrition). In addition, varying degrees of maturation exist among eighth grade students (maturation). The most important limitation of correlational research is that it does not address causation.

CHAPTER TWO: REVIEW OF THE LITERATURE

Historical Summary

The epidemic of obesity in America has been growing steadily since the 1990s (CDCP, 2012). Mokdad et al. (2003) reported a 74% climb in obesity rates between 1991 and 2001. The CDCP defines obesity in the United States as a "significant public health problem" that affects 18.7% to 32% of the United States population (Ward-Smith, 2010, p. 1).

Use of BMI

The demand for an index of relative body weight to measure the proportions of height to weight was recognized by the medical field (Keys et al., 1971). BMI is an excellent tool when determining obesity. BMI was first developed in the 19th century to compare average weight of adults from one population to another population (Keys et al., 1972). A Belgian statistician and sociologist, Lambert Adolphe Quetelet, designed the concept of BMI so that he could accurately study groups of individuals (Keys et al., 1971). The measurement for BMI was called the Quetelet index until 1972 when it was changed to BMI (Romero-Corral et al., 2008). A paper published in 1972 in the *Journal of Chronic Diseases* presented a formula very similar to BMI calculations that could be used to predict heart disease (Romero-Corral et al., 2008). The National Institute of Health Consensus Development Panel (1985) decided that BMI would be utilized to measure obesity in individuals. However, BMI is arguably not the only form of measurement that is needed to fight against obesity (McMurtry & Jelalian, 2010).

In 2002, Ogden et al. found that teens with BMIs at obese or overweight levels were at higher risk of being obese and overweight as adults, particularly by age 35. McMurtry and Jelalian (2010) found that slightly more than 16% of children ages 2-19 in the United States were overweight or obese as defined by having BMIs greater than or equal to the 95th percentile, and

34% were either overweight or obese as defined as BMIs greater than the 85th percentile. In conclusion, steps to identify adolescents with higher BMIs will enable educators and policymakers to make decisions that will decrease BMIs in adolescents.

BMI reporting is a controversial strategy that has already been used in state legislation and policymaking for schools. Eckstein et al. (2006) explored parents' perceptions about their child's appearance and health. In Eckstein et al.'s study, parents selected a sketch they felt matched their child's appearance. After grouping children based on their percentile of body mass index, few parents (36%) who had children overweight or obese agreed with the results.

Beginning in 2011, Georgia legislature required each school district to conduct fitness assessments and report results to parents (GaDOE, 2012). The reports include BMI percentiles, fitness levels and strategies to improve fitness. Using measures of adiposity, which the Centers for Disease Control and Prevention (CDCP) (2010) defines as "having excess body fat," (p.1), researchers found that American children may be more at risk of obese-related health issues due to a higher body fat content than what would be reported in BMI alone (Beydoun & Wang, 2011). Lavie (2009) was one of the first researchers to document the "obesity paradox" (p.5). Weight consists of fat and muscle. A thin person may be mostly fat and a heavy person may be all muscle. The reports sent home to parents regarding their child's BMI do not explain this paradox.

Obesity Defined

Obesity is defined as an excess of body weight that accumulates to the point that it can influence mental and physical health (Keller, 2008). Obesity in children has risen with the increase of technology and self-entertainment (Nieman, 1990). The CDCP (2010) defines obesity as any index level above 30 BMI, which is calculated by body weight divided by height,

and reports that obesity is the second leading cause of death. As many as half of all adolescents developed obesity within their first 3 years of life, eventually experiencing the negative health impacts of obesity ranging from diabetes through cardiovascular disease (Birch, McPhee, Steinberg, & Sullivan, 1990; Ice, Murphy, Cottrell, & Neal, 2011).

Obesity in children has been closely linked to increases in type 2 diabetes. Type 2 diabetes was previously a disease associated with adults rather than children (CDCP, 2010). Chen (2012) suggested that the struggle with childhood obesity could be compared to going through treatments for cancer or diabetes. Obesity is often associated with a cycle of depression and continued weight gain. While there is conflicting research on childhood obesity, most studies conclude that the mental health of children, even at a very young age, is negatively influenced by obesity (Griffiths, Dezateux, & Hill, 2011; Tiffin, Arnott, Moore, & Summerbell, 2011). Children who suffer from obesity may develop negative self-image, experience the disapproval of peers and mentors, and suffer embarrassment amongst other children, creating a negative learning environment (Altrichter et al., 2008; Castelli et al., 2007; Fox & Edmunds, 2000). Furthermore, Clark, Slate, and Viglietti (2009) found that white children and Hispanic children experienced more problems with obesity than did other ethnic groups. Adolescents have suffered from psychosocial difficulties related to obesity including depression, anxiety, and eating disorders (Browman, 2003; Drukker et al., 2009; Sawyer et al., 2006).

The negative effects of obesity on the mental health of children also directly influence the ability of children to do well academically (Aktop, 2010; Crosnoe &Muller, 2004; Reback, 2010). Obese students are more likely to be absent from school (Elkins, Cohen, Koralewicz, & Taylor, 2004). Mellin, Neumark-Sztainer, Story, and Resnick (2002) indicated that overweight adolescents reported engaging in unhealthy behaviors and experienced more psychosocial

distress than their non-overweight peers. Additionally, Mellin et al. (2002) found that obese students sometimes demonstrated a bleak outlook about their educational futures.

Fitness

Concerns for fitness in the United States can be traced to this country's entrance into World War I. Reports indicated that many recruits were unfit for combat (Barrow & Brown, 1988). This dismal news sparked the Congress of the United States to pass legislation that fitness programs be part of the curriculum in public schools (Wuest & Bucher, 1995). When the depression struck in the late 1920s, the fitness agenda was nearly forgotten. World War II arrived, and once again the fitness levels of draftees were statistically disappointing as nearly one-third had to be appointed to non-combat positions (Karolides & Karolides, 1993). It was not until the Cold War that fitness concerns shifted from adults to children (Karolides & Karolides, 1993). Americans were more focused on becoming a healthier nation than any other country. This led to the formation of The President's Council on Youth Fitness in 1956 by President Eisenhower (Nieman, 1990). President Kennedy expanded this program by passing legislation that physical education be required in every public school and changed the previous name from Youth Fitness to The President's Council on Physical Fitness (Nieman, 1990).

Dr. Ken Cooper (1968) known as "the father of the modern fitness movement," shifted the fitness concept from disease treatment to disease prevention (Jenkins, 1997). Dr. Cooper opened the Cooper Clinic in 1970 and proclaimed the risk factors of obesity and lower fitness levels (Jenkins, 1997). He introduced the word *aerobics* to the United States and started a fitness craze that lasted well into the 1990s. The amount of reported joggers increased from 100,000 to more than 30 million (Jenkins, 1997).

Risk Factors

There are many risk factors associated with obesity and lower fitness levels. Risk factors associated with adolescent obesity include low socioeconomic status, a lack of health education, health insurance and education of parents, a decline in family mealtime, obesity in parents, parental depression, genetic disposition towards obesity, and decrease in physical activities (Davis, Young, Davis, & Moll, 2008; Haas et al., 2003; Mellin et al., 2002; Rosas et al., 2011; Simmons - Holcomb, 2004; Trost & Van der Mars, 2010). Factors can be defined as fixed or variable. Fixed factors such as genetics, age, gender, and socioeconomic conditions are factors that either cannot be controlled or cannot be controlled by typical means. Variable factors—such as diet, physical activity, and psychological factors—can be addressed through legislation, programs, and education.

Development of Programs

Historically, public and private entities developed programs to decrease obesity in the United States. These programs were deemed necessary to protect the safety of children, promote healthy adults, and decrease unnecessary deaths (CDCP, 2010). As the costs of health care, health insurance, and life insurance continued to grow, the increased number of obese individuals placed additional strain on the healthcare system (Au, 2012; Greenapple & Ngai, 2011). The costs of these additional services outweighed the costs of early detection and prevention programs added to schools and community programs (Trogdon, Finkelstein, Feagan, & Cohen, 2011). To monitor progress, Villas, Zhixiang, Ganta, and Salazar (2006) developed an electronic student health record system that enables three different types of stakeholder groups to access information about the health of student populations. The program screened for high-risk conditions using measures such as the BMI index. These programs have not been widely promoted, and limited testing of programs for monitoring student health and wellness has not

been applied to programs used by school systems.

Initiatives

The increasing risks of obesity to the health of adults and children are addressed by a variety of health initiatives (CDCP, 2010). Many companies invested in worksite wellness programs due to the rising costs of insurance and worker compensation claims (Baicker, Cutler, & Song, 2010). These programs include on-site fitness facilities, fitness breaks and healthy food offered in the cafeteria (Linnan et al., 2008). Some companies even offer financial incentives for participation (Warner, 1990). Several large companies including General Motors, Dell, Johnson & Johnson, IBM, and Texas Instruments have reported improved fitness levels, decreased hospital visits and decreased sick days among their employees (Warner, 1990). Individual communities around the United States have community-based approaches for improving health and combating childhood obesity (Heaney & Goetzl, 1997). Taylor et al. (2007) determined that controlled community-based interventions reduce BMI and increase fitness levels of children. This community, located in Otago, New Zealand, offered free activities through the Young Men's Christian Association (YMCA) such as swimming, dancing, and yoga classes. The program also offered fresh fruits and vegetables. Results included reduced BMI and increased fitness levels. Methods adopted by schools often include developing food plans, counseling students on good nutritional habits, consulting with parents who need help with wise food choices, closely working with teachers and administrators to understand the value of good nutrition, and even recommending that schools hire health coordinators in addition to guidance counselors (Satcher, 2005; Torre, Akre, & Suris, 2010).

School-Related Issues

A variety of school related-issues seem to plague students with obesity. These range

from issues with their peer group to negative attitudes about school to educators' beliefs that obese students have problems learning (Puhl & Brownell, 2001). Clark et al. (2009) divided elementary school students into four different weight categories, and using a partial correlation analysis, compared their weight category to their grades and standardized test scores. Results of the study demonstrated that students in the higher weight categories typically had lower grades and test scores. Wingfield, McNamara, and Janicke (2011) investigated test results from the President's Challenge Physical Activity and Fitness Awards Program and compared them to the Florida Comprehensive Assessment Test (FCAT) for 132 fourth and fifth grade students. They found that students with higher BMI ratios tended to score lower on measures of academic success. Specifically, obese females tended to perform poorly on academic tests when compared to males.

Two additional studies confirm the results from Wingfield et al. (2011). Msengi and Killion (2011) evaluated obesity in school-aged children at seven different Texas middle schools. Included in this study was the availability of fast-food restaurants and sedentary entertainment. Results indicated that obesity was more prevalent in older students and in females. Furthermore, Beydoun and Wang (2011) found that children in the United States were more at risk for health impacts of obesity than previously believed. Their study included differences in gender, ethnicity, and educational background. Their study results indicated that females in southern states had obesity levels of 30% or higher.

Chaddock et al. (2010) evaluated the relationship between increased exercise and release of chemicals in the brain that influence cognitive ability. The study demonstrated that exercise and physical fitness increases the production of brain chemicals and associated brain activity in children and has a positive influence on cognitive skills. This strongly supports the long-

standing viewpoint that the academic success of children is directly related to both mental and physical health (Reed et al., 2010; Taras & Potts-Datema, 2005).

State Programs

Congress provided $120 million to support states in developing and promoting wellness activities (CDCP, 2010). Some of this money went to fitness sites at various places of employment, community gardens, new bike lanes, free memberships at the YMCA, and more physical activity opportunities for children in after-school programs. Some statewide obesity prevention programs have been more successful than others. For example, in Utah, programs and policies to reduce obesity appeared to be well structured and successful when compared to programs in other states (Metos & Nanney, 2007). These programs included The Utah Nutrition and Physical Activity Plan (2010-2020) and the Gold Medal Schools program. In both of these programs, schools are awarded cash incentives for following healthy guidelines as suggested by the CDCP (Metos & Nanney, 2007). Ultimately, school systems have a vast support system to decrease obesity rates and increase fitness levels.

Federal Programs

Federal programs have been developed to address the issue of childhood obesity in schools. President Johnson signed the Child Nutrition Act into law in 1966. This law was an outgrowth of the National School Lunch Act signed by President Truman in 1946 (United States Department of Agriculture, 2011). The Nutrition Program for Women, Infants, and Children (WIC) was an amendment to the Child Nutrition Act and was updated by the Healthy, Hunger-Free Kids Act of 2010 (Gunderson, 2012). WIC provides supplemental food, formula, nutrition education, and access to healthcare to low income families (USDA, 2011). A decade of statistics that show no change in the rate of obesity in children demonstrates stability in the condition, but

not success of programs or legislation when success is defined as a reduction in childhood obesity (Ogden et al., 2010).

The National School Lunch Act of 1946 provides nutritionally balanced, low cost or free lunches to children every day (USDA, 2011). This program serves 30.5 million children (USDA, 2011). Robinson-O'Brien et al. (2010) found that children participating in National School Lunch Programs received more than half of their food intake during school hours at their respective schools and were consuming below the recommended daily servings of fruits and vegetables. Story, Nanney, and Schwartz (2009) found that school food options contributed to higher levels of fats and calories. Nevertheless, it is considered a benefit to not only school children but to the agricultural industry of the country (USDA, 2011). The Healthy, Hunger-Free Kids Act of 2010, which President Barack Obama signed into law, has improved the nutritional value of school lunches for children (USDA, 2011). In order to meet the new objectives of Healthy, Hunger-Free Kids, menus are currently changing in most of America's schools. By providing menus that tell parents what meals are being served on what days, schools can assist parent meal planning. Studies that assess the productive nature of embracing all of these healthy initiatives are currently not available. Under this new law, Congress set new nutrition standards and allocated $4.5 million for their implementation. Specifically, schools are provided resources to utilize local farms for fresh fruit and vegetables and are required to serve only non-fat or 1% white milk and limit choices in vending machines. Additionally, schools are guided by federal regulations when competitive foods of low nutritional value (candy, soda, chips, and gum) in these vending machines can be purchased. Moreover, this act increases the number of eligible children and provides nutritious meals in more after-school programs (USDA, 2011). Schools will be audited every 3 years to determine if they have met the new standards

(USDA, 2013).

In spite of all the new programs and laws to decrease obesity and increase fitness levels, conflicting data generates hesitation from school officials to take further action on any documented reports of obesity and low fitness levels. Results from these federal programs, specifically The National School Lunch Act and WIC, indicate that

> the rate of childhood obesity has remained relatively consistent over the past 10 years, with about 32% of children considered overweight (above 85th percentile for BMI), 16.9% of children obese (above 95th percentile for BMI), and 11.9% of children considered extremely obese (above 97th percentile for BMI) in 2006. (McCarthy, Fallon, Hagermoser-Sanetti, 2012, p. 73)

Conversely, in 2014, the CDCP (2014) reported a significant decrease in obesity rates among adolescents who had attended schools that participated in the Healthy, Hunger Free Kids Act program. Further research into various programs may produce the need for refinements to specifically benefit individuals with high obesity levels and low fitness levels.

New Programs

New models and programs have been developed to help schools address health-related issues. Anderson and Phelps (2009) introduced Promoting Universal Longevity via School-Family Ecologies (PULSE), an "evidence-based, school-wide curriculum" to promote healthy eating habits, encourage exercise, and increase awareness of healthy best practices. Another example is the Coordinated School Health (CSH) model, which was used in Louisiana to provide guidance to schools to create healthy initiatives that could effectively assist parents and the community in addressing the health needs of children (Joshi & Howat, 2011). Participation in this program increased awareness of the health problems in the school community and included

identification of key elements needed to reverse those problems, including health education, health services, nutrition services, and family/community involvement (Joshi & Howat, 2011). In addition, the program enabled schools to coordinate efforts and create positive change using a seamless approach with other communities and local school districts. Villas et al. (2006) developed an "electronic student health record system" (p.3) that evaluated for high risk conditions and enabled three different groups of stakeholders to access information. This program has not been widely promoted and only limited testing of the program's ability to monitor individual student progress toward health goals is available to date.

Theoretical Framework

Reducing obesity, increasing fitness, supporting self-efficacy and improving academic achievement in students requires an understanding of theories that influence obesity behaviors and intervention practices associated with those theories. Theories that directly influence the successful reduction of obesity, increase fitness, support self-efficacy, and increase academic achievement include behaviorism, social learning theory, and the zone of proximal development.

Behaviorism

John B. Watson founded behaviorism in 1913 with his successful publication, "Psychology as the Behaviorist Views It" (Baum, 2005). This theory is based upon the premise that all behaviors are acquired through conditioning. Conditioning occurs as individuals interact with their environment. Behaviorists also believe that behaviors can be measured, trained, and changed through the right conditioning (Baum, 2005).

In 1965, B. F. Skinner defined behaviorism as operant conditioning. Skinner's work was based on Thorndike's law of effect (McLeod, 2007). Skinner presented an original term into the law of effect: reinforcement. From this evolved operant conditioning: behavior changes with the

use of reinforcement (Bandura, 1977). For Skinner, reinforcers are used to establish repeat performance, and punishers are used to decrease the likelihood of repeated behavior (Baum, 2005).

Building on Skinner's work in the area of operant conditioning, Shields (2009) reported that making healthy choices the easier choice for Americans has resulted in positive behavioral changes. Given the current culture, making healthy choices easy for Americans is difficult. In American culture, popular entertainment does not involve much physical activity, and increasing activities and healthy behaviors often require finding more time in an already time-strained environment. Also, a lack of time for cooking leads to Americans' consumption of high fat content foods. This is particularly true for adults but also for middle-school-aged children. Influences on individual behaviors are directly related to behavioral settings, sectors of influence, and social norms and values (Shields, 2009). The empowerment of the community often ignites individual members to act. Hanson (1989) provided evidence that when individuals work together in a community, they can affect change towards any goal: reduced crime, increased fitness, and long term health improvements. For example, communities can collaborate to engage in fitness activities, grow fresh fruits and vegetables from a community garden, and organize community workshops to increase public awareness of health issues in their community, which can lead to changes in individual behavior. A community is bound together by common interests of diverse people (Chavis & Wandersman, 1990).

Social Learning Theory

Bandura laid the groundwork for the social learning theory in 1977, with his publication *Self-Efficacy: The Exercise of Control*. Social learning theory highlights the importance of modeling observed behaviors of others in the immediate environment (Bandura, 1977). People

learn from one another by observing, imitating, and modeling. This theory connects two theories, behaviorism and cognitive learning, since it encompasses motivation, memory and attention (Bandura, 1977). Bandura (1977) stated:

> Learning would be exceedingly laborious, not to mention hazardous, if people had to rely solely on the effects of their own actions to inform them what to do. Fortunately, most human behavior is learned observationally through modeling: from observing others, one forms an idea of how new behaviors are performed, and on later occasions this coded information serves as a guide for action. (p. 22)

Similar to the cause and effect behavior of Skinner's operant conditioning, Bandura's social learning theory suggests that environmental and personal factors play a large role in the chosen behaviors of children. Social learning theory is used as a model to study socioeconomic status as it relates to various social and behavioral issues. Conger, Conger, Costanzo, Wright and Matter (1980) and Elovainio et al. (2011) found relationships among these factors; Demırbaş and Yağbasan (2006) did not find relationships among these factors. Demırbaş and Yağbasan found that academic success is strongly influenced by social learning.

Building on Bandura's theory, Davis, LaShun, Davis, and Moll (2011) found that family significantly shapes the learned and behavioral responses in children with regards to good food choices, obesity, and healthy habits. Taking a lesson from social learning theory, Davis et al. (2011) found that parent involvement, as suggested under No Child Left Behind, not only helps children achieve better grades and higher test scores but also assists schools in reducing the incidence of obesity in school age children.

Self-regulation. An important aspect of social learning theory is self-regulation. Self-regulation is a socially learned behavior that is dictated by perceived boundaries of social norms

(Stoebe, 2008). Self-regulation is the ability to control primal needs such as hunger, thirst, and sleep (Perry, 2002). Self-regulation gradually goes on to include the control of feelings such as anger, fear, and frustration (Perry, 2002). Cin Cin and Holub (2011), in a study of 63 parents, found that self-regulation was guided and encouraged by inhibitory control and that parents whose children engaged in positive self-regulation practices required decreased parental control. When adults exhibit good behaviors, this positively affects the success of children in the family and at school (Gable, Crnic, & Belsky, 1994). The ability to self-regulate is the foundation of healthy emotional development (Patrick, 2003). An individual's brain is constantly scanning and responding to the basic needs of the human body (Perry, 2002). An infant reacts to his or her needs by crying until an adult determines what he or she needs and supplies that need to satisfy. As an infant grows, more challenges are experienced, and self-regulation develops over time by mastering those challenges (Perry, 2002). When self-regulation has not had an opportunity to develop in a child, he or she may experience problems with sleeping and eating (Perry, 2002).

Self-efficacy. In addition to the aspect of self-regulation, one of the least researched areas in education is the use of self-efficacy as a framework for developing full school interventions designed to create a productive and healthy school environment. Studies of individual student needs create opportunities for parental involvement, which is perceived to have a direct influence on student self-confidence (Okorodudu, 2012). Addressing individual and societal issues of obesity, levels of fitness and self-efficacy may be directly influenced by how schools utilize self-efficacy to help students successfully cope with both health and academic issues.

It is widely understood that depression is a result of unhappiness with self, whether of personal appearance or other related issues, such as being overweight or obese (Goldfield et al., 2010; Sánchez-Villegas et al., 2010; Zhao et al., 2011). In addition to evaluating the relationship

between weight and depression, studies also examined changes in self-efficacy as a result of obesity and found a strong relationship between obesity and student self-efficacy, suggesting they did influence each other, particularly in food choices (Annesi, 2011). Annesi (2011) examined self-regulatory behaviors to better understand how self-regulation and self-efficacy affect the ability to control weight gain that can lead to obesity and found that increased self-regulation and self-efficacy was associated with an increase in fruit and vegetable intake.

Lack of self-efficacy has been linked to numerous issues from smoking to sexual behavior in adolescents and may play a significant role in a number of unhealthy behaviors that adolescents may participate in over their teen years (Alvy et al., 2011; Minnix, Blalock, Marani, Prokhorov, & Cinciripini, 2011). Influences at school, prior education, family, and environmental conditions individuals face during their lifetimes affect self-efficacy, and measures of self-efficacy can be used to indicate how effectively a student responds to different school programs designed to improve health and academic achievement. Benson, Williams, and Novick (2013) determined that underlying problems including absent parents, amount of television watching or other sedentary activities actually were correlated with depression in obese children. Throughout these studies, the underlying premise is that increase of self-efficacy is the mediator to increase fitness and decrease obesity.

Numerous researchers evaluated the relationship between self-efficacy and how individuals perceive their abilities to achieve and maintain a healthy weight (Ray & Henry, 2011; Rutkowski & Connelly, 2012). Caprara, Vecchione, Alessandri, Gerbino, and Barbaranelli (2011) researched self-efficacy in grade school students in the United Kingdom. Their study demonstrated that higher grades increased self-efficacy in students and created a continued pattern of success in education. The higher the grades, the better the self-efficacy, which

consequently resulted in better grades, resulting in a continued improvement cycle that overcame even the influence of socioeconomic factors that are perceived to have a strong negative influence over student academic achievement and self-efficacy. Researchers found that self-efficacy is directly associated with perceived behavioral control, which identifies individual intention or ability to control activities (Rhodes & Courneya, 2003). This suggests that there is an inverse relationship between academic achievement and BMI scores. Students with low scores on self-efficacy scales often find it difficult making positive academic and health changes in their daily lives and may require help from a school counselor or outside resources to provide the support these students need.

Social Cognitive Theory

The social cognitive theory is similar to but not the same as the social learning theory (Bandura, 1977). The social cognitive theory can be used to understand the relationship between self-efficacy as related to obesity and self-efficacy as related to academic success. Glanz, Rimer, and Lewis (2002) explained that three factors, environment, people, and behavior, are constantly influencing each other to affect change in an individual. The environment in which an individual lives provides a model for learning. Observational learning transpires when an individual observes behaviors of another individual and the reinforcements or consequences that the other individual receives (Bandura, 1997). According to the social cognitive theory, observational learning of behaviors, habits and skills are dependent on processes involving attention, retention, production, and motivation (Pajares & Schunk, 2001). Attention to a particular behavior and observing the outcome of that behavior motivates an individual to engage in that behavior, granted that the outcome is positive (Bandura, 1997).

Zone of Proximal Development

Vygotsky's concept of zone of proximal development (ZPD) was developed in the 1970s (Zaretskii, 2009). Simply put, ZPD is the difference between what an individual is capable of doing independently and what that individual can do with help. Vygotsky (1978) defined zone of proximal development in *Mind in Society: Development of Higher Psychological Processes* as:

> The distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers. For example, two 8 yr. old children may be able to complete a task that an average 8 yr. old cannot do. Next, more difficult tasks are presented with very little assistance from an adult. In the end, both children were able to complete the task. However, the styles and methods they chose depended on how far they were willing to stretch their thinking process. (p. 86)

ZPD is used in classrooms all over the United States, particularly in the "form of hints, leading questions, and so forth" and is particularly known in the United States as scaffolding (Obukhova & Korepanova, 2009, p. 25). Scaffolding is a method used by teachers to present complex concepts to students (Obukhova & Korepanova, 2009). Scaffolding increases a student's knowledge by steadily building on previous knowledge. Obukhova and Korepanova (2009) suggested that aggregate action could be a key indicator to the student's ZPD, including the ability to expand it. Aggregate action is when a group of people who may have similar goals act together to achieve that goal. Expansion of an individual's ability to complete tasks independently is developed through the self-confidence of having a positive outcome of previously completing the task. To date, no studies have been developed using scaffolding as a productive method of obesity control, increased fitness, and improved self-efficacy; however,

FitnessGram® is a program that both guides students in learning how to become physically fit and steadily increases that knowledge and pushes the children to achieve more.

Using the theories of ZPD, it may be reasonable to suggest that not all students are able to achieve fitness goals due to a lack of readiness for the current lessons needed once they reach the point of obesity. For example, if ZPD were to be effectively administered in a method of scaffolding, students would begin learning about health, healthy foods, healthy weight, and other healthy objectives prior to the weight gain, building on it each year to prevent this from happening (Obukhova & Korepanova, 2009). However, in cases where the condition comes about without intervention, it may be difficult to introduce the amount of learning required in a sufficient amount of time.

Intervention Practices for Obese Adolescents

Schools across the United States are working diligently to help combat what is perceived to be one of the largest problems facing America's future: obesity (Taras & Potts-Datema, 2005). Behavioral researchers document the relationships between environmental events and behavior (Alberto & Troutman, 2003; Cooper, Heron, & Howard, 2007; Miltenberger, 2008). Many states throughout the United States have implemented strict guidelines limiting the availability of sweet foods, provided nutritional guidance in school lunch menus, and added more physical education into the school day (Taber, Chriqui, Perna, Powell, & Chalaupka, 2012). A longitudinal study conducted by Taper et al. (2012) found evidence that state competitive food laws are competitive with lower body mass index change of a student if the student remains at the same school.

FitnessGram®

In 1982, the Cooper Institute developed FitnessGram® to address the growing problem of obesity and declining physical health of school age children. FitnessGram® measures three

components of health-related physical fitness: aerobic capacity, body composition and muscular strength, endurance and flexibility. Students choose a test under each of the three categories to evaluate their fitness levels. Students may choose a one-mile run, walk test, or a PACER test. A PACER test is a series of increased speed, short distances for the aerobic capacity test. Muscular strength, endurance, and flexibility are measured by curl-ups, push-ups, and sit and reach tests. Students enter their scores into the computer with the aid of the trained physical education teacher and a report is generated to give feedback on where their current fitness levels are in comparison to suggested fitness levels dictated by the CDCP (FitnessGram®, 2010). While implementation of FitnessGram® in school districts is not mandatory, many states have opted to use the program in their schools (FitnessGram®, 2010).

FitnessGram® enables students to use social encouragement and rewards based on personal value in their fitness goals or in creating fitness goals. Graser, Sampson, Pennington, and Prusak (2011) evaluated the use of FitnessGram® for student self-assessment of their personal fitness progress and found that children involved in the program were interested in their results and felt good about their individual control over their fitness progress. Overall, children felt encouraged by their progress and challenged to meet their fitness goals. FitnessGram® specifically uses reinforcers that promote healthy behavior through competition, even when that competition is only with self (FitnessGram®, 2010). The program encourages social learning aspects of education by providing children the opportunity to be competitive amongst peers of their choosing, and not peers that through negativity or discouragement may keep them from reaching their goals. Finally, the program enables self-regulation, which is necessary to protect children from becoming obese adults (Miller et al., 2012).

Steps to Active Kids

Steps to Active Kids (STAK) is a study of the physical fitness levels of school age children in the United Kingdom. The study strives to increase the amount of exercise Nothingham children engage in daily (Glazebrook et al., 2011). The researchers sought to understand the relationship between individualized exercise and self-regulation. By participating in the study, self-efficacy is encouraged and success in achieving goals in each step of the program is measured (Glazebrook et al., 2011). The results of the study have not been published (Glazebrook et al., 2011).

Complete Programs

Creating effective programs for preventing and controlling obesity in children should include complete programs designed to contribute to education, mental health, nutritional meals, and exercise (Dzewaltowski et al., 2010). Health programs are initiatives that are directed and guided by federal programs and necessary to prevent obesity in schoolchildren (CDCP, 2012). Health programs include health instruction, health services, healthy school environments, food services, health promotion through staff education, counseling, psychological services, physical education, and parent and community involvement. While many schools have created programs designed to implement many of these recognized needs, most schools have not created programs that embrace all of them (Dzewaltowski et al., 2010). Creating Opportunities for Personal Empowerment (COPE) and Healthy Lifestyles Teen (Thinking, Emotions, Exercise, and Nutrition) programs were designed to address the needs of adolescents to develop self-efficacy and healthy decision-making skills. COPE consists of 15 lessons that incorporate behavioral skills that are guided by the social cognitive behavior theory (Melnyk et al., 2009). Each lesson consists of 20 minutes of physical activity and 10 minutes of reflection with a counselor (Melnyk et al., 2009).

Health Education

Health education involves creating class-related instruction that teaches students to make healthy choices and describes health-related issues associated with obesity (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2002). Behavioral studies indicate that understanding the cause and effect of obesity may result in a decrease in obesity in children, thus reducing the incidence of obesity in adults (CDCP, 2010). In a study of 19 Hispanic adolescents enrolled in health classes of a southwestern high school, Melnyk et al. (2009) found using the COPE program resulted in distinctive changes in healthy lifestyle beliefs, increased nutrition knowledge, decreased cholesterol indicators, and promotion of well-being. The researchers concluded that the use of the COPE programs in schools would promote better health choices and combating mental health issues.

Promotion of Healthy Programs

Promoting healthy programs in schools requires education and promotion of healthy behaviors by families and school staffs (Yager & O'Dea, 2005). Modeling of appropriate and preferred behaviors enables social learning behaviors that promote healthy choices and can increase awareness of health needs in the schools (Yager & O'Dea, 2005). For example, some schools throughout the United States are considering or have banned the sale of baked goods and candy fundraisers (Armour, 2012). Programs that fully utilize the school staff and family to promote healthy lifestyles are limited, involving such small steps as eliminating school bake sales and candy sales as a school-wide stand against unhealthy choices (Armour, 2012; Stop Bake Sales, 2009). Rarely do programs promote healthy behaviors by staff members (Brown & Summerbell, 2009). An additional study advocating removal of nonnutritive items by James,

Thomas, and Kerr (2007) in the United Kingdom found removal of soft drinks in the school vending machines was associated with a decreased the number of students that were overweight or obese. School officials can take simple steps to increase fitness, lower obesity levels, and improve self-efficacy.

Counseling

Counseling and psychological services have rarely been evaluated in school and community settings for effectiveness in combating obesity in children (Chirinos et al., 2013). Most researchers evaluated counseling services based on overall mental health or one-on-one results of individual sessions to address mental health issues that included physical health issues such as obesity (Carey, Dimmitt, Hatch, Lapan, & Whiston, 2008). McCormick, Ramirez, Caldwell, Ripley, and Wilkey (2008) evaluated the YMCA's program, which included a group-counseling component that could decrease weight and/or prevent weight gain. The YMCA's program also included rewards for participants who met the objectives in their personal health program. The program was successful at preventing weight gain for all participants and in decreasing weight of some participants. While some participants did not lose weight, all participants were able to demonstrate small health changes that would benefit the families and individuals in the long-term (McCormick, Ramirez, Caldwell, Ripley, & Wilkey, 2008). Providing effective counseling services to obese middle school students is essential to increasing fitness and self-efficacy levels.

Physical Education

Physical education has been an essential part of many school districts for decades; however, with the emphasis of the NCLB Act on high-stakes testing in academic subjects, to make room for more academic and math, many schools either removed physical education or

reduced the number of hours each child was required to participate in physical education courses (Trost & Van der Mars, 2010). Educators may want to reevaluate reducing physical education time for students in light of Chomitz et al.'s (2009) findings that there is a strong positive correlation between exercise and academic performance. While obesity rates have steadied in the past decade, the increase of physical education in schools has not been completely responsive to the need to meet the activity rates required for healthy children (Taras & Potts-Datema, 2005).

Parent Involvement

Parent and community involvement are essential to the success of health programs designed to prevent and control obesity rates in children (Myers & Vargas, 2000). NCLB suggests parent involvement in Title I schools as an important component for student success in learning (GaDOE, 2011). Smith, Wohlstetter, Kuzin, and Pedro (2011) found that participation of parents in school programs creates better and stronger learning environments with students.

Family-based intervention programs often involve pediatricians and other health providers rather than school personnel (Davison, Jurkowski, Li, Kranz, & Lawson, 2013). West and Sanders (2009) created a Lifestyle Behavior Checklist (LBC) to determine the need for additional support in managing child obesity issues in families. Parents listed some of the challenges that prevent strict meal controls at home. These include the ability to monitor and control eating by 11-12 year olds who may have meals outside the nutritional plan in school, snacking at friends' homes, or even the busy schedule of the parents themselves. Parents also expressed concern that a strong stand regarding exercise or food could create negative self-images or decreased self-esteem. West and Sanders (2009) found that parents of obese children tended to express less confidence in their abilities to meet the needs of their child's lifestyle behaviors.

Studies focusing on socioeconomic factors found that low-income families may lack awareness of and education needed to assess the obesity issues in their children (Dammann, Smith, & Richards, 2011; Tschamler, Conn, Cook, & Halterman, 2010). While school district programs can encourage parent involvement, often they cannot mandate participation in programs designed to decrease obesity in school-age children (Hingle, O'Connor, Dave, & Baranowski, 2009). Parental involvement is considered extremely important to the success of students and is guided by the principles of learned behavior, which encourages the success of students. The theory of behaviorism contributed to the initiatives for creating opportunities for parents to be involved in the school learning initiatives.

No Child Left Behind

NCLB increased programs that invited parents and family members to be active participants in the success of students in school projects, particularly for English, science, and math classes. Some districts in the United States have experienced increased participation by parents in these programs, and historically, participation of parents creates better and stronger learning environments for students (Smith, Wohlstetter, Kuzin, & Pedro, 2011). Currently, legislation specifically addresses nutrition to help encourage healthy behaviors in students. In fact, many states have added legislation requiring physical education. In the future, NCLB may not be the only legislation that invites and encourages parents and communities to become a part of educational initiatives for students. Decades of research demonstrate that involvement from family could greatly increase the success of students, decrease absenteeism, and increase graduation rates (Wanat, 2010). Schools could begin to consider involving community action plans into the healthy programs developed for the schools.

Family-based interventions are the most commonly researched obesity programs that

engage parents; however, these programs primarily involve pediatricians and other health providers in identifying the problem and seeking solutions to childhood obesity. West and Sanders (2009) listed numerous challenges that parents face when trying to address behavioral issues associated with obesity. Parents also expressed concern that a strong stand regarding exercise or food could create negative self-images or decreased self-esteem. Researchers, seeking a standard for defining the need for additional support in managing child obesity issues in families developed the Lifestyle Behavior Checklist (LBC). Using the LBC checklist, the study demonstrated that parents of obese children tended to express less confidence in their ability to meet the needs of their child's lifestyle behaviors.

Individualized Interventions

Implementation of individualized fitness interventions can include teaching children how to evaluate resting heart rates against target heart rates, such as can be done using programs like FitnessGram®. Programs can combine the objectives of health courses, which introduce healthy food choices and demonstrate relationships between caloric intake and outtake, and physical education that emphasizes aerobic activity. Individualized health plans to address specific issues are often perceived as best practices by pediatricians, the YMCA, FitnessGram®, and some types of counseling-related services. Each intervention may seem minimal when done in isolation, but when combined with parent involvement, community activities, and school functions, the effects will be significant in combating increased BMI, decreased fitness, and self-efficacy.

Obesity Rates

Only 20 to 50 years of quantitative and qualitative research exists regarding obesity in children living in the United States. While obesity rates have not grown in the past 10 years,

they have also not declined, regardless of the information gathered and implementation of best-practice programs in classrooms and in communities (CDCP, 2012). Governments around the world are working towards creating legislation that decreases the opportunities for children to become addicted to unhealthy food choices, restrictions on marketing communications, and programs to increase the involvement of schools by offering physical education and healthy choices during the student's many hours at school. In the United States, schools dictate some of their own agendas and develop their own programs.

The current results of initiatives and programs such as health instruction, health services, healthy school environments, food services, health promotion through staff education, counseling, psychological services, physical education, and parent and community involvement demonstrate that the obesity problem can be overcome. Schools in the United States are able to dictate many of their own programs and initiatives, to include how much physical education is available or required in a school day, and to allow lunchroom staff to create their own menus. Some schools in the United States have created new roles in their schools/districts for their counselors. In Maine school districts, school health coordinators are the primary resource used to ensure that the most productive methods to address student health and well-being are introduced to students in their schools (O'Brien et al., 2010). The obesity numbers have remained consistent over the past decade; however, creating programs to decrease the prevalence of obesity requires clear understanding of pre-existing factors that may impede the progress of obesity prevention and control programs.

Summary

In 2012, The World Health Organization found that obesity was a worldwide problem that affects nearly 40 million children under the age of five. Around the world, governments

have created programs and legislation to control and decrease the growth of obesity. Within the United States, obesity, low fitness levels, and low self-efficacy have become serious health issues that influence everything from families to insurance companies (Bleich, Ku, & Wang, 2011; Elkins et al., 2004; Hao et al., 2003). Researchers examining the climbing obesity rates and lower fitness levels have studied issues such as sedentary lifestyles and the increase of processed foods. The United States issued legislation guidelines for nutritional and physical education programs in schools throughout the country (Story et al., 2009). Researchers demonstrated that increased levels of physical activities in schools can be productive in meeting the goals of increased health and academic success for all children; however, research typically evaluates only one or two aspects of this process (Anderson & Phelps, 2009; Chaddock et al., 2010; Metos & Nanney, 2007).

Researchers suggest that programs successful in meeting the academic needs of students as measured by improvement on high-stakes tests include parental involvement (Joshi & Howat, 2011; Villas, Zhixiang, Ganta, & Salazar, 2006). Childhood obesity and low fitness levels could be improved from a comprehensive program approach including a parent involvement component; however, no study has evaluated all of the factors, specifically obesity, decreased fitness levels, and low self-efficacy. Additionally, researchers rarely correlated self-efficacy and various programs' components to understand how issues of obesity influence student perceptions. Measures of self-efficacy can be used to evaluate emotional responses that influence behaviors such as exercise and self-regulation of eating habits.

Researchers found that obesity is correlated with depression, low self-esteem, and low self-efficacy (Aktop, 2010; Ashmore et al., 2008; Cin Cin & Holub, 2011). Bandura (1977) found that self-efficacy was directly related to the ability of a person to adapt to uncertainty,

distress, and conflict. However, studies addressing how school programs influence these mental health issues as related to obesity are lacking. Researchers studying the FitnessGram® program examined the impact of physical education on student attitudes towards exercise programs, and demonstrated that self-regulation created positive viewpoints among children (Graser et al., 2011). Additionally, Melnyk et al. (2009) found that health courses embracing the components outlined in the COPE program successfully created positive attitudes towards healthy behaviors and choices. No studies to date examined how a comprehensive school program of health classes, physical education, and availability of nutritional food choices influence self-efficacy and assist in self-regulation of healthy behaviors.

Studies that demonstrate how individuals benefit from individualized plans to address obesity-related issues are necessary to create appropriate objectives for successful obesity management in schools. This study, which addresses the relationships between BMI, fitness, academic achievement, and self-efficacy, is significant because it contributes to the content literature on the academic achievement and personal health. There are currently no studies that correlate all of these variables in one study. Knowledge obtained from this study will fill this gap in the literature. The study findings will enhance students' understanding of physical activity, healthy eating habits, and methods to increase self-efficacy and self-regulation (Puder & Munsch, 2010). It is imperative that educators and policymakers know the role that obesity plays in self-efficacy and academic achievement in order to create the best health programs and improve the academic experience for every student (Rancourt & Prinstein, 2010). Additionally, the results may indicate that a decrease in physical education for students may contribute to negative self-image and attitudes detrimental to self-efficacy (Aktop, 2010). A study evaluating the relationship between BMI, fitness, self-efficacy, and academic performance of students will

enable the school districts to successfully develop programs that address the issues surrounding obesity and education in a way that is designed to address academic success by addressing obesity.

CHAPTER THREE: METHODS

This chapter includes the research design, target population, and study area. The chapter concludes with the quantitative sampling, instrumentation, data collection, and data analysis methods.

Design

A correlational design was used to examine the relationship between BMI, fitness, self-efficacy, and academic success as measured by scaled test scores on the Georgia CRCT. An intervention plan was not introduced to manipulate the variables. This allows the researcher to estimate the relationship between the variables and predict their effect on the dependent variable. While this study evaluated a specific population in a rural setting, it allowed for generalizations to be made to other sample populations (Gall et al., 2007). This design was best suited to evaluate the benefits of multiple predictor variables (BMI, self-efficacy, fitness) on the outcome variable, academic performance. This correlational study provided a numerical estimate to the degree of the relationship between the variables: BMI, fitness, self-efficacy, and their prediction on academic performance as expressed in a regression model.

Three sample populations (groups) from three rural middle schools in North Georgia were identified. BMI measurement, fitness scores from FitnessGram®, the General Self-Efficacy Survey (GSES) results, and Georgia CRCT scores were collected from each participant in the study. Scores from the spring 2013 administration of the Georgia CRCT were used in this study. BMI measurements, individualized fitness scores from FitnessGram®, and composite scores from the GSE (Schwarzer & Jerusalem, 1995) survey were collected in the fall of 2013.

Research Question and Null Hypotheses

The following research question and null hypotheses guided this study:

RQ1: Is there a predictive relationship from the measures of BMI, fitness, and self-efficacy on academic achievement scores of eighth grade students?

$H_0$1: There is no predictive linear relationship from the measures of BMI, aerobic capacity, push-ups, curl- ups, sit and reach, and self-efficacy on academic Reading achievement scores of eighth grade students.

$H_0$2: There is no predictive linear relationship from the measures of BMI, aerobic capacity, push-ups, curl-ups, sit and reach, and self-efficacy on academic Language Arts achievement scores of eighth grade students.

$H_0$3: There is no predictive linear relationship from the measures of BMI, aerobic capacity, push-ups, curl-ups, sit and reach, and self-efficacy on academic Math achievement scores of eighth grade students.

Participants

The target population in this study consisted of 183 eighth grade students enrolled in physical education classes in three north Georgia middle schools during the 2013-2014 academic calendar year. Out of this sample size, 117 students were Caucasian (64 males, 53 females), 43 were Hispanic (24 males, 19 females), 11 were African American, (six males, five females) eight were Asian, (three males, five females) three American Indian (three males) and one was two or more races (one female). The three schools in this study serve grades six through eight and have comparable demographics with regard to geography, size, race, and socioeconomic status. Convenience sampling was used due to the fact the participants could offer the most information on the topic (Gall et al., 2007).

According to Gall et al. (2007), the rule for conducting multiple regression analysis is to "increase sample size by at least 15 individuals for each variable that will be included in the

multiple regression analysis" (p. 360). Gay, Mills, and Airasian, 2009) indicated that if the instrumentation had a lower validity and reliability, then the sample size needed to be higher. The reliability and validity of all the instruments utilized ranged from very good to generally acceptable. When using Pearson correlations, researchers strive for a moderate and significant correlation between the variables. To observe a significant and moderate correlation (r = .30), a minimum sample of 64 students provides 80% power to determine whether the relationship or correlation between the variables is significant (Gay et al., 2009).

The sample population for this study included eighth grade students enrolled in physical education during the fall of 2013 from three north Georgia middle schools. Data used in this study include BMI and fitness scores from the spring 2013 administration of the FitnessGram®, scores on the GSES survey administered in the fall of 2013, and seventh grade spring 2013 Georgia CRCT scores in Reading, Language Arts, and Math.

Three middle schools, one from each of three school districts in rural north Georgia, served as sites for this study. To protect the privacy of the students in this study, the real names of the districts and schools in this study were not used. The three districts are referred to as School District One, School District Two, and School District Three. The three school districts were geographically and demographically similar. The three middle schools were referred to as Middle School One (MS1), Middle School Two (MS2), and Middle School Three (MS3).

School District One consists of one primary school, one elementary school, one middle school, one high school, one alternative school, and one school that houses grades K-12. The total population for this school district is 3,553 students, with 1% American Indian/Alaska Native, 1% Asian, 5% Hispanic, 3% Black, 89% Caucasian, and 1% two or more races. The district employs 249 full-time teachers and has an overall student to teacher ratio of 14:2. The

percentage of students that are economically disadvantaged (ED) in this district is 52% while 18% of the students make up the special education population, and 1% of the student body is Limited English Proficient (LEP) (Georgia Department of Education, 2012). In this district, the single middle school was utilized in the study and referred to as Middle School One (MS1). MS1 has a population of 606 with proportional demographics to the district.

Students that attend School District Two are enrolled in one of the three elementary schools, two middle schools, or one high school that serves the students of this district. The total population for School District Two is 3,728 students, with 1% American Indian/Alaska Native, 1% Asian, 2% Hispanic, 8% Black, 86% Caucasian, and 2% two or more races. School District Two has 256 full time teachers and a student/teacher ratio of 13:3. Fifty-six percent (56%) of students in School District Two are economically disadvantaged (ED) while 16% are identified as special education. At 4%, the percentage of Limited English Proficient (LEP) is higher in this district than in the other two districts (Georgia Department of Education, 2012). Middle School Two (MS2) is one of the two middle schools in the district. MS2 has a population of 712 students with proportional demographics to the district.

Students that attend School District Three are enrolled in one of the three schools: the elementary school, the middle school, or the high school. The total population of School District Three is 2457 students, with 1% American Indian/Alaska Native, 1% Asian, 2% Hispanic, 1% Black, and 95% Caucasian. The school district employs 204 full time teachers with a student/teacher ratio of 12:1. Forty-two percent of the students in this district are economically disadvantaged (ED), and 13% receive special education services. Middle School Three (MS3) has a population of 408 students with proportional demographics to the district.

Setting

The three middle schools participating in this study are located in rural north Georgia. All three schools use the Common Core Standards as their curriculum (GaDOE, 2012).

Middle School One

Middle School One provides 300 minutes a day of core academic classes and 100 minutes a day of enrichment through Connection classes (electives). MS1 is compliant with Georgia Middle School Standards. The core academic classes consist of language arts, math, science, and social studies while the Connection classes offer computers, agriculture, physical education, guitar, band, and chorus. To remediate students in math and reading, MSI set aside 30 minutes each day for Response to Intervention (RTI). At MS1, students may choose from a wide range of sports, clubs, chorus, and band activities. Students that are identified as at-risk students meet weekly with an assigned mentor from the community.

MS1 has two teams of three academic teachers for each of the three grade levels. Each academic team serves approximately 200 students (100 per team). Four resource special education teachers and three co-teachers facilitate the learning of the special education students. In addition, 12 gifted certified teachers provide enriched curriculum for the gifted population in each content area and at each grade level. For students who have been identified as needing intervention in the area of reading, 10 reading endorsed teachers work with those students to increase reading fluency and comprehension. MS1 has one principal, one assistant principal, and a guidance counselor.

Middle School Two

The leadership team of Middle School Two consists of one principal, one assistant principal, and a guidance counselor. MS2 has three resource special education teachers (one for

each grade level) and three co-teachers that facilitate the learning of the special education students along with the general education teacher. MS2 has three reading endorsed teachers (one for each grade level) and three gifted certified teachers (one for each grade level).

Curriculum is guided by the Common Core Standards. Students attend 300 minutes of academic core classes and 100 minutes of electives (Connection classes) each day. Core subjects include reading, language arts, science, math, and social studies. MS2 shortens every academic subject to allow for reading to be taught as a separate subject. The electives offered at MS2 are physical education, computers, consumer sciences, Spanish, and band. Extracurricular activities include football, basketball, softball, baseball, track, tennis, volleyball, cheerleading, drama, and band.

Middle School Three

Middle School Three is the smallest of the three middle schools in this study; however, it has similar demographics proportionate to the other two schools. The administrative teachers include one principal, one assistant principal, and a guidance counselor. One team of four academic teachers serves the 103 eighth graders at MS3. The school has one reading endorsed teacher and one gifted endorsed teacher to serve the entire middle school. The Connection classes offered at MS3 are computers, art, physical education, agriculture, and chorus. Extracurricular activities at this school include football, basketball, soccer, cheerleading, and band.

Students enrolled in each of the three middle schools in this study have physical education programs that adhere to the Georgia GPS Standards (Georgia Performance Standards Framework, 2008). The physical education curriculum includes skill development, physical activity, improved physical fitness, self-discipline, improved judgment, and stress reduction

(GaDOE, 2012).

Instrumentation

FitnessGram®

The Georgia Department of Education, in an effort to comply with the Georgia Shape Act, required every school system to administer a physical fitness assessment to all students enrolled in grades one through 12 (GaDOE, 2011). The program selected for use in all public schools in Georgia was FitnessGram®. The FitnessGram® program evaluates each student's fitness using criterion-referenced standards and provides an individual report for each student (FitnessGram®, 2010). This program is used as both a guided and an individualized assessment of student fitness. FitnessGram® scores include not only a BMI measurement, but also measurements of aerobic capacity, muscular strength, muscular endurance, and flexibility (see Appendix A for instrument). This instrument was used in numerous studies to validate its reliability to measure accurate fitness levels (Murray, Eldrige, Silvius, & Squires, 2007; Welk, 2006; Welk, Going, Morrow, & Mailu, 2011).

FitnessGram® provides training programs to the physical education teachers each year, providing physical education teachers with the correct methods for measuring student success, which is important to the success of the program. Each teacher instructed students on the methods required to perform each test and how to record their results. Guided lessons for instructors are included with the program, and wherever needed, teachers may receive additional assistance or have questions answered by the administrators of the program. In addition, the teachers checked all final measurements to ensure the accuracy of the reports provided to parents/guardians during the school year.

Students receive classroom instruction and guidance from trained physical education

teachers. Scores on every component, with the exception of aerobic capacity, places the student at a particular level in the Healthy Fitness Zone or as Needs Improvement. The Healthy Fitness Zone standards are the criteria used to measure individual fitness based on individual performance. Printed reports provide accurate measurements from both student self-service activities and teacher administrated and evaluated portions of the program. The Cooper Institute for Aerobics Research (1992) determined the results from FitnessGram® assessments were reliable and valid with field tests presented by Morrow, Martin, and Jackson (2010).

Aerobic capacity. Aerobic capacity is one measure of fitness included in the FitnessGram® program. Aerobic capacity can be measured by a one-mile walk/run or a Progressive Aerobic Cardiovascular Endurance Run (PACER) test. Data included in this study utilized the one-mile walk/run. The PACER test involves gradually increasing the run/walk speeds over a short distance until a student can no longer maintain the pace. The validity of the one-mile walk/run showed it to be the most reliable with reliability percentages ranging between .91 and .93 (Beets & Pitelli, 2006). Students at each of the three middle schools have access to a track that measures one-quarter of a mile in circumference. Students complete this test numerous times throughout their school years and are familiar with its requirements. Physical education teachers record each student's time to complete the one-mile walk/run with stopwatches, record their time, and inform the students of their personal time.

Muscular strength, endurance, and flexibility. Muscular endurance was measured by counting the number of curl-ups a student completes in a single setting while maintaining a constant specified rhythm. Students complete a curl-up by lying flat on their backs and lifting their head and shoulders two inches off the mat, then returning to the resting position. Students continue the curl-up exercise until they can no longer maintain a rhythm of one curl-up every

three seconds. This exercise is important for core stability and back support. Morrow et al. (2010) found reliability of the curl-up test to be between .70 to .93.

The 90-degree push-up is utilized to measure muscular strength. To complete a push-up a student must push his or her body up, using his or her arms, from the floor, keeping the torso firm and straight, stopping just before the point where the elbows would lock, and gently move the torso back to the position on the floor, or just above the floor, prior to moving back up to the highest position again. The student performs a push-up every three seconds in a constant motion. The student continues the push-up exercise until he or she cannot maintain the required rhythm. Physical education teachers monitor the student's performance and use a stopwatch to account for elapsed seconds. The student and the teacher keep an accurate count of the test results and record all information on the computer. The reliability coefficients of this test were .50 to .86 (Morrow et al., 2010).

The sit and reach test measures students' hamstring and lower back flexibility. The students warm up for this test by running several laps around the gym and performing some light stretching exercises. With shoes removed, the student places one foot flat and the other bent against the box. The toes should be pointed vertical, and the legs are shoulder width apart. The student then places both hands on top of each other and slowly reaches as far as he or she can on top of the box and holds the position for 3 seconds. Physical education teachers and students record their scores in the FitnessGram® program. The reliability of this test was .93 to .99 (Welk & Meredith, 2008). Scores were entered into an Excel spreadsheet and used for this study.

The General Self-Efficacy Scale

The General Self-Efficacy Scale (GSES) was used to measure the self-efficacy of eighth

grade middle school students enrolled in physical education classes in three middle schools in north Georgia in the fall of 2013 (see Appendix B for instrument). The GSES is available in 33 languages and has been used for over 20 years in 23 different countries. The survey is used to measure perceived self-efficacy of coping and adaptation abilities not only in a routine day but also in a crisis situation. Cronbach's alpha for each subscale ranged from .76 to .90 with the majority in the high .80s which, according to Cohen (1992), is a reliable measure. The criterion-related validity that is noted in various correlation studies displayed positive coefficients for emotions, dispositional optimism, and work satisfaction. Negative coefficients were found with depression, anxiety, stress, burnout, and health complaints (Schwarzer & Jerusalem, 1995). The GSES survey presents 10 statements that the students respond to with answers of (a) not at all true, (b) hardly true, (c) moderately true, and (d) exactly true. This instrument was used in numerous studies to validate the psychometric properties (Marks & Allegrante, 2005; Sargent-Cox, Butterworth, & Anstey, 2014; Scherbaum, Charash, & Kern, 2006). A composite score was collected for this multiple linear regression study.

The GSES survey was administered via pencil and paper through the students' homeroom classes in the fall of 2013. The students taking the survey were all eighth grade students attending three north Georgia school districts. The GSES has 10 items mixed at random into a larger pool of questions that students answer in a four-point scale multiple choice response format. Students identified themselves on the survey so that surveys can be matched with their BMI and fitness scores. Upon completion of the survey, the test administrator tabulated the responses to find the sum to each of the 10 items in the GSES survey to yield a final composite score with a range from 10-40. Scores were entered into an Excel spreadsheet. All information identifying a particular student was destroyed once the surveys, BMI, fitness scores, and

academic scores from the Georgia CRCT were correlated and the study was complete.

The Georgia Criterion-Referenced Competency Test (CRCT)

The Georgia Criterion-Referenced Competency Test (CRCT) is a high-stakes criterion-referenced test designed to measure Georgia state standards of content knowledge in reading comprehension, language usage, math, science, and social studies. For purposes of this study, the researcher used the seventh grade CRCT Reading, Language Arts, and Math scaled scores from the spring of 2013 administration of the CRCT.

The CRCT was introduced to Georgia classrooms in the spring of 2000. It is given at the end of the year to assess how well students acquired the required curriculum through selected-response items (GaDOE, 2011). The CRCT is administered to students in the third grade and every subsequent year through eighth grade. The purpose of the CRCT is to evaluate the quality of education each student in the state of Georgia is receiving.

School, district, and state scores on the CRCT are used to ensure that Georgia is compliant with requirements of the NCLB Act. Score reporting ensures that core learning standards are being met in each school system and is the measure of Adequate Yearly Progress (AYP). AYP uses test scores to annually compare all Georgia public schools. Students' scores are reported as a scaled score to achieve comparability (ETS, 2002). Converting raw scores and statistically adjusting them to a common scale accommodates for differences in difficulty of the test from year to year and produces reliable and valid scores. Performance levels are indicated to the student after assessment as *Does Not Meet Standard* (scale score below 800), *Meets Standard* (scale score ranging from 800-849), or *Exceeds Standard* (scale score above 850). The same scoring dynamics are used for all content testing areas (GaDOE, 2012). Georgia schools and districts establish goal-orientated objectives each year to either meet or exceed expectations as

defined by the mandates of AYP.

The validity of the CRCT was established by identifying the purpose of the test: a measure of how well students have mastered the state's curriculum (GaDOE, 2009). Each of the core content tests—Reading, Language Arts, Math, Social Studies, and Science—was then developed from the Georgia Performance Standards (GPS). Wallace (2010) measured the reliability of the Georgia CRCT and found the Cronbach's alphas scores indicated that all the scores are an accurate representation of a student's performance, and range between .85 and .93.

Procedures

Before beginning this study, submission of an IRB packet with obtained approval was in place (see Appendix C for IRB approval). In the fall of 2013, the researcher gained permission from all superintendents, principals, and teachers in the three school districts (see Appendix D for consent forms). The researcher contacted teachers in all districts to explain the purpose of the research study and entertain any concerns or questions concerning procedures. Students in the eighth grade were sent home with an information sheet explaining that data from BMI, FitnessGram®, GSES, and CRCT may be used in a research study (see Appendix E for recruitment letter to students). Informed parent consent forms were sent home with every student (see Appendix F for parental consent form). Student consent forms were sent home with each student (see Appendix G for student consent form), and students who met the criteria for the study (enrolled in physical education during the fall of 2013 and had valid seventh grade CRCT and FitnessGram® data) were pulled and matched with their information.

Due to limitations associated with being a rural district, access to computers for all students was not possible. Eighth grade students in all three targeted middle schools were administered the GSES, which measures self-efficacy, via pencil and paper during the fall of

2013. The researcher gave instructions to all eighth grade teachers concerning the test before the test was administered. Homeroom teachers in the eighth grade distributed surveys in August 2013. Students put an identifying numerical code on the paper and were informed that their information would be kept confidential and later destroyed. Students answered 10 questions and responded with (a) not at all true, (b) hardly true, (c) moderately true, or (d) exactly true. Homeroom teachers collected the completed surveys and stored them in a secure location. The researcher collected all surveys from each of the middle schools in this study.

Physical education teachers in all three districts are trained annually on how to administer the FitnessGram® program and accurately measure BMI. Results of students' BMIs are calculated along with their fitness scores to evaluate the effectiveness of a school's physical education programs. The student and the teacher enter the data in the computer generated FitnessGram® data program. Information is stored in an Excel spreadsheet for organizational purposes.

GSES surveys at Middle Schools One, Two, and Three were collected in the fall of 2013 by the researcher and matched to students' BMI and fitness scores from the spring 2013 FitnessGram® assessment. The scores were collected from the teachers of each student; however, no personally identifiable information was preserved for the research data. All data were recorded in a password-protected Excel spreadsheet. Numbers were assigned in place of names to protect the participants' privacy.

Data Analysis

The purpose of this study was to determine if there were any statistically significant predictive correlations between BMI, fitness, and self-efficacy on academic achievement as measured by the Georgia CRCT for eighth grade middle school students in a rural environment.

Data were collected based on the recommendations of FitnessGram®, the GSES, and the Georgia CRCT. To understand any relationships between the variables, correlation data were developed for each variable.

Analysis was done using SPSS 22 (IBM Corp, 2012). To prevent mathematical errors, a second, unbiased party evaluated the data to ensure data were entered with accuracy. Data elements were correlated to determine if relationships existed between BMI, fitness, and self-efficacy.

Before conducting a multiple regression analysis, the sample was checked for assumptions. Assumptions of multiple linear regression analysis will warrant normality, homoscedasticity, independence of errors, and the removal of extreme outliers (Steinberg, 2008). The normality assumption assumes the residuals follow a Gaussian distribution (bell curve) named after Carl Friedrich Gauss (Gall et al. 2007) A Durbin Watson test was used as evidence of independence of the residuals (Field, 2013). This statistic can differ between 2 and 4 with a value of 2 determining the residuals are independent of each other. Scatterplots were analyzed to ensure normality (Gall et al., 2010). Furthermore, the Kolmogrov-Smirnov test determined if the sample came from a normally distributed population (Field, 2013). If the alpha level (.05) was less than the *p*-values, then the researcher rejected the null hypotheses. If the alpha level (.05) was higher than the *p*-values, then the researcher failed to reject the null hypotheses (Lind, Marchal, & Wathan, 2013).

Multiple linear regressions (*R*) were used to calculate the effect size of the outcome variable (academic achievement scores) to the predictive variables (BMI, fitness, self-efficacy) (Gall et al., 2007, p. 358). Multivariate correlations examined the strength and direction of those relationships. According to Dancey and Reidy (2004), correlations can be categorized by the

strength of their correlation. If the value of the correlation coefficient is 1, the strength of the correlation is perfect. A correlation coefficient between .70 and .90 would indicate a strong correlation. A correlation coefficient between .04 and .60 would indicate a moderate correlation. A correlation coefficient between .10 and .30 would indicate a weak correlation. In addition, a correlation coefficient of 0 would indicate there is no correlation between the variables (Dancey & Reidy, 2004). The psychometric properties were considered moderate for the CRCT and FitnessGram®. Summary scores for these instruments and individual component scores have been validated and are used in this study's analysis.

Multiple regression analysis was used to predict the influence of BMI, fitness, and self-efficacy on scores of the Georgia CRCT. Multiple regression analysis allows the researcher to determine what predictor variable (BMI, fitness, and self-efficacy) is the best predictor of the outcome variable (CRCT scores). While performing a multiple regression analysis, a complete prediction would indicate that the resulting error term had a mean value of zero (Howell, 2011). Multiple regression analysis permits the researcher to utilize different types of predictor variables. Chapter four will discuss the findings of the multiple regression analysis.

CHAPTER FOUR: FINDINGS

Research Question

RQ1: Is there a predictive relationship from the measures of BMI, fitness, and self-efficacy on academic achievement scores of eighth grade students?

Null Hypotheses

$H_0$1: There is no predictive linear relationship from the measures of BMI, aerobic capacity, push-ups, curl-ups, sit and reach, and self-efficacy on academic Reading achievement scores of eighth grade students.

$H_0$2: There is no predictive linear relationship from the measures of BMI, aerobic capacity, push-ups, curl-ups, sit and reach, and self-efficacy on academic Language Arts achievement scores of eighth grade students.

$H_0$3: There is no predictive linear relationship from the measures of BMI, aerobic capacity, push-ups, curl-ups, sit and reach, and self-efficacy on academic Math achievement scores of eighth grade students.

Descriptive Statistics

Descriptive statistics for the demographic data are presented in Table 1. Data obtained for the predictor variables included Body Mass Index (BMI), aerobic capacity, push-ups, curl-ups, and sit and reach. FitnessGram® standards as suggested by the Cooper Institute (1992) for males and females to be in the Healthy Fitness Zone (HFZ) were identified and were compared to the sample population for the predictor variables. Reading, Language Arts, and Math subtests from the Georgia Criterion-Reference Test (CRCT) were used for academic achievement for the criterion variables. Performance levels (PL) are indicated to the student after assessment as Does Not Meet Standard (scale score below 800), Meets Standard (scale score between 800-849), or

Exceeds Standard (scale score above 850). The same scoring dynamics are used for all content testing areas (GaDOE, 2012).

Table 1

Descriptive Statistics of Population Sample

	n	Minimum	Maximum	Mean	DH	HFZ/PL
BMI						
Females	83	15.5	38.5	25.31	5.15	23.6
Males	100	12.0	33.5	22.90	4.97	23.0
Aerobic Capacity						
Females	83	7.0	16.2	10.91	2.00	11.00
Males	100	6.3	16.0	10.40	1.97	9.30
Push-ups						
Females	83	2	14	7.28	2.60	7
Males	100	3	21	9.55	3.10	14
Curl-ups						
Females	83	6	36	23.21	6.52	18
Males	100	9	48	36.80	36.80	24
Sit and Reach						
Females	83	7	16	10.74	1.38	10
Males	100	3	11	6.50	1.68	8
Reading	183	798	929	836.42	28.29	800
Language	183	788	930	836.93	29.38	800
Math	183	784	929	836.08	32.25	800

Note. HFZ/PL refers to Healthy Fitness Zone as deemed by FitnessGram®/ Required Performance level on CRCT to pass.

Assumption Tests

Multiple linear regression was employed to determine if CRCT academic achievement scores for Reading, Language Arts and Math (criterion variables) from eighth grade students could be predicted from FitnessGram® measures and a self-efficacy rating (predictor variables taken from the GSES. FitnessGram® measures include BMI, aerobic capacity, push-ups, curl-

ups, and sit and reach.

The following normal distributions were investigated in a parametric multiple regression test so a reliable prediction could be made from the data: adequate sample size, independence, linearity, homoscedasticity, noncollinearity, and normality (Field, 2013; Warner, 2013). According to Field (2013), one problem with normality significance tests is that results can be skewed by indicating significance for small effects with a large sample. Furthermore, multiple regression analyses utilizing large sample sizes have demonstrated robustness against violations of normality (Lind et al., 2013). To further analyze the data, histograms were created and visually examined for normality.

Adequate Sample Size

According to Gall et al. (2007), the rule for conducting multiple regression analysis is to "increase sample size by at least 15 individuals for each variable that will be included in the multiple regression analysis" (p. 360). According to Field (2013), a sample of 104 plus one for each predictor variable must be obtained. A sample size of 183 was obtained and the essential assumptions were verified.

Independence

The Durbin-Watson statistic was used as evidence of independence of residuals (Field, 2013; Warner, 2013) and was 1.534 for $H_0$1, 1.544 for $H_0$2, and 1.476 for $H_0$3. This statistic can differ between 0 and 4 with a value of 2 determining the residuals are independent of each other (Field, 2013; Warner, 2013). This statistic suggests that the assumptions of residual independence exist as it is relatively close to 2, the statistic of zero autocorrelation ($k = 6$, $dl = 1.543$, $du = 1.708$) (Field, 2013).

Linearity

Visual inspection of the scatter plot for each of the predictor variables and the criterion variables was examined to determine that linearity (Warner, 2013). The assumption was met.

Homoscedasticity

An initial inspection of the standard residual/unstandardized predicted scatter plot demonstrated that the criterion variables exhibited similar amounts of variance for each predictor variable (Field, 2013). A visual inspection of the predictive versus the residual scatter plot demonstrates that both the assumptions of linearity and homoscedasticity are met (Warner, 2013).

Normality

Both the Kolmogorov-Smirnov and Shapiro-Wilk tests indicate the likelihood of non-normal distributions (Field, 2013). However, Warner (2013) recommends that these tests "be interpreted in conjunction with histograms, P-P or Q-Q plots, and the values of skew and kurtosis," as both tests are prone to demonstrate significance when "the scores are only slightly different from a normal distribution" (p. 153).

Therefore, normality was also examined by viewing histograms and P-P plots (Warner, 2013). The criterion variables, Reading, Language Arts, and Math all demonstrated a positive skewness and negative kurtosis of .57 (*SE* = .18) skewness, and -.06 (*SE* = .35) kurtosis for Reading; .622 (*SE* = .18) skewness, and -.60 (*SE* = .35) kurtosis for Language Arts; and .62 (*SE* = .18) skewness and -.45 (*SE* = .35) kurtosis for Math.

Likewise, an exploration of each predictor variable was run to identify the influence of skewness and kurtosis. Normality was only observed in the independent variables, BMI, sit and reach, and self-efficacy. However, Field (2013) states that the central limit theorem lessens the

need for worry concerning the assumption of normality in larger samples. He continues that when samples are "fairly large, outliers are a more pressing concern than normality" (para. 5).

Results

Data Screening

All variables were screened for normality, inconsistencies and multivariate outliers (Warner, 2013). Data diagnosis was performed on each of the predictor variables and on the criterion variable pertaining to data inconsistencies, outliers, and normality. Two outliers were identified by looking for z-scores that were greater than +/-3.29 (Field, 2013). These two multivariate outliers were identified and excluded from the sample size. Case number 11 had an extremely high sit and reach score (predictor variable) and case number 74 had and extremely low self-efficacy score (predictor variable).

Null Hypotheses

$H_0$1: A multiple linear regression analysis was used to test the first null hypothesis: There is no predictive linear relationship from the measures of BMI, aerobic capacity, push-ups, curl-ups, sit and reach, and self-efficacy on academic Reading achievement scores of eighth grade students. Data diagnosis was performed on each of the predictor variables and on the criterion variable pertaining to data inconsistencies, outliers, and normality. Two outliers were identified by looking for z-scores that were greater than +/-3.29 (Field, 2013). The assumptions of linearity and homoscedasticity were reviewed by visually inspecting scatter plots. The scatter plots indicated linear relationships between the predictor variable and the criterion variable (Field, 2013). All tests were conducted using a .05 alpha level. Furthermore, the variance inflation factor (VIF) and tolerance statistics indicate that no multicollinearity exists within the model (Warner, 2013).

The first null hypothesis was rejected at an alpha level of .05. This analysis was used to determine that six predictor variables (BMI, aerobic capacity, push-ups, curl-ups, sit and reach, and self-efficacy) significantly predicted Reading CRCT scores, $F(6, 174)= 28.78$, $p < .001$. Additionally, the multiple correlation coefficient for the model was $R = .69$, $R^2 = .47$, and adj. $R^2 = .45$. Thus, these six independent variables accounted for 47% of the model's variance. Three of the six independent variables were statistically significant predictors of Reading achievement: ($p < .05$), aerobic capacity ($p = .007$), push-ups ($p = .002$), and curl-ups ($p = .03$). Conversely, BMI ($p = .18$), sit and reach ($p = .20$), and self-efficacy ($p = .13$) were not statistically significant predictors of Reading scores on the CRCT. However, this is a valid model for predicting CRCT Reading scores, because at least half of the dependent variables are valid predictors of the dependent variable (Field, 2013). See Table 2 for the regression coefficients.

Table 2

Contribution of Predictor Variable for Criterion Variable (Reading) (N = 181)

Variable	*B*	*SE B*	β	*t*	Sig	Zero-order Correlation	Partial Correlation
BMI	-.93	.69	-.16	-1.34	.18	-.61	-.10
Aerobic Cap (AC)	-4.57	1.66	-.31	-2.75	.007	-.63	-.20**
Push-ups (PU)	-2.65	.82	-.24	-3.20	.002	.28**	.23**
Curl-ups (CU)	1.09	.50	.24	2.13	.03	.58**	.16*
Sit and reach (SR)	1.62	1.29	.07	1.26	.20	.20	.09
Efficacy Scale (ES)	.80	.53	.13	.15	.13	.13	.11

Note. *$p < .05$, **$p < .01$.

A Pearson product-moment correlation coefficient was conducted to measure the strength of the relationship between the variables. A multiple linear regression analysis was used to evaluate the first null hypothesis that there is no predictive linear relationship from the measures of BMI, aerobic capacity, push-ups, curl-ups, sit and reach, and self-efficacy on academic Reading achievement scores of eighth grade students ($N = 181$). See table 3. Preliminary analysis

determined that the assumptions of linearity and homoscedasticity were met. Conversely, the data demonstrated non-normal distributions and the assumption of normality was in question. Fields (2013) states, however, that the central limit theorem lessons any cause for alarm where the assumption of normality in larger samples is concerned. Both the population and sample sizes were relatively large in comparison to the number of predictor variables; a multiple linear regression was employed, and significant evidence was found to reject the null hypothesis.

Table 3

Correlations of Predictor Variables for Criterion Variable (*Reading*) (*N* =181)

Variable	Reading	Sig
Aerobic Cap	-.64**	.001
Push-ups	.28**	.001
Curl-ups	.59**	.001

Note. $^{**}p < .01$.

Significant relationships were found between the criterion variable, Reading, and three predictor variables: aerobic capacity, push-ups, and curl-ups. Aerobic capacity had a large effect size and a negative correlation, meaning that as aerobic capacity decreased, Reading increased. However, push-ups, small effect size, and curl-ups, large effect size, correlated positively with the criterion variable, Reading. Figures 1, 2, and 3 display the scatter plot of the relationship between the significant predictor variable and the criterion variable, Reading.

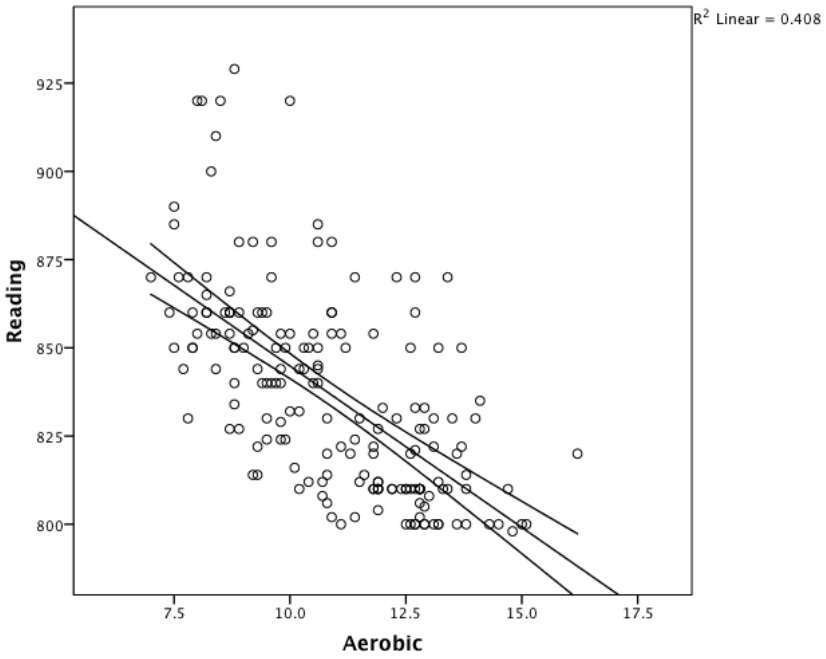

Figure 1. Scatter plot between aerobic capacity and Reading.

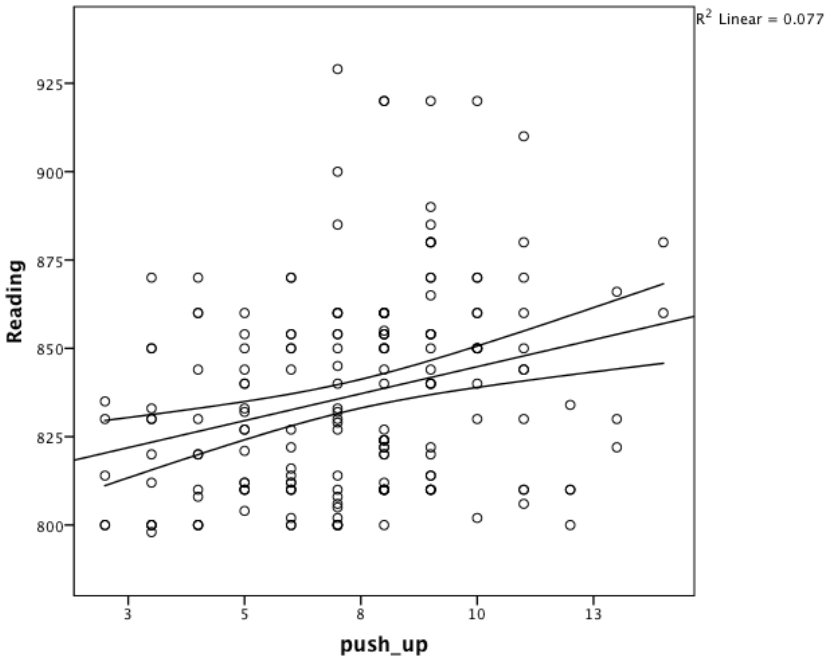

Figure 2. Scatter plot between push-up and Reading.

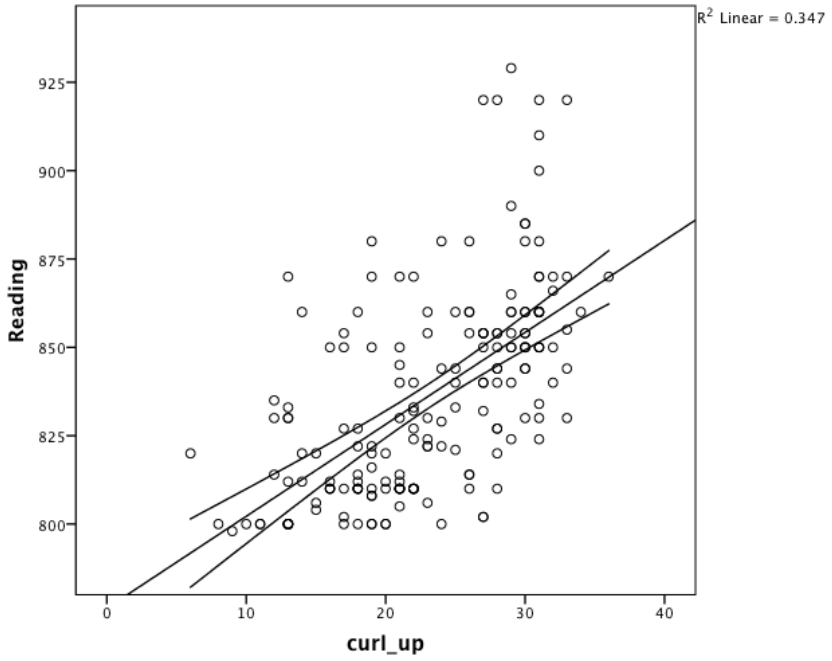

Figure 3. Scatter plot between curl-up and Reading.

$H_0$2: A multiple linear regression analysis was used to test the second null hypothesis: There is no predictive linear relationship from the measures of BMI, aerobic capacity, push-ups, curl-ups, sit and reach and self-efficacy on academic Language Arts achievement scores of eighth grade students. Data diagnosis was performed on each of the predictor variables and on the criterion variable pertaining to data inconsistencies, outliers, and normality. Two outliers were identified by looking for z-scores that were greater than +/-3.29 (Field, 2013). The assumptions of linearity and homoscedasticity were reviewed by visually inspecting scatter plots. The scatter plots indicated linear relationships between the predictor variable and the criterion variable (Field, 2013). All tests were conducted using a .05 alpha level. Furthermore, the variance inflation factor (VIF) and tolerance statistics indicate that no multicollinearity exists within the model (Warner, 2013).

The second null hypothesis was rejected at an alpha level of .05. This analysis was used to determine that six independent variables (BMI, aerobic capacity, push-ups, curl-ups, sit and reach, and self-efficacy) significantly predicted Language Arts CRCT scores, $F(6, 174) = 20.23$, $p < .001$, adj $R^2 = .39$ and $R^2 = .41$. Thus, these six independent variables account for 41% of the variance. Four of the six independent variables were statistically significant predictors of Language Arts achievement ($p < .05$): aerobic capacity ($p = .04$), push-ups ($p < .001$), curl-ups ($p = .005$), and self-efficacy ($p = .02$). Conversely, BMI ($p = .63$) and sit and reach ($p = .35$) were not statistically significant predictors of Language Arts scores on the CRCT. Therefore, this is a valid model for predicting CRCT Language Arts scores, because more than half of the dependent variables are valid predictors of the dependent variable (Field, 2013). See Table 4 for the contribution of predictor variables.

Table 4

Contribution of Predictor Variable for Criterion Variable (Language Arts ELA) (N=181)

Variable	*B*	*SE B*	β	*t*	Sig	Zero-order Correlation	Partial Correlation
BMI	-.35	.75	-.06	-.47	.63	-.53	-.03
Aerobic Cap (AC)	-3.62	1.79	-.24	-2.02	.04	-.56*	-.15*
Push-ups (PU)	-3.52	.89	-.31	-3.93	.001	.20**	.28**
Curl-ups (CU)	1.56	.54	.34	2.84	.001	.54**	.21**
Sit and reach (SR)	1.28	1.39	.05	.92	.35	.18	.07
Efficacy Scale (ES)	1.27	.57	.20	2.21	.02	.50	.51*

Note. *$p < .05$, **$p < .01$.

A Pearson product-moment correlation coefficient was conducted to measure the strength of the relationship between the variables. A multiple linear regression analysis was used to evaluate the second null hypothesis that there is no predictive linear relationship from the measures of BMI, aerobic capacity, push-ups, curl-ups, sit and reach, and self-efficacy on academic Language Arts achievement scores of eighth grade students ($N = 181$), as shown in

Table 5. Preliminary analysis determined that the assumptions of linearity and homoscedasticity were met. Conversely, the data demonstrated non-normal distributions and the assumption of normality was in question. Fields (2013) states, however, that the central limit theorem lessens any cause for alarm where the assumption of normality in larger samples is concerned. Both the population and sample sizes were relatively large in comparison to the number of predictor variables, and a multiple linear regression was, therefore, employed, and significant evidence was found to reject the null hypothesis.

Table 5

Correlations of Predictor Variables for Criterion Variable (*Language Arts*) (*N =181)*

Variable	Language Arts	Sig
Aerobic Cap	-.59**	.001
Push-ups	.20**	.001
Curl-ups	.54**	.001
Self-Efficacy	.51**	.001

Note. $^{**}p < .01$.

Significant relationships were found between the criterion variable and four predictor variables: aerobic capacity, push-up, curl-up, and self-efficacy. Aerobic capacity had a large effect size and a negative correlation, meaning that as aerobic capacity increased, Reading decreased. However, push-ups, small effect size, curl-ups, large effect size, and self-efficacy, large effect size, correlated positively with the criterion variable, Language Arts. Figures 4, 5, 6, and 7 display the scatter plots of the significant predictor variable on the criterion variable, Language Arts.

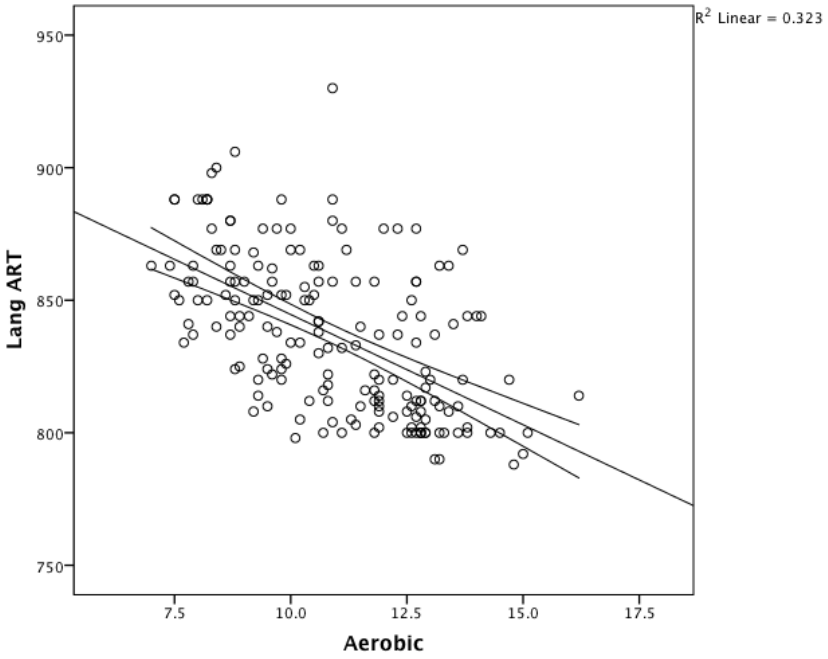

Figure 4. Scatter plot between aerobic capacity and Language Arts.

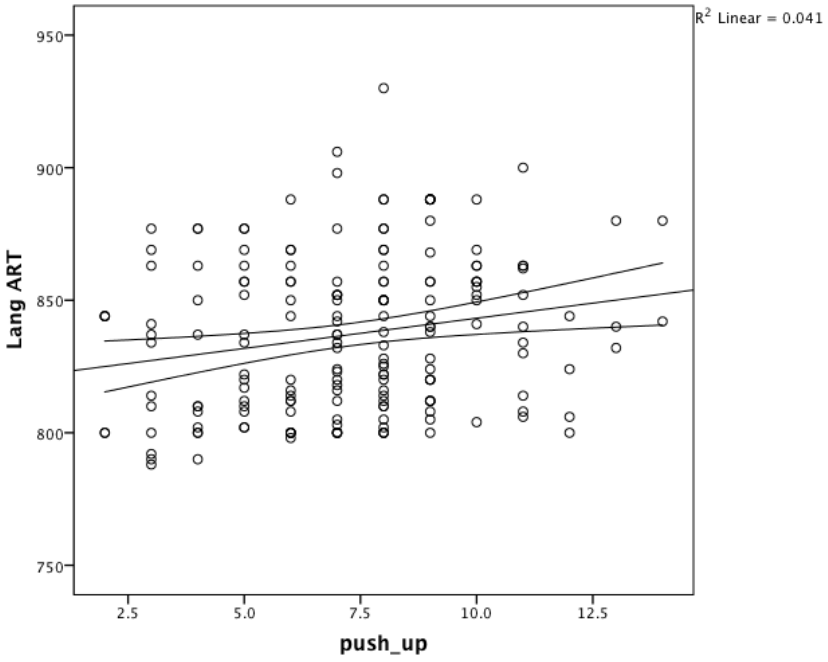

Figure 5. Scatter plot between push-up and Language Arts.

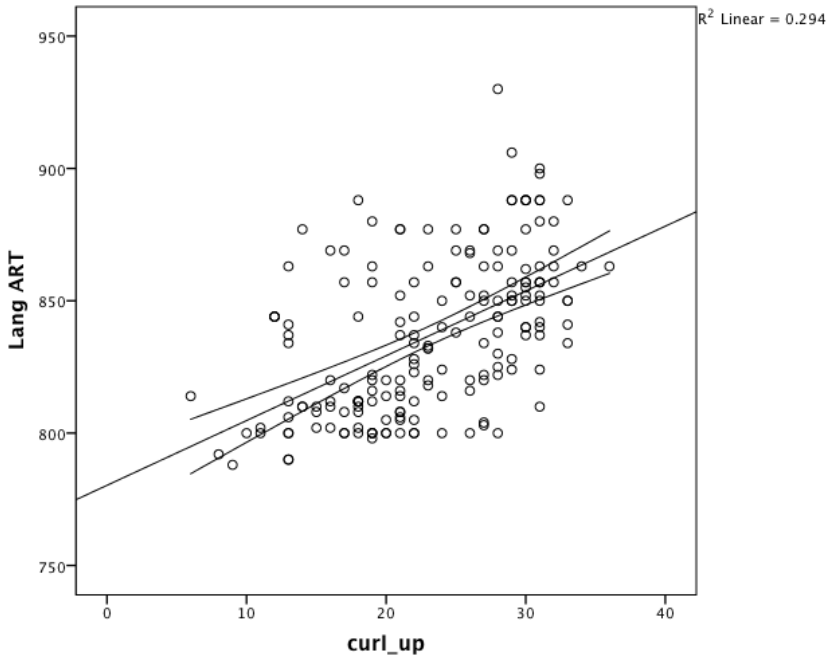

Figure 6. Scatter plot between curl up and Language Arts.

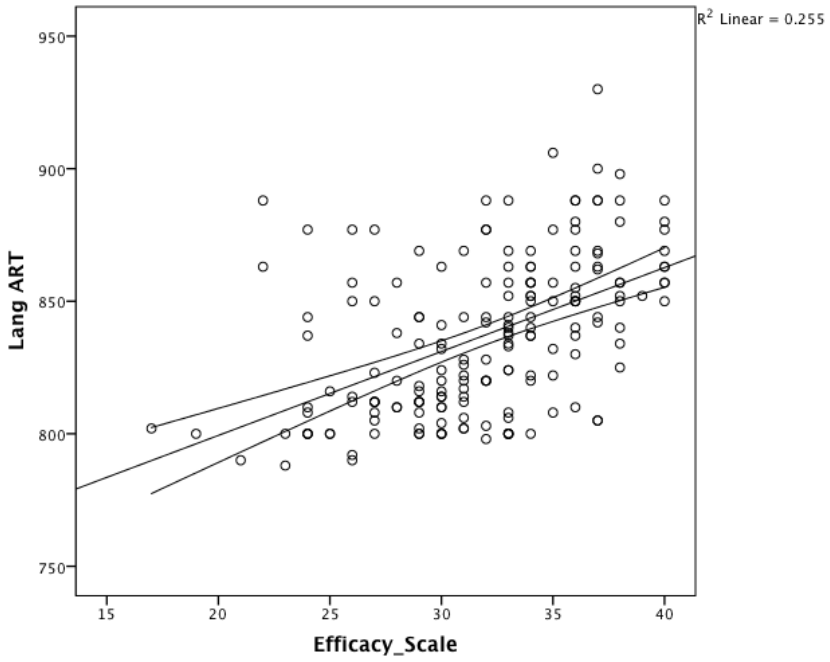

Figure 7. Scatter plot between self-efficacy and Language Arts.

$H_0$3: A multiple linear regression analysis was used to test the third null hypothesis: There is no predictive linear relationship from the measures of BMI, aerobic capacity, push-ups, curl-ups, sit and reach and self-efficacy on academic Math achievement scores of eighth grade students. Data diagnosis was performed on each of the predictor variables and on the criterion variable pertaining to data inconsistencies, outliers, and normality. Two outliers were identified by looking for z-scores that were greater than +/-3.29 (Field, 2013). The assumption of linearity and homoscedasticity were reviewed by visually inspecting scatter plots. The scatter plots indicated linear relationships between the predictor variable and the criterion variable (Field, 2013). All tests were conducted using a .05 alpha level. Furthermore, the variance inflation factor (VIF) and tolerance statistics indicate that no multicollinearity exists within the model (Warner, 2013).

The third null hypothesis was rejected at an alpha level of .05. This analysis was used to determine that six independent variables (BMI, aerobic capacity, push-ups, curl-ups, sit and reach, and self-efficacy) significantly predicted Math CRCT scores, $F(6, 174) = 25.34$, $p < .001$, $R^2 = .47$, adj $R^2 = .45$. Thus, these six independent variables account for 47% of the variance. Three of the six independent variables added statistically significantly to the prediction of Math achievement: ($p < .05$), aerobic capacity ($p = .003$), push-ups ($p = .001$), and curl-ups ($p = .003$). Conversely, BMI ($p = .50$), sit and reach ($p = .46$), and self-efficacy ($p = .10$) provided no statistically significant assistance in predicting Math scores on the CRCT. However, this is a valid model for predicting CRCT Math scores, because at least half of the dependent variables are valid predictors of the dependent variable (Field, 2013). See Table 6 for the contribution of the predictor variables.

Table 6

Contribution of Predictor Variable for Criterion Variable (Math) (N=181)

Variable	*B*	*SE B*	β	*t*	Sig	Zero-order Correlation	Partial Correlation
BMI	-.55	.83	-.08	-.66	.50	-.55	-.05
Aerobic Cap (AC)	-6.03	1.99	-3.04	-3.04	.00	-.62**	-.22**
Push-ups (PU)	-4.21	.99	-.32	-4.25	.00	.20*	.30**
Curl-ups (CU)	1.81	.60	.34	2.97	.00	.58**	.22**
Sit and reach (SR)	-1.13	1.54	-.04	-.73	.46	.09	-.05
Efficacy Scale (ES)	1.03	.63	.14	1.63	.10	.49	.12

Note. *$p < .05$, **$p < .01$.

A Pearson product-moment correlation coefficient was conducted to measure the strength of the relationship between the variables. A multiple linear regression analysis was used to evaluate the third null hypothesis that there is no linear relationship from the measures of BMI, aerobic capacity, push-ups, curl-ups, sit and reach, and self-efficacy on academic Math achievement scores of eighth grade students ($N = 181$), as shown in Table 7. Preliminary analysis determined that the assumptions of linearity and homoscedasticity were met. Conversely, the data demonstrated non-normal distributions and the assumption of normality was in question. Fields (2013) states, however, that the central limit theorem lessons any cause for alarm where the assumption of normality in larger samples is concerned. Both the population and sample sizes were relatively large in comparison to the number of predictor variables, and a multiple linear regression was, therefore, employed, and significant evidence was found to reject the null hypothesis.

Table 7

Means (*M*)*, Standard Deviations* (*SD*)*, and Correlations of Predictor Variables for Criterion Variable* (*Math*) (*N =181)*

	Math	Sig
Aerobic Cap	-.62**	.001
Push-ups	.20**	.001
Curl-ups	.58**	.001

Note. $^{**}p < .01$.

Significant relationships were found between the criterion variable and three predictor variables: aerobic capacity, push-ups, and curl-ups. Both aerobic capacity and curl-ups had large effect sizes. However, aerobic capacity had a negative correlation with Math, where curl-ups positively correlated with Math, meaning that as aerobic capacity increased, Math decreased, and as curl-up increased, Math increased as well. Push-ups, small effect size, also, positively correlated with the criterion variable, Math. Figures 8, 9, and 10 display the scatter plots of the significant predictor variable on the criterion variable, Math.

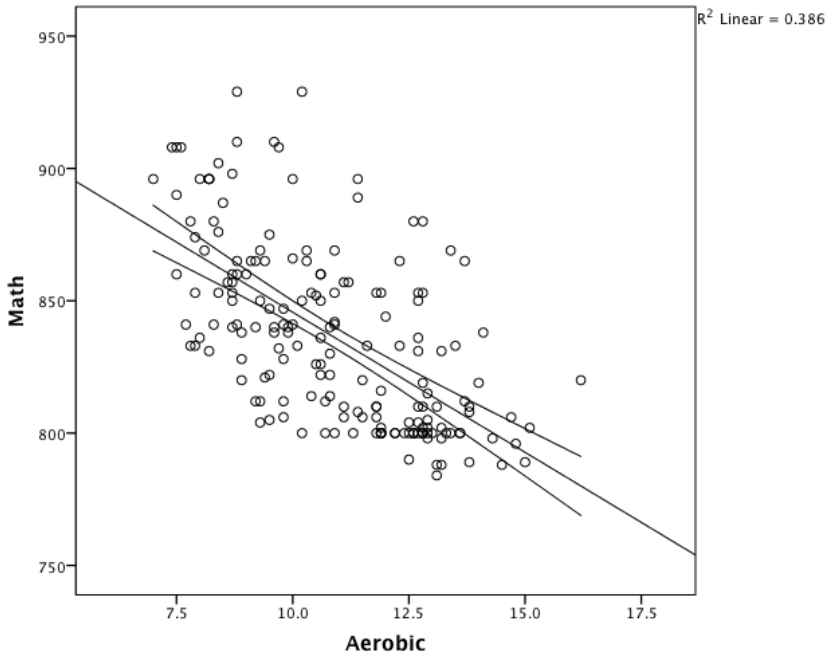

Figure 8. Scatter plot between aerobic capacity and Math.

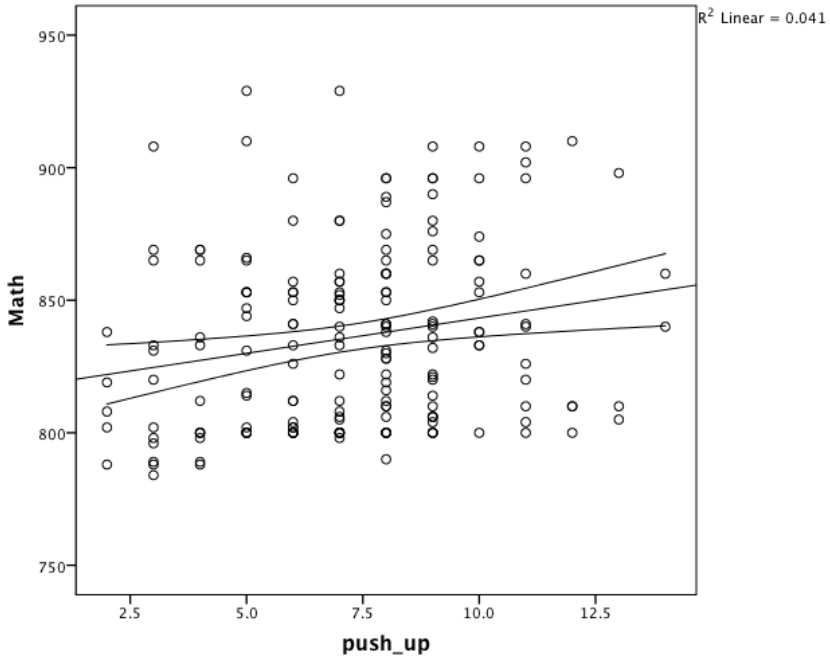

Figure 9. Scatter plot between push-up and Math.

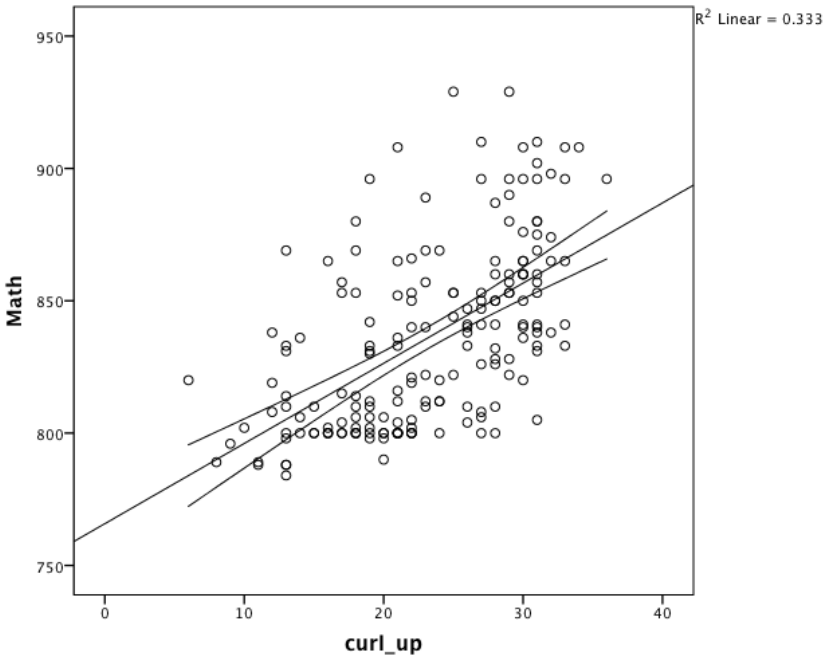

Figure 10. Scatter plot between curl-up and Math.

CHAPTER FIVE: DISCUSSION AND CONCLUSIONS

Chapter Five includes discussion of how measures of fitness influence academic achievement in students in three middle schools in north Georgia. This chapter includes a discussion of the findings, how these are related to the field, and how the information can be used in future research. Each section revisits research literature and compares it to the current findings. Finally, the chapter concludes by considering the implications of obesity, low fitness levels, and decreased self-efficacy on academic success for students in the United States.

The purpose of this correlational multiple regression study was to determine the relationship between BMI, fitness, and self-efficacy, and their prediction of academic performance as measured by the seventh grade Georgia CRCT for students enrolled in the eighth grade in three middle schools in rural north Georgia. BMI was used as a measure of obesity, FitnessGram® data were used as a measure of fitness, and the General Self-Efficacy scale (GSES) measured self-efficacy. The Georgia CRCT was used to measure academic achievement.

The participants for this study included 183 eighth grade students enrolled in physical education classes during the spring semester of 2013, from one of the three middle schools in rural north Georgia. The three schools had similar demographics with regard to socioeconomic status, racial make-up, size of the special education populations, number of LEP, and the size of the student population.

Discussion

This study addressed three null hypotheses with the following results: **H01**: There is no predictive linear relationship from the measures of BMI, aerobic capacity, push-ups, curl-ups, sit and reach and self-efficacy on academic Reading achievement scores of eighth grade students.

The null hypothesis was rejected, given that aerobic capacity, push-ups and curl-ups were statistically significant predictors of Reading scores on the CRCT. Aerobic capacity and push-ups were negatively correlated with Reading scores on the CRCT. Conversely, curl-ups were correlated positively with Reading scores on the CRCT.

$H_0$2: There is no predictive linear relationship from the measures of BMI, aerobic capacity, push-ups, curl-ups, sit and reach, and self-efficacy on academic Language Arts achievement scores of eighth grade students. This null hypothesis was rejected, given that aerobic capacity, push-ups, curl-ups, and self-efficacy were statistically significant predictors of Language Arts scores on the CRCT. Aerobic capacity was negatively correlated with Language Arts scores on the CRCT. Conversely, push-up, curl-up, and self-efficacy were correlated positively with Language Arts scores on the CRCT.

$H_0$3: There is no predictive linear relationship from the measures of BMI, aerobic capacity, push-ups, curl-ups, sit and reach, and self-efficacy on academic Math achievement scores of eighth grade students. This null hypothesis was rejected, given that aerobic capacity, push-ups, and curl-ups were statistically significant predictors of Math scores on the CRCT. Both Aerobic capacity and curl-up had a large effect sizes. However, aerobic capacity had a negative correlation with Math scores on the CRCT, whereas curl-up and push-up were positively correlated with the Math scores on the CRCT.

The results of the study demonstrated that a significant relationship existed between Aerobic capacity, push-ups, curl-ups, and self-efficacy and academic achievement for eighth grade middle school students in three north Georgia schools. In this section, the findings are discussed in regard to the literature.

Physical Fitness and Academic Achievement

Gans (2011) asserted that people have grown up in a society where being overweight is a norm instead of an exception. McMurtry and Jelalian (2010) found that slightly more than 16% of children ages 2-19 in the United States were overweight or obese as defined by having BMIs greater than or equal to the 95th percentile, and 34% were either overweight or obese as defined as having a BMI greater than the 85th percentile. Surprisingly, Ward -Smith (2010) found that many individuals suffering with BMI ratios over 30 believed that, "their weight is not within the range of overweight or obese" (p. 4). Many people do not know what a healthy weight should be. Ogden et al. (2002) found that teens with BMI indexes at obese or overweight levels were at higher risk of being obese and overweight as adults, particularly by age 35.

In this study, FitnessGram® fitness indicators included BMI, aerobic capacity, muscular strength, endurance, and flexibility. The findings from several studies that examined the relationship between physical fitness and academic achievement support the rejection of $H_0$1, $H_0$2, and $H_0$3. Grissom (2005) conducted a correlational study with 884,715 students and found a positive relationship between fitness and academic achievement. Grissom's study indicated a stronger correlation between the variables for females as compared to males. Furthermore, his study indicated a stronger correlation between those of a higher socioeconomic status as compared to those of lower socioeconomic status. In a longitudinal study, Carlson et al. (2008) examined the relationship between physical education and academic achievement in 5,316 students in kindergarten through fifth grade. They found that girls experienced a small increase in mathematics and reading tests when they had 70–300 minutes of physical activity per week; this same effect was not observed for boys.

Coe, Peterson, Blair, Schutten, and Peddie (2013) examined the association between

performance on the Math and Social Studies Michigan Education Assessment Program (MEAP) test among 1,701 third, sixth, and ninth grade students from five school districts. They found that sixth- and ninth-grade students with high fitness scored significantly better on the Math and Social Studies MEAP than less fit students. In addition, muscular strength and endurance were significantly and positively associated with academic achievement in all grades (Coe et al., 2013). Chen, Fox, Ku, and Taun (2013) explored the relationship between various forms of fitness and academic performance among 669 adolescents. Physical fitness included cardiovascular fitness, sit-and-reach flexibility, bent-leg curl-ups, and BMI. Academic performance was measured by "the mean score of Language, Mathematics, Science, and Social Studies from the school records" (Chen, Fox, et al., 2013, p. 632). Regression analyses indicated that cardiovascular fitness (CV fitness) was significantly associated with better academic performance.

Meta-analytic studies also support the relationship between physical fitness and academic achievement. After conducting a meta-analytic review of 10 cross-sectional studies examining the influence of physical education and physical activity upon youth's academic achievement, Trudeau and Shephard (2008) concluded there is a positive association between academic performance and physical activity. The CDCP (2010b) also conducted a review of 14 studies that examined the relationship between physical education courses or school-based physical activity and students' academic performances. They found that "Eleven of the 14 studies found one or more positive association between school-based physical education and indicators of academic performance" (CDCP, 2010a, p. 5). In a 2013 study conducted at the American College of Sports Medicine, Reynolds (2013) concluded that children who exercised vigorously before a math test performed better than their peers who had been sitting quietly.

Evidence of the relationship between physical fitness and youth's academic achievement is strong but not entirely conclusive; as such, additional longitudinal research is needed.

This study found that BMI was not a statistically significant predictor of academic achievement, as it was not significantly associated with any of the CRCT scores. This finding is inconsistent with some previous research, as the research on the relationship between BMI and students' academic achievement is mixed. For example, Chen, Fox, et al. (2013) found that BMI was not related to academic performance among 669 adolescents. However, other researchers found that middle school students' BMI and academic achievement are inversely related. Jong-Hyuck and Wi-Young (2013) examined the relationship between academic performance and obesity/overweight among 72,399 South Korean students in grades 7-12. Through multivariate analysis, they found that overweight and obese boys and girls had greater odds of having poor and very poor academic performance. MacCann and Roberts (2013) studied 383 eighth-grade students to determine the relationship between BMI and self-reported and parent reported grades. MacCann and Roberts (2013) found that obese students had significantly lower grades than normal-weight students.

Research documented the relationship between fitness and BMI and demonstrates that individuals able to score high on fitness tests tend to be healthier and have a reduced fat ratio as compared to individuals unable to perform as well (Castelli et al., 2007). Castelli et al. (2007) found that students perceived as physically fit were more likely to have higher levels of academic achievement. They also found that students who score high on fitness tests tend to be healthier and have lower fat ratios than less fit individuals (Castelli et al., 2007). Fitness is recognized as the exercise component, or the value of how "in shape" an individual is; if an individual has high fitness scores, it is likely the person will also have lower BMI scores

(Chomitz et al., 2009).

Researchers suggest that BMI is directly related to self-esteem, self-efficacy, and depression, and that these factors moderate the relationship between BMI and academic achievement (Annesi, 2011; Ashmore et al., 2008; Benson et al., 2013; Clark et al., 2009; Griffiths et al., 2011). While other researchers also found that BMI and academic achievement are often directly associated with social stigmas such as teasing, it is not clear without a longitudinal study if BMI increases prior to the changes in academic achievement or if the failures in academic achievement are acting upon the BMI results.

Self-Efficacy and Academic Achievement

Self-efficacy contributes to the mental well-being of students and is a positive influence on academic achievement by these students (Carey et al., 2008). High levels of self-efficacy empower students to reach goals that seem unattainable (Bandura, 1997). In contrast, a low level of self-efficacy increases feelings of despair and decreases motivation (Bandura, 1997). In this study, self-efficacy was positively correlated with Language Arts CRCT scores. No relationship was found between self-efficacy and Reading and Math CRCT scores. This finding for Language Arts is consistent with the findings from a study by Bong, Cho, Ahn, and Kim (2012). Bong et al. (2012) examined the relationship between self-efficacy and academic achievement in language arts among 234 elementary and 512 middle school students in Korea. Students' scores on first semester final exams for mathematics and Korean language measured academic achievement. The researchers found a strong statistically significant correlation between the middle school students' self-efficacy and their achievement in language arts.

This study confirms a relationship between self-efficacy and academic achievement in Language Arts. However, it is likely that other variables directly and indirectly influence the

relationship between self-efficacy academic achievement. These findings contribute to the expanding research on the effects of obesity, decreased fitness levels, and lower self-efficacy on academic achievement within school systems. Other studies found similar relationships between students' psychological factors and variables such as academic achievement (Glazebrook et al., 2011, Griffiths et al., 2011; Rancourt & Prinstein, 2010).

Conclusions

Many researchers in the past decade examined the relationships among physical fitness, self-efficacy, and academic achievement (Ahriad et al., 2007; Aktop, 2010; Browman, 2003; Castelli et al., 2007; Glanz et al., 2002). The purpose of this correlational study was to examine BMI, fitness, and self-efficacy and their prediction of academic achievement as measured by the Georgia CRCT. This study was built on the premise that increased levels of fitness and self-efficacy lead to increased scores on the Georgia CRCT. Data included scores from FitnessGram® —which included BMI, aerobic fitness, muscular strength, and endurance and flexibility—composite scores from the GSES, and scaled scores from the Reading, Math, and Language Arts tests on the Georgia CRCT. A correlational study does not provide the means to infer causation, so results should be interpreted with discretion. Relationships between the variables may be due to variables not analyzed and beyond the researcher's control.

While many facets of education affect academic achievement, this study clearly demonstrated that academic achievement as measured by the Georgia CRCT is related to physical fitness as measured by FitnessGram®and emotional fitness as measured by the GSES of eighth grade students in select schools in north Georgia. The results of this study can inform policies and practice at the classroom, school district, state, and national level. Educators must find ways to (a) reduce obesity, (b) improve fitness, and (c) support student self-efficacy to

create an educational environment that supports academic achievement for all students.

Implications

In this study, a correlation was found between aerobic capacity, push-ups, curl-ups, self-efficacy and student academic achievement as measured by scores on the Georgia CRCT in the areas of Reading, Language Arts, and Math. The classroom setting is the ideal place to reach students and put into place some practices to increase fitness, reduce BMI, and improve self-efficacy. Nearly 53 million students in the United States between the ages of 5 and 17 attend classes for at least 6 hours a day (Synder & Hoffman, 2001). Recommendations for future practice include (a) identifying students at risk for physical and/or emotional problems; (b) designing targeted assistance programs to address these at-risk students including parent involvement programs; (c) utilizing action research to determine the effectiveness of these programs; (d) reporting results at a district, state, and national level; and (e) becoming proactive in promoting policies that promote physical and mental health in students.

Students attending middle school are not required to take physical education as one of their electives, making it difficult to utilize FitnessGram® to identify at-risk students within the middle school setting. Health educators can help identify students whose fitness levels are not at the healthy fitness zones by taking some simple measurements of height and weight in the classroom. In addition to BMI, educators may need to use psychosocial surveys, nutrition assessments, and physical assessments. As BMI is recognized as a valuable method for identifying obesity and a chosen method in programs such as FitnessGram®, it is essential that future researchers consider this method as a source for assisting in determining at-risk students and providing assistance early, in order to reduce the likelihood that obesity will continue into adulthood or negatively influence academic achievement.

Counselors who form close relationships with students can identify students who are experiencing low self-efficacy. Informing students of the dangers of obesity, low fitness levels, and low self-efficacy levels may guide students in making choices that will improve the overall quality of health in their lives.

In conjunction with ongoing discussion and research in regards to the benefits of decreased BMI, increased fitness levels, increased self-efficacy and their prediction on academic achievement, data unearthed as a result of this study support some current research related notions, yet refute others. The results of this study indicate aerobic capacity, push-ups, and curl-ups but not necessarily BMI, self-efficacy, and flexibility as predictor variables for academic achievement. Initially, it should be noted that BMI is not the most accurate method of ascertaining an individual's level of body fat because it tends to overestimate the amount of fat and makes no differentiation between fat mass and muscle mass (CDCP, 2010). For the predictor variables, (aerobic capacity, curl-ups, and push-ups) to have a significant correlation on every criterion variable in the study (Reading, Language Arts, Math) seems logical. A study conducted by Lees and Hopkins (2013) indicated that aerobic physical activity (APA) had a positive impact on children's cognition and psychosocial function. Carlson et al. (2008) conducted a study among a random group of students in which only the girls were subjected to a greater degree of physical activity, and only their academic scores as opposed to the boys showed a slight improvement. Coe et al. (2013) investigated the predictor variables BMI, aerobic capacity, curl-ups, push-ups, and sit and reach and found that the predictor variables, aerobic capacity, push-ups, and curl-ups were the only variables to have a significant impact on academic achievement. Students used for this study were not required to take physical education, and therefore the results have to be interpreted lightly since students that enjoy

physical activity and are perhaps more fit than the rest of their grade level peers routinely take physical education classes. It is possible that self-efficacy rose as one of the predictor variables that indicated significance to the criterion variable, Language Arts, because it tests grammar, a concept many students feel they cannot master. Perhaps their sense of self-efficacy helped them master the content of that particular test.

Research-Based Programs

Several research-tested intervention programs (RTIPs) that target overweight/obese individuals with low fitness levels and low self-efficacy include New Moves and Vtrim-Your Online Partner for Healthy Weight (National Cancer Institute, 2010). The New Moves class is a physical education class for girls that focuses on behavioral changes through a supportive environment, making them feel comfortable and motivated to improve their health and fitness (National Cancer Institute, 2010). In addition, Vtrim –Your Online Partner for Healthy Weight provides similar support by offering online, therapist-led weight loss and fitness goals (National Cancer Institute, 2010). Both programs are offered throughout the United States in place of traditional physical education classes.

In the past decade, researchers found that obesity is directly correlated with depression, self-esteem, self-efficacy, health, and academic achievement (Aktop, 2010; Ashmore et al., 2008; Cin Cin & Holub, 2011; Puder & Munsh, 2010). Government programs and legislation worked to acknowledge the problem of obesity, particularly in children, and to implement programs and incentives that can increase the likelihood those children will be able to meet healthy objectives. Some of these programs include providing healthier lunches, requiring physical education, and promoting the use of health initiatives in public schools. School districts would benefit from understanding how their students' BMI, fitness levels, and self-efficacy

results compare to their academic achievement in state testing. Many schools and legislative initiatives are dedicated to reducing obesity in the student population. Some examples include developing healthy food plans, counseling for good nutritional habits, parent consultations, working with teachers and administrators to implement healthy eating programs, or to hire staff members dedicated to increasing awareness or counseling opportunities associated with the reduction of obesity in students (Satcher, 2005; Torre et al., 2010). Effective programs and incentives that can increase the likelihood those children will meet healthy objectives include CDCP-funded programs in Georgia such as "Take Charge of Your Health" (CDCP, 2010a). This organization involves state and local leaders that provide workshops at schools, worksites, early childcare facilities, and churches to promote healthy lifestyle habits. Another program, "Cooking Matters Georgia," offers hands-on cooking classes with nutritional, low-cost menus that promote healthy eating habits (CDCP, 2010a).

School-Based Programs

Improving fitness. Fitness programs in schools should be focusing on life-long activities as opposed to individual or team sports (Ratey, 2008). Lifelong fitness is defined as engaging in exercise that promotes and maintains overall fitness so that an individual can continue to live a healthy lifestyle (Nunley, 2013). Several recent studies conducted by Vinciullo and Bradley (2009) investigated the Coordinated School Health Program (CSHP) developed by the Centers for Disease Control and Prevention (CDCP). The CDCP developed this program to provide schools with health education, health services, nutrition services, counseling, and social services to promote lifelong fitness (Vinciullo & Bradley, 2009).

Supporting student self-efficacy. Students can learn the skills required to achieve self-efficacy by making personal goals and aspirations (Marzano, 2012). High student self-efficacy

can be achieved through school-wide programs such as New Moves and Vtrim, which help students identify their short-term and long-term goals and monitor their progress. Students need to understand that as their circumstances change, they may need to revise their goals. Students need to identify want they want to accomplish and who will help them along their path to success (Marzano, 2012).

Developing targeted assistance programs. Developing targeted assistance programs to increase fitness and increase self-efficacy within the middle school curriculum requires the support of educators and policymakers. A targeted assistance school is a school that receives federal funds based on the needs of a specific group of children (GaDOE, 2012). These funds provide interventions and programs such as CSHP, New Moves, and Vtrim. Interventions that embrace the concept that physical and mental health has a direct relationship on the academic success of students are essential for program and intervention success.

Determining program effectiveness. School-based health programs are one of the most efficient strategies that a school might use to prevent major health and social problems (CDCP, 2010). Determining program effectiveness requires that educators and administrators take baseline measurements of BMI, fitness levels, and self-efficacy before implementing any intervention. An effective school-based program should incorporate policies that advocate for the provision of services that will meet the needs of the diverse population of middle school students (CDCP, 2010). The CDCP developed school health education profiles that schools may utilize to assess the effectiveness of their programs. Students are administered surveys that assess their comprehension of health promotion and disease prevention. In addition, educators analyze results and implement the necessary interventions to increase fitness and self-efficacy. These interventions help students analyze the influence of peers, culture, and technology on their

current health status. The data from these surveys are used to furnish information to local and state agencies on nutrition practices, physical education, physical activity programs, and mental health issues. The CDCP also offers technical support to school systems implementing these profiles. In addition to the current health programs being used by the schools, it is possible that schools can use health coordinators to evaluate existing programs or make changes to systems as needed.

Revise and refine programs. In Graser et al. (2011), students who used self-testing methods showed improvement, and this type of empowerment may be beneficial to students. During this study, students were engaged in self-assessments as part of FitnessGram®. Programs with school health coordinators have been used in some schools throughout the United States; however, they are not popular (O'Brien et al., 2010). There are other types of programs, in addition to FitnessGram®, such as Steps to Active Kids (STAK), which are designed to be implemented on many different levels, such as the schools, family, and community levels (Glazebrook et al., 2011). These programs should be evaluated to determine how the schools could best use them.

Report results. The move toward accountability to develop effective programs that meet the needs of all students continues to challenge educators and school districts throughout the United States. Best practices that are meeting the needs of students and producing positive test results need to be reported to benefit surrounding districts with similar populations. The Healthy, Hunger-Free Kids Act of 2010 resulted in a number of schools working to change national school lunch programs and to implement programs such as the backpack program that fills students' backpacks with healthy foods they can take home to their families. Few schools have evaluated how these programs directly influenced their students, and little research exists

on the percentages of obesity, low self-efficacy, and deficient fitness levels of these children prior to these changes. When schools report changes, it can influence schools that have not implemented special programs to address the physical and mental health of their students. Finally, collecting results from programs enables schools to make corrections in their programs as needed.

Promote effective policies. Schools have many models that address health-related issues, particularly Promoting Universal Longevity via School-family Ecologies (PULSE), which is evidence-based and applies to the entire school curriculum (Anderson & Phelps, 2009). This curriculum is designed to change behaviors of students and their families via proactive and long-term interventions. Promoting effective policies means more than just adding programs to the school: it requires monitoring and maintenance to remain successful (Villas et al., 2006). Promotion of policies requires the participation of the staff and parents. Students and schools benefit from parental involvement in school initiatives, particularly in understanding and meeting school requirements on state required high-stakes testing, which students must endure many times during their education (Joshi & Howat, 2011). Involving parents could include introducing parents to the new requirements issued in legislation for nutritional and physical education. Another example would be to create opportunities to make parents aware of research demonstrating the success of increased physical activity on students' emotional, physical, and school health, and how to apply this information to their own lifestyles.

Limitations

While others monitored this study and checked the results for accuracy, as with all studies, there are some delimitations and limitations. These include the following:

1. If the study is repeated, different populations may produce different results

(population validity).

2. The sample was limited due to failure of some students to complete the entire process.
3. Students with disabilities were not disaggregated; some of these students may have taken the CRCT with significant accommodations.
4. There may have been inaccurate administration of tests (instrumentation).
5. Students left the school system or dropped out of physical education classes prior to completion of the study (experimental mortality or attrition).
6. Variations in physical and emotional maturation among seventh grade students may have skewed results on fitness results and the GSES (maturation).
7. Correlational research does not provide the means to infer causation.
8. It is assumed that contributors and respondents understood the requirements of the study and completed their parts accurately.
9. FitnessGram® data collected in the fall of 2013 may not precisely reflect students' actual fitness levels at the time of the spring 2013 administration of the CRCT.

Recommendations for Further Research

To assist in closing the gap in research regarding the relationships between BMI, fitness, and self-efficacy and their prediction of academic success, a study that expands to a more generalizable sample would be beneficial. The present study was restricted to mostly Caucasian students in rural north Georgia where diversity is limited. Sampling other regions of the United States may result in differences that enable researchers to examine other variables. In addition, expanding the study to include multiple grade levels and including gender and socioeconomic differences may give researchers deeper insight into the relationships between the variables.

A longitudinal study would establish whether an increase in BMI results in decreased academic achievement or if academic achievement was the causal variable. A study to determine causal patterns would require multiple years with the same students, taking results from BMI, academic achievement scores, fitness, and self-efficacy. If developed over 5-7 years, the researcher could recognize patterns in the data based on changes to any of the scores. This type of study would be limited in number of respondents and it could be difficult to follow that sample longitudinally. However, a longitudinal approach would be useful in better understanding causal relationships between these variables.

Future research should include a path analysis of the variables, which would allow the researcher to determine the strength of the relationship between each variable and if any of the variables are dependent on each other to predict the outcome (Jupp, 2006). Applying this principle to this study would allow the researcher to determine whether increased levels of fitness led to increased self-efficacy or increased levels of self-efficacy led to increased academic achievement.

Future researchers should utilize extensive measures of academic achievement as opposed to one test administered to students within a 5-day period. Many other variables not explored by the researcher could affect the outcome of the test scores on the Georgia CRCT. Further research into self-efficacy would enable researchers to determine if they obtained accurate responses from the sample. Repeated administration of the GSES throughout the year may result in different outcomes and enable researchers to acquire a deeper perspective of the participants' self-efficacy.

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Appendix A

FitnessGram Girls' Standards for HFZ

THE PRUDENTIAL FITNESSGRAM
STANDARDS FOR HEALTHY FITNESS ZONE*

GIRLS

AGE	ONE MILE min/sec		PERCENT FAT		CURL-UP # completed		TRUNK LIFT inches		PUSH-UP # completed		BACKSAVER SIT&REACH** inches
5	Time Standards Not Recommended		32	17	2	10	6	12	3	8	9
6			32	17	2	10	6	12	3	8	9
7			32	17	4	14	6	12	4	10	9
8			32	17	6	20	6	12	5	13	9
9			32	17	9	22	6	12	6	15	9
10	12:30	9:30	32	17	12	26	9	12	7	15	9
11	12:00	9:00	32	17	15	29	9	12	7	15	10
12	12:00	9:00	32	17	18	32	9	12	7	15	10
13	11:30	9:00	32	17	18	32	9	12	7	15	10
14	11:00	8:30	32	17	18	32	9	12	7	15	10
15	10:30	8:00	32	17	18	35	9	12	7	15	12
16	10:00	8:00	32	17	18	35	9	12	7	15	12
17	10:00	8:00	32	17	18	35	9	12	7	15	12
17+	10:00	8:00	32	17	18	35	9	12	7	15	12

* Number on left is lower end of HFZ; number on right is upper end of HFZ.
**Test is scored Pass/Fail; must reach this distance to pass.

THE PRUDENTIAL FITNESSGRAM
STANDARDS FOR HEALTHY FITNESS ZONE*

BOYS

AGE	ONE MILE min/sec		PERCENT FAT		CURL-UP # completed		TRUNK LIFT inches		PUSH-UP # completed		BACKSAVER SIT&REACH** inches
5	Time Standards Not Recommended.		25	10	2	10	6	12	3	8	8
6			25	10	2	10	6	12	3	8	8
7			25	10	4	14	6	12	4	10	8
8			25	10	6	20	6	12	5	13	8
9			25	10	9	24	6	12	6	15	8
10	11:30	9:00	25	10	12	24	9	12	7	20	8
11	11:00	8:30	25	10	15	28	9	12	8	20	8
12	10:30	8:00	25	10	18	36	9	12	10	20	8
13	10:00	7:30	25	10	21	40	9	12	12	25	8
14	9:30	7:00	25	10	24	45	9	12	14	30	8
15	9:00	7:00	25	10	24	47	9	12	16	35	8
16	8:30	7:00	25	10	24	47	9	12	18	35	8
17	8:30	7:00	25	10	24	47	9	12	18	35	8
17+	8:30	7:00	25	10	24	47	9	12	18	35	8

* Number on left is lower end of HFZ; number on right is upper end of HFZ.
**Test scored Pass/Fail; must reach this distance to pass.

Dear Julie,
By virtue of this correspondence you have permissions to utilize the FITNESSGRAM® Healthy Fitness Zone standards chart(s) for purposes of your dissertation. Use is limited and restricted to use in accordance with your request below, your dissertation, and dissertation abstract.
Good luck with this final leg in your doctoral candidacy journey!
Catherine

Catherine Vowell
Director of FITNESSGRAM®
The Cooper Institute®
12330 Preston Road | Dallas, TX 75230
O: 972.341.3283 | 800.635.7050 | F: 972.341.3227
cvowell@cooperinst.org| CooperInstitute.org

Appendix B

General Self-Efficacy Test

English version by Ralph Schwarzer & Matthias Jerusalem, 1995

1. I can always manage to solve difficult problems if I try hard enough.
2. If someone opposes me, I can find the means and ways to get what I want.
3. It is easy for me to stick to my aims and accomplish my goals.
4. I am confident that I could deal efficiently with unexpected events.
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.
6. I can solve most problems if I invest the necessary effort.
7. I can remain calm when facing difficulties because I can rely on my coping abilities.
8. When I am confronted with a problem, I can usually find several solutions.
9. If I am in trouble, I can usually think of a solution.
10. I can usually handle whatever comes my way.

Response Format

1=Not at all true 2=Hardly true 3=Moderately true 4=Exactly true

Appendix C

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

September 20, 2013

Julie Hale
IRB Exemption 1673.092013: The Relationship Between Body Mass Index, Fitness, Self-Efficacy, and Their Prediction on Seventh Grade Georgia CRCT Scores in North Georgia

Dear Julie,

The Liberty University Institutional Review Board has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and that no further IRB oversight is required.

Your study falls under exemption category 46.101 (b)(2,4), which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46

> (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:
> (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.
>
> (4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

Please note that this exemption only applies to your current research application, and that any changes to your protocol must be reported to the Liberty IRB for verification of continued exemption status. You may report these changes by submitting a change in protocol form or a new application to the IRB and referencing the above IRB Exemption number.

If you have any questions about this exemption, or need assistance in determining whether possible changes to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,

Fernando Garzon, Psy.D.
Professor, IRB Chair
Counseling

(434) 592-4054

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1971 UNIVERSITY BLVD. LYNCHBURG, VA. 24502 IRB@LIBERTY.EDU FAX (434) 522-0506 WWW.LIBERTY.EDU

Appendix D

CONSENT TO CONDUCT RESEARCH

[redacted]

March, 14, 2013

[redacted] MIDDLE SCHOOL'S CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Project Title: The Relationship Between Body Mass Index, Fitness and Self-Efficacy, and Their Possible Effect on Academic Performance

Researcher: **Julie Hale**

Introduction

Union County Middle School has agreed to take part in a research study being conducted by Julie Hale for a dissertation under the supervision of Dr. Judy Sandlin in the Department of Education at Liberty University in Lynchburg, Virginia. Union County Middle School has been selected to participate as one of three north Georgia schools as required by the study in order to increase the reliability and validity of the research.

Purpose

The purpose of the study is to investigate the relationship between 8th grade students' levels of fitness, self-efficacy and their body mass index, and their possible effect on academic performance in order that needed interventions be considered for implementation.

Research Procedures

Homeroom teachers in the 8th grade will be asked to administer the General Self-Efficacy scale to their homeroom class. The entire questionnaire will take approximately 15 minutes to complete. The researcher will collect all questionnaires upon completion. The researcher will collect data from Fitness Gram results administered by the school's physical education teachers. The researcher will also collect data from a norm-referenced test measuring reading comprehension (CRCT-Spring 2013).

Risk to Participants

Participation in this study does not pose any foreseeable risks or harm to the participants.

Confidentiality

All records will be kept confidential and will not be released without the school system's and/or parents' consent. The identity of each participant will be kept private and all identifying information will be destroyed after initial research data is collected. All data will be stored until destroyed in a locked file cabinet.

[redacted]

[redacted] Principal
[redacted] Assistant Principal

March, 14, 2013

[redacted] MIDDLE SCHOOL'S CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Project Title: The Relationship Between Body Mass Index, Fitness and Self-Efficacy, and Their Possible Effect on Academic Performance

Researcher: **Julie Hale**

Introduction

Union County Middle School has agreed to take part in a research study being conducted by Julie Hale for a dissertation under the supervision of Dr. Judy Sandlin in the Department of Education at Liberty University in Lynchburg, Virginia. Union County Middle School has been selected to participate as one of three north Georgia schools as required by the study in order to increase the reliability and validity of the research.

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Confidentiality

All records will be kept confidential and will not be released without the school system's and/or parents' consent. The identity of each participant will be kept private and all identifying information will be destroyed after initial research data is collected. All data will be stored until destroyed in a locked file cabinet.

[redacted]

System Web Address: [redacted]

[redacted]
"STUDENTS' READHING THEIR HIGHEST POTENTIAL"

[redacted]

CONSENT TO PARTICIPATE IN RESEARCH

Project Title: The Relationship Between Body Mass Index, Fitness and Self-Efficacy and Their Possible Effect on Academic Performance

Researcher: Julie Hale

Introduction

Your district is being asked to take part in a research study being conducted by Julie Hale for a dissertation under the supervision of Dr. Judy Sandlin in the Department of Education at Liberty University in Lynchburg, Virginia. Your district is being asked to participate because this study requires data from three north Georgia schools in order to increase the reliability and validity of the research.

Purpose

The purpose of this study is to investigate the relationship between 8th grade students' levels of fitness, self-efficacy and their body mass index and their possible effect on academic performance in order that needed interventions be considered for implementation.

Research Procedures

Homeroom teachers in the 8th grade will be asked to administer the General Self-Efficacy scale to their homeroom class. The entire questionnaire will take approximately 15 minutes to complete. The researcher will collect all questionnaires upon completion. The researcher will collect data from Fitness Gram results administered by the school physical education teachers. The researcher will also collect data from a norm-referenced test measuring reading comprehension.

Risk to Participants

Participation in this study does not pose any foreseeable risks or harm to the participants.

Confidentiality

All records will be kept confidential and will not be released without the district's consent. The identity of each participant will be kept private and all identifying information will be destroyed after initial research data is collected. All data will be stored until destroyed in a locked file cabinet.

[redacted]

Voluntary Participation

Completion of the General Self-Efficacy questionnaire shows voluntary participation in this study from the participant and they may withdraw from participation at any time without penalty.

Dissemination of Results

The results of this study will be disseminated in the form of a dissertation and articles in academic journals. In addition, the information gathered from the district needs to be stored for 15 years.

Contacts and Questions

If you have any questions about this research study, please feel free to contact Julie Hale at [redacted]

Statement of Consent:

Your signature below indicates that you have read and understood the information provided above, have had an opportunity to ask questions, and agree for your district to participate in this research study.

Superintendent		9/29/13
Title		*Date*
Principal		9/29/13
Title		*Date*
Signature	*Title*	*Date*

[redacted]

Voluntary Participation

Completion of the General Self-Efficacy questionnaire in this study will be administered voluntarily to the participants and they may withdraw from participation at any time without penalty.

Dissemination of Results

The results of this study will be disseminated in the form of a dissertation and articles in academic journals.

Contacts and Questions

If you have any questions about this research study, please feel free to contact Julie Hale at [redacted]

Statement of Consent:

The signatures below indicate that the [redacted] administrators have read and understood the information provided above, have had an opportunity to ask questions, and agree to [redacted]'s participation in this research study.

Superintendent *Title*	4/12/13 *Date*
Principal *Title*	4/12/13 *Date*
Asst. Principal *Title*	4/12/13 *Date*

Voluntary Participation

Completion of the General Self-Efficacy questionnaire shows voluntary participation in this study from the participant and they may withdraw from participation at any time without penalty.

Dissemination of Results

The results of this study will be disseminated in the form of a dissertation and articles in academic journals. In addition, the information gathered from the district needs to be stored for 15 years.

Contacts and Questions

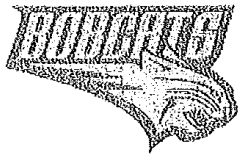
If you have any questions about this research study, please feel free to contact Julie Hale at [redacted]

Statement of Consent:

Your signature below indicates that you have read and understood the information provided above, have had an opportunity to ask questions, and agree for your district to participate in this research study.

Superintendent		3/29/13
Title		*Date*
Principal		3/29/13
Title		*Date*
Signature	*Title*	*Date*

[redacted]



[redacted]

"Destination Graduation"

[redacted]

Jason Kouns
Principal

Doris Sanford
Asst. Principal

Donna Sexton
Counselor

CONSENT TO PARTICIPATE IN RESEARCH

Project Title: The Relationship Between Body Mass Index, Fitness and Self-Efficacy and Their Possible Effect on Academic Performance

Researcher: Julie Hale

Introduction
Your district is being asked to take part in a research study being conducted by Julie Hale for a dissertation under the supervision of Dr. Judy Sandlin in the Department of Education at Liberty University in Lynchburg, Virginia. Your district is being asked to participate because this study requires data from three north Georgia schools in order to increase the reliability and validity of the research.

Purpose
The purpose of this study is to investigate the relationship between 8th grade students' levels of fitness, self-efficacy and their body mass index and their possible effect on academic performance in order that needed interventions be considered for implementation.

Research Procedures
Homeroom teachers in the 8th grade will be asked to administer the General Self-Efficacy scale to their homeroom class. The entire questionnaire will take approximately 15 minutes to complete. The researcher will collect all questionnaires upon completion. The researcher will collect data from Fitness Gram results administered by the school physical education teachers. The researcher will also collect data from a norm-referenced test measuring reading comprehension.

Risk to Participants
Participation in this study does not pose any foreseeable risks or harm to the participants.

Confidentiality
All records will be kept confidential and will not be released without the district's consent. The identity of each participant will be kept private and all identifying information will be destroyed after initial research data is collected. All data will be stored until destroyed in a locked file cabinet.

Voluntary Participation
Completion of the General Self-Efficacy questionnaire shows voluntary participation in this study from the participant and they may withdraw from participation at any time without penalty.

Dissemination of Results
The results of this study will be disseminated in the form of a dissertation and articles in academic journals. In addition, the information gathered from the district needs to be stored for 15 years.

Contacts and Questions

If you have any questions about this research study, please feel free to contact Julie Hale at jhale@union.k12.ga.us.

Statement of Consent:
Your signature below indicates that you have read and understood the information provided above, have had an opportunity to ask questions, and agree for your district to participate in this research study.

Joe Amos on behalf of Brad Deaton, Superintendent of Schools.
Vice Chair

Signature Title Date

Signature Title Date

Signature Title Date

Principal
[redacted]

Appendix E

Recruitment Letter to Students

Date: September 5, 2013
Dear Student:

As a graduate student in the education department at Liberty University, I am conducting research as part of the requirements for an Ed.D. and I am writing to invite you to participate in my study.

If you choose to participate, you will be asked to complete the General Self-Efficacy Survey. It should take approximately fifteen minutes for you to complete the questions. Only your student numerical code will be requested as part of your participation so that your name will not be identified with any personal information.

To participate you will be asked by your homeroom teacher to complete the General Self-Efficacy Survey in your homeroom period. Your homeroom teacher will give you your numerical code that you will need to put on your paper. Do not put your name on the paper.

An informed consent document is attached to this letter. The informed consent document contains additional information about my research, please sign the consent letter and return it to your homeroom teacher.

If you choose to participate, you will be entered in a drawing to receive one of several $25 Wal-Mart gift cards.

Sincerely,

Julie Hale

Appendix F

Parental Consent

THE RELATIONSHIP BETWEEN FITNESS, BODY MASS INDEX, SELF-EFFICACY AND THEIR POSSIBLE EFFECT ON ACADEMIC PERFORMANCE

Julie Hale, Principal Investigator

Liberty University

Lynchburg, Virginia

Parent Informed Consent—Quantitative Study

Thank you for considering the participation of your child in my research project. I am currently a graduate student at Liberty University interested in learning how your child's fitness, body mass index and self-efficacy are related and how it may affect their academic performance on the Criterion Referenced Competency Test (CRCT). If you agree to have your child in this study I will be gathering data from their Fitness gram scores, body mass index and self-efficacy surveys and comparing them to their CRCT scores in order to determine a correlation.

What I will Ask You to Do:

If you decide to allow your child to participate in this study, I will ask you to sign a consent form granting me permission to gather data from your child.

What I Will Do With the Information You Give Me:

Any information I get about your child will be kept strictly confidential. All information I receive will be kept in locked files or on a computer with a locked password. I will not give any information to anyone, unless you give me written permission to do so. After all identifying information has been recorded; coded numbers will take the place of names to protect the privacy of each individual.

Risks and What will be done to Reduce Risks:

1. All information will be kept locked
2. All identifying names will be replaced with code numbers
3. Only authorized teachers are allowed to see the information
4. All teaching research staff members are trained and experienced in working with private information. They are committed to protecting your right to privacy
5. All information will be destroyed within a timely manner

Benefits to You for Your Participation:

Allowing your child to participate in this study will add to the knowledge of how fitness, body mass index and self-efficacy affect academic performance. Being involved in this project may also give you useful information about you and your family.

Right to Withdraw from the Project:

Taking part in this study is completely voluntary. My child is free to refuse to participate or to withdraw from participation at any time and it will no way affect his/her relationship with any employee at school or at Liberty University. If my child decides not to participate in any part of the study he/she can quit at any time without penalty.

Please keep this informational sheet for your records, return signature page to researcher.

Liberty University

Lynchburg, Virginia

Title of Project:

The Relationship Between Fitness, Body Mass Index, Self-Efficacy and their Possible Effect on Academic Performance

Informed Consent for Research Involving Human Subjects

Principal Investigator: **Julie Hale** E-mail: (omitted)

I, _____ hereby give my consent to have my child participate in the research study entitled " The Relationship Between Fitness, Body Mass Index, Self-Efficacy and their Possible Effect on Academic Performance," details of which have been provided to me above, including anticipated benefits, risks, and potential complications.

I fully understand that my child may withdraw from this research project at any time without prejudice or effect. I also understand that I am free to ask questions about any procedures that will be undertaken.

Finally, I understand that the information about my child obtained during the course of this study will be kept confidential unless I consent to its release.

_____

Student name

_____

Parent's Signature

I hereby certify that I have given an explanation to the above individual of the contemplated study and its risks and potential complications.

_____

Principal Investigator

Appendix G

Student Consent

CONSENT FORM

The Relationship Between Body Mass Index (BMI), Fitness, Self-Efficacy and Their Prediction On CRCT Test Scores for Eighth Grade Students in North Georgia

Julie Hale

Liberty University

Education Department

You are invited to be in a research study of an examination of the relationship between BMI, fitness, self-efficacy and their prediction on academic success as measured by the CRCT scores of seventh grade students. You were selected as a possible participant because you are a student in attendance in one of three north Georgia middle schools. I ask that you read this form and ask any questions you may have before agreeing to be in the study.

Julie Hale is conducting this study.

Background Information:

The purpose of this study is to determine the relationship between BMI, fitness, self-efficacy and their prediction on seventh grade CRCT scores.

Procedures:

If you agree to take part in this study, I would ask you to do the following things:

Complete the General Self-Efficacy Survey, which consists of ten questions in their homeroom class and allow me to collect your data from Fitness Gram and your seventh grade results from the CRCT reading, language arts and math tests.

Risks and Benefits of being in the Study:

The study has several risks: This research study has minimal risks to the participants. Most of the data being gathered is information that is executed throughout the school year and is already in place. The only additional data being asked of the participant is to complete the General Self-Efficacy Survey. Risks to some participants may be psychological. All student records will be kept confidential with only coded numbers to identify each student. Steps to minimize these risks are ensuring the confidentiality terms are carried out. Confidentiality terms are discussed below. Students have the services of the school guidance counselor at their disposal.

The benefits to participation are that students and parents and the community will understand the relationship between their BMI, fitness and self-efficacy and determine if these variables affect their academic performance. If a relationship or prediction is noted in the forthcoming research, students and parents can take the necessary measures to produce the desired outcome. Society benefits from this study by understanding the possible link between BMI, fitness and self-efficacy and their foreseeable affect on academic performance. If the research indicates a prediction on a negative or positive outcome for academic performance, subsequent interventions may be part of the curriculum at the middle school level.

Compensation:

All students who complete the study will be entered into a drawing to receive one of

several $25 Wal-Mart gift cards.

Confidentiality:

The records of this study will be kept private. In any sort of report I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely and only the researcher will have access to the records. Confidentiality of data will be maintained by securing all data in a locked file cabinet and on a computer that has password protection. The only personnel that will have access to a portion of the data will be: physical education teachers (fitness data), testing coordinator (CRCT data) and 8th grade homeroom teachers (self-efficacy data). All records will be destroyed after the required three-year time period has passed by shredding all paper records of the self-efficacy surveys and deleting all files on the computer pertaining to all data for this research study.

Voluntary Nature of the Study:

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Liberty University or the school your child attends. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

Contacts and Questions:

The researcher conducting this study is Julie Hale. You may ask any questions you have now. If you have questions later, you are encouraged to contact her at ######## Middle School by calling (omitted) or emailing her at (omitted). You may also contact her advisor, Dr. Judy

Sandlin at (omitted).

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd, Suite 1837, Lynchburg, VA 24502 or email at irb@liberty.edu.

You will be given a copy of this information to keep for your records.

Statement of Consent:

I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

Signature: _____ Date: _____

Signature of parent or guardian: _____ Date: _____

Signature of Investigator: _____ Date: _____

IRB Code Numbers: 1673.092013

IRB Expiration Date: 9/13/2014

Appendix H

Presentation to Students

"Hello, class of 2018! My name is Julie Hale and I presently teach at ######### middle school. I am working on a degree through Liberty University and I need your help. Would you be interested in participating in a study that could possibly give you or your future classmates more free time outside to take a walk or play a game? Well, if so, please listen! I would like to first get your feedback on a short survey that you take during your homeroom class. It will take about 15 minutes of your time. Then, I will be correlating that with your FitnessGram scores and CRCT scores from the spring. If my study proves that your BMI, fitness and self-efficacy has any effect on your CRCT scores, it could lead to interventions (like more time to play) that could help future classmates.