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An Examination of Third and Fourth Grade TCAP Scores and the Universal Breakfast Program  
in Unicoi County, Tennessee

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A dissertation

presented to

the faculty of the department of Educational Leadership and Policy Analysis

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Doctor of Education

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by

Harold Lamar Smith

May 2011

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Dr. Don Good

Dr. Aimee Govett

Dr. Terry Tollefson

Keywords: Universal Breakfast Program, Tennessee, Standardized Testing, Obesity

## ABSTRACT

An Examination of Third and Fourth Grade TCAP Scores and the Universal Breakfast Program  
in Unicoi County, Tennessee

by

Harold Lamar Smith

The purpose of this study was to investigate the relationship of standardized test scores on the Tennessee Comprehensive Assessment Program (TCAP) of students enrolled in Unicoi County Schools, that offers a universal breakfast program, compared with mean scores of students in both public and private schools in the state of Tennessee during the 2007-2008 school year. Test results of 404 Unicoi County third and fourth graders were examined with only the mathematics and reading and language arts sections of the TCAP used in this research. The State means were calculated using data collected from TCAP mathematics and reading and language arts tests in 222 public and private school systems across Tennessee.

The concept that nutrition, eating breakfast in particular, played an integral role in cognition has been considered for years. Student assessments are now measured using standardized tests. A school system that featured a universal breakfast program and TCAP scores provided a connection between the 2 areas.

Four research questions guided the study. One null hypothesis was generated from each of these questions for a total of 4 null hypotheses. Four one-sample  $t$  tests were computed to evaluate the data.

The results of the one-sample  $t$  tests were that there were no statistically significant differences between the Unicoi County and State TCAP score means in third grade mathematics and reading and language arts. However, there was a statistically significant increase between the Unicoi County and State TCAP score means in fourth grade mathematics and reading and language arts. From the results of the study, it was suggested that school administrators consider implementing school breakfast and universal breakfast programs.

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## DEDICATION

This dissertation is dedicated to several special people without whom this work would have never been possible:

To my Mother and Father Linda and James Smith for their constant love and support in whatever endeavors that I chose to follow.

To my aunts, Jean Denton and Jo Helen Baker, for their patience, understanding, and love while raising me as one of their own.

To my cousin, Dr. Kevin Smith, whose camaraderie and brotherhood I will forever value

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## CHAPTER 1

### INTRODUCTION

In the United States over the past several generations typically concerned parents have impressed upon their children the positive aspects of eating a nutritious breakfast on their overall health and well-being. Moreover, professionals such as administrators, teachers, dietitians, and physicians have repeated a similar line of thought. However, until recently little research has been available that ascertains whether a nutritionally balanced breakfast is associated with student cognitive performance (Taras, 2005). Even fewer of these research studies have examined the possible association between a breakfast provided daily by the school system and student test score performance. The purpose of this study is to investigate the relationship of standardized test scores on the Tennessee Comprehensive Assessment Program (TCAP) of students from the Unicoi County school system, which offers a universal breakfast program, and average scores on identical tests of students from across Tennessee during the 2007– 2008 school year.

The National School Lunch Program (NSLP) began as a mechanism to improve national defense after the end of World War II. During the war physicians who examined young, freshly conscripted Americans, found their bodies in a state of severe nutritional want. Congress, with some prodding from President Harry Truman, enacted legislation that created the program on June 4, 1946. The program's primary mission was to provide the nation with a much more nourished population from which the military could draw if given the need in the future. In essence, Truman's agenda to provide able-bodied military personnel was advanced not only in the country's agriculture department but also in the Department of Defense (DOD) (Haskins, 2005).

Moreover, the DOD as well as the United States Department of Agriculture (USDA) profited from the passage of the National School Lunch Act, which has provided funding for the bulk of the food used in the program over the years through domestic agricultural commodities. Truman planned to help the American farmer by providing an outlet for crops to the nation's children through the NSLP, which is overseen by the USDA (Taras, 2005).

Following 2 decades of success with the NSLP, the federal government decided to expand school meal offerings, and on October 11, President Lyndon B. Johnson signed the Child Nutrition Act of 1966, which created the School Breakfast Program (SBP) as a pilot program. After a 9-year trial and evaluation, Congress granted the program permanent status for the Food and Nutrition Service (FNS) in 1975 (Taras, 2005). In fact, Tennessee law (49-6-2302) requires any individual school in the state with 40% or more of its students who are eligible for free or reduced-price meals to offer a SBP (Tennessee Code Annotated, 2010).

Within the framework of the SBP, a School Food Authority (SFA) may choose to incorporate a universal breakfast program. The SFA can institute this option either on a system-wide basis or target individual schools within the district for this opportunity. Schools offering the universal program option are required to follow the exact SBP guidelines that are stipulated by the USDA. However, each student in a school system, regardless of free-, reduced-, or paid-meal status, may eat breakfast at no cost when a universal breakfast program is instituted. The monetary difference between the normal USDA breakfast reimbursement and the cost of the reduced and paid meals is absorbed by the school system because of the importance placed on the first meal of the day.

According to Martha Davenport, Unicoi County School Nutrition Supervisor (personal communication, January 24, 2011), the SFA started offering a free breakfast to every student in

each district school during the 2001-2002 school year. Sarah White, Director of School Nutrition for the Tennessee Department of Education (personal communication, November 22, 2010), explained that 21 school systems in Tennessee offered a system-wide universal breakfast program in November of 2010. A list of the other 20 systems along with their respective regions is provided in Appendix A.

### *Statement of the Problem*

The No Child Left Behind Act (NCLB) of 2001 has increased the importance of standardized tests to individual educators in the United States in respect to measuring their classroom accountability (Ravitch, 2009). Stakeholders are searching for programs and services that will boost students' academic achievement, which is increasingly tied to optimal performance on standardized tests. The purpose of this study is to investigate whether students with access to a universal breakfast program had higher mean TCAP scores in mathematics and reading and language arts in third and fourth grades compared with the mean TCAP scores of their counterparts from across all of Tennessee's public and private schools on the same tests.

### *Research Questions*

The following research questions guided this quantitative study:

#### *Research Question 1:*

Is there a significant difference between the Unicoi County mean third grade mathematics TCAP scores and the statewide mean third grade mathematics TCAP scores?

#### *Research Question 2:*

Is there a significant difference between the Unicoi County mean third grade reading and language arts TCAP scores and the statewide mean third grade reading and language arts TCAP scores?

*Research Question 3:*

Is there a significant difference between the Unicoi County mean fourth grade mathematics TCAP scores and the statewide mean fourth grade mathematics TCAP scores?

*Research Question 4:*

Is there a significant difference between the Unicoi County mean fourth grade reading and language arts TCAP scores and the statewide mean fourth grade reading and language arts TCAP scores?

*Significance of the Study*

Student performance on standardized tests has become the major topic of discussion for school system personnel. School system officials from across the country are concerned about negative implications assigned to their schools if they are labeled “failing” by standardized test results (Harriman, 2005). These same instructional leaders should examine any variable that might provide a student with a boost in academic achievement. Therefore, this study will explore the connections between a universal breakfast program and TCAP performance while attempting to identify at least one factor by which student achievement may be increased on future standardized tests.

*Limitations and Delimitations*

Tennessee was the only state examined in this study, and the only standardized test measure used was the TCAP. Only the mathematics and reading and language arts tests for students in third and fourth grades during the 2007-2008 school year were examined. In addition, data from Unicoi County and other Tennessee school systems that have universal breakfast programs were included in the State mean. This study only examined the association of a universal breakfast program on a criterion-referenced test. Other variables such as teacher

efficacy or class size that could have increased or decreased the standardized test scores were not studied. School systems comparable to Unicoi County that are interested in establishing a universal breakfast program might take note of this research. Also, states similar to Tennessee in demographic attributes may welcome the results of this study.

### *Definition of Terms*

The following terms are defined by the Tennessee Department of Education and the USDA to facilitate the use of this research study:

*Food and Nutrition Service* - An agency within the United States Department of Agriculture devoted to overseeing nutrition assistance programs within the country.

*National School Lunch Program* – A program that provides low cost or free meals at lunch to qualified students through subsidized commodities in the nation’s schools.

*School Breakfast Program* – A program that provides low-cost or free meals at breakfast to qualified students through subsidized commodities in the nation’s schools.

*School Food Authority* – The administrative body that is responsible for the governing of one or more schools and has the legal authority to operate the National School Lunch Program as approved by the Food and Nutrition Service.

*Standardized test* – A test designed with set criteria that evaluate a pupil’s attainment when compared with a standard.

*Tennessee Comprehensive Assessment Program* – The standardized test that is given to students in the third through the eighth grades each year in Tennessee to assess their achievement.

*Universal Breakfast Program* – A program that allows each student to eat a free breakfast regardless of the designation of free, reduced, or paid status as determined by the NSLP.



### *Overview of the Study*

This quantitative study is organized and presented over five chapters and focuses on the possible associations between mean TCAP test scores of students in Unicoi County Schools, which offer a universal breakfast program, and mean scores on the same tests by students in all Tennessee public and private schools. Chapter 1 contains an introduction, statement of the problem, research questions, significance of the study, limitations and delimitations, the definition of terms, and an overview of the study. In Chapter 2 a review of related literature deals with school nutrition, developmental levels of third- and fourth-grade students, and standardized tests. Descriptions of the methods and research procedures are provided in Chapter 3; Chapter 4 presents the data, description, and results; and Chapter 5 provides a summary of the study findings, the conclusion of the study, recommendations for practice, and the recommendations for further research.

## CHAPTER 2

### REVIEW OF LITERATURE

This chapter contains a review of relevant literature as it pertains to school nutrition and its association on student academic achievement. The review is divided into three main content areas. Initially, the historical background and scope of the National School Lunch Program (NSLP) and the School Breakfast Program (SBP) in the United States are discussed. Next, the focus is on developmental levels unique to students in third and fourth grades. Finally, the increased emphasis and significance of standardized testing is examined.

#### *Historical Background and Scope of the NSLP and SBP*

The NSLP is currently in its sixth decade of existence, which indicates that school food service is a relatively modern practice. However, the concept of providing children a nutritious meal at school can be traced farther back than 60 years. According to Martin and Conklin (1999), “School feeding is not a twentieth century invention. It’s at least 200 years old” (p. 32).

The seeds for the National School Lunch Act (NSLA), which created the NSLP, originated in the economic depression that the United States faced in the 1930s. Franklin Delano Roosevelt’s New Deal programs benefited school children of the day by allocating surplus food, referred to as commodities, to nearly all schools. Indeed, agriculture along with almost all other sectors of the country’s economy was in a grim financial state (Arif & Smiley, 2003). Hence, both the nation’s agricultural sector and the country’s school children benefited from this piece of legislation, which attempted to eliminate malnutrition.

In 1937 Senator Richard B. Russell of Georgia was one of the first legislators who realized the significant benefit of starting a national program at the school level to feed children. His vision of what the NSLP could mean to the nation finally came to fruition after World War II

(Fite, 1991). Millions of children have received at least one and often two good meals a day thanks to this entitlement program. The NSLP should not be misconstrued as a welfare program because participating children are entitled to receive the programs benefits based upon family income eligibility guidelines that are developed from the yearly federal poverty guidelines (Lindsey, 2004).

The major point of emphasis behind the NSLA was to provide nutritious meals to America's school children. Also, by providing agricultural commodities in the program, domestic farmers were able to benefit financially from it (Zucchini & Ramey, 1990). According to Carleton (2002), "The School Lunch Program created by the NSLA was designed to ensure that all students in primary and secondary education, in both public and private schools, had reasonable access to a nutritionally sound lunch" (p. 87). Carleton's study shows that the program had been able to fulfill its initial mission. The NSLA in its first decade dramatically increased the number of students with access to nutritious food at school (Carleton, 2002).

As explained by Josephine Martin from the Department of Nutrition at Georgia State University (personal communication, May 24, 2010), the United States Department of Agriculture oversees the NSLP. The Food and Nutrition Service (FNS) is the agency within the USDA that administers the NSLP and provides agricultural commodities for the program to participating public and private schools, along with residential child care institutions. Appendix B illustrates the required minimum quantities for the traditional lunch menu pattern (Tennessee School Nutrition Program, 210a).

According to Martin and Conklin (1999) the NSLP was so successful that expansion was inevitable and eventually occurred. The 1960s brought the addition of free and reduced-priced eligibility based on income to the program. The Agriculture Department implemented the

School Breakfast Program (SBP) as a pilot program in accordance with the Child Nutrition Act of 1966 and permanently authorized it in 1975. This program proved to be another significant step in providing the country's children an opportunity for two nutritious meals during the school day (Martin & Conklin, 1999).

All meals served at breakfast have to be offered to all students at the school while adhering to all federal conditions (Antoine, Donald, & Cox, 2003). The minimum breakfast quantities required by the USDA are found in Appendix C (Tennessee School Nutrition Program, 2010b). This standard of equality to all participants made this particular program prominent among the country's supplemental nutrition programs. According to Devaney and Stuart (1998) the "program regulations specified that each reimbursable breakfast include a serving of fluid milk, a serving of fruit or vegetable or a full-strength fruit or vegetable juice, and two servings of either bread or meat or their equivalent" (p. 10). This school breakfast meal pattern menu plan is illustrated in Appendix D (Tennessee School Nutrition Program, 2010c). Standardization of the breakfast meal for all participants in the United States ensures that each student receives the proper amount of nutrients each meal in accordance with USDA policy (7 CFR 220, 2009).

Despite almost universal accolades from school administrators and teachers about the SBP, breakfast participation rates have never reached the same levels as that of the lunch meal service. For example, in Tennessee average daily breakfast participation was 250,275 students compared with average daily lunch participation of 616,038 students during the school year 2008–2009 (Food Research Action Center, 2010). Many school nutrition supervisors have tried to increase breakfast participation rates because conventional wisdom holds that breakfast is the most important meal of the day. However, that choice is not influenced by the availability of food or the means to purchase it (Shaw, 1998). Guinn, Baxter, Thompson, Frye, and Kopec

(2002) found that fourth graders in their study had equal participation in their school breakfast program regardless of gender. The Food Research Action Center (FRAC) approximates that 1.9 million children are not included in the SBP even with free or reduced- priced breakfast eligibility (Christie, 2003). This research illustrates that there are still improvements to be made in the SBP to ensure that more children receive the nutritional benefits that are available by the program.

Some school systems have turned to universal breakfast programs, which allow all students to eat a free breakfast regardless of their free, reduced, or paid-meal status, to encourage more pupil participation in the SBP. Murphy et al. (1998) showed that school systems could put universal breakfast programs into operation with minimal extra funding in schools where 70% or more of the students were eligible for free-or reduced- price school meals. This statistic is explained in two ways. First, the USDA funds schools with 40% or more of the students are eligible for free- and reduced-price meals, which is determined based on their April claim numbers from 2 years prior, at a higher breakfast reimbursement rate than schools that fall below this threshold. This extra funding mechanism is referred to as *severe need breakfast*, and the funds are allowed to be expended only at those schools deemed as such. Finally, with breakfast available for free to every child, the student participation rate increases, bringing in more USDA reimbursement money, which then will cover the breakfast costs of the reduced and paid students who participate in the program, according to the School Nutrition Program of the Tennessee State Department of Education (Phyllis Hodges, personal communication, May 17, 2010).

Undoubtedly, universal breakfast programs destigmatize those students who previously ate free or reduced-price meals when every student regardless of family status or wealth is permitted to take part in the program (Pertschuk, 2002). According to Howell and Stenberg

(2002), “Some of the benefits of this program are a heightened alertness while learning, all students receive a nutritious morning meal, and students who may not otherwise receive a morning meal are guaranteed breakfast” (p. 716). This was based on research conducted on 780 students at Dobie Primary School in Richardson, Texas. Moreover, schools featuring universal breakfast served in the classroom report improved learning environments with fewer incidents of disobedience along with decreased tardiness when compared with statistics prior to implementation of the program (Chmelynski, 2007). According to information received through an informal survey from school systems in Tennessee, with positive research mounting relating to universal breakfast programs, more school systems are investigating establishing their own version of this valuable program (S.C. White, personal communication, October 11, 2010).

Each school system, known as a School Food Authority (SFA) on the NSLP, must undergo a Coordinated Review Effort (CRE) and a School Meals Initiative (SMI) every 5 years (7 CFR 210, 2009). The CRE is performed to verify reimbursement information that systems turn into the State Agency (SA) is accurate. The SA then, in turn, files these data with the USDA. This ensures that the numbers of reimbursable meals, meals served to students for which the USDA reimburses the SFA, are correctly counted and no meals are counted incorrectly from either human error or fraud. The SMI is done to verify that meals served to children at lunch by the SFA contain the correct nutritional and caloric balance (Hiatt & Klerman, 2002). Adults who have children who participate in the NSLP can be assured that their local SFA has undergone a thorough review of every meal counting and claiming system along with an examination of the nutritional quality of meals served by the system, according to the School Nutrition Program of the Tennessee State Department of Education (Amy Haynes, personal communication, May 10, 2010).

Research has found a clear link to sound nutritional practices and physical and cognitive development of children. Florence, Asbridge, and Veugelers (2008), “demonstrated that, above and beyond socioeconomic factors, diet quality is important to academic performance. This association is important to children’s future educational attainment and herewith future income, socioeconomic status, and health” (p. 214). The meal of the day that has monopolized the litany of the research is breakfast.

Schools have a vested interest in improving school breakfast participation because good nutrition increases student achievement in all aspects of a good education according to researchers (David, 2009). Consequently, it appears school administrators, guidance counselors, and teachers, who all are under ever increasing pressure to improve their students’ standardized test scores, have a vested interest in what occurs in the school’s cafeteria. Perhaps the most groundbreaking research concerning eating a healthy breakfast and cognitive development was completed over a half century ago. According to Conners (1989):

In a series of studies known as the ‘Iowa breakfast studies’ (carried out at the University of Iowa in the mid 1950s), the authors concluded that omission of the morning meal may result in the lowering of the mental and physical efficiency during the late morning hours. (p. 63)

Additionally, further study has been done on the growing segment of the population of children who do not meet all of their nutritional requirements over the course of a normal day. Researchers found that a higher proportion of students who skipped breakfast suffered with cognitive problems as compared with students who ate breakfast. Moreover, this association was more pronounced in children who were deemed to be at risk of nutritional deficiencies (Pollitt & Mathews, 1998). Also, researchers found that children who had skipped breakfast had much smaller nutrient intakes on a daily basis compared with their peers who ate breakfast on a daily

basis. In addition, the SBP can intervene and fill the nutritional void for these children who are at nutritional risk (Wilson, Parnell, Wohlers, & Shirley, 2006).

Chandler, Walker, Connolly, and Grantham-McGregor (1995) found students who ate a school breakfast improved their cognitive performance. The performance of undernourished children on a verbal fluency test improved significantly after they were fed breakfast. Pursuing this link even further Taras (2005) stated, “Offering a healthy breakfast is an effective measure to improve academic performance and cognitive functioning among undernourished populations” (p. 213). This conclusion was reached after an examination of 18 peer-reviewed articles on school children who ate breakfast and their subsequent test performance. The previous research has indicated that these children have their nutritional needs met for full physical as well as mental growth.

Studies have demonstrated that the positive association between academic achievement and SBP participation is possible. According to Worobey and Worobey (1999), “Children’s participation in school breakfast programs, where their daily dietary intake is superior to that of children who go without breakfast, has been documented to improve performance on standardized achievement tests and other cognitive measures” (p.113). Researchers found in their study that students who ate breakfast regularly had nearly a letter grade higher in math when compared to peers who typically did not participate in the program (Murphy et al., 1998). In the same manner, Bellisle (2004) added, “...breakfast nutrient composition and size might also modify the observed changes in cognitive ability” (p. S230). The link between nutrition and cognition seems to be ever expanding within the research.



In addition, the general school climate can be susceptible to either positive or negative consequences depending on the students' nutritional states. Mouser and Worley (2003) found that serving breakfast in the classroom had increased program participation while also improving the academic climate of the elementary school. In another study Lent (2007) discovered that 60% of teachers in Milwaukee Public Schools reported improved behavior, attendance, and tardiness rates after only a short period when their schools had established universal breakfast programs. Evidence clearly indicates that the key to improving all aspects of a school community is to ensure each student is able to benefit from nutritionally sound meals.

Research studies have been conducted that examine the relationship of nutrition and brain activity for children in age-specific ranges. For example, Pollitt (1995) confirmed that children, particularly those within normal third and fourth grade age parameters, had memory functions that were slower after missing breakfast. Also, researchers found that food-insecure children in the normal age limits for third and fourth graders had lower math scores than peers who had maintained adequate nutrition (Alaimo, Olson, & Frongillo, 2001). It appears that children in those specific age and grade groupings are especially vulnerable to any nutritional deficiencies in their diets.

It would be misleading to discuss the NSLP or the SBP without mentioning the ramifications of childhood obesity. In addition, hunger also can be a severe hindrance in the learning process. Children who skip or miss breakfast or lunch are more likely to be sick, absent, tardy, or disruptive in class. Students who are lacking proper nutrition are susceptible to poor performances on school tests (Mouser & Worley, 2003). These outcomes are the same in a person who is obese but malnourished, and program officials have been cognizant of this problem for some time now. According to Walker and Humphries (2005), "Since 1995, the

USDA has been working toward improving the nutrition of meals by reducing the fat, saturated fat, cholesterol, and sodium content of foods, while providing more fruits, vegetables, and grains” (p. 189). According to Tennessee School Nutrition State Director Sarah White (personal communication, May 10, 2010), the USDA is to be commended for taking this step along with the implementation of the SMI. Nevertheless, research has shown that similar measures have had little impact in halting the spread of obesity within our society.

Coyl (2009) noted that in the later elementary grades obesity recently had become a major health threat the general public would never have imagined only several years earlier. The severity in the rise of childhood obesity will be obvious in the future as life-threatening illnesses become more common in younger adults (Olfman, 2005). According to the National Conference of State Legislatures (2008) obesity rates have more than quadrupled over the past 30 years for children within the normal age range for third and fourth grade students. Anderson and Butcher (2006) found that childhood obesity rates could be associated with increasing adult obesity rates in the United States. Children who suffer from this malady have a higher propensity to carry their condition into adulthood. In fact, researchers have found that an overweight juvenile has a 70% chance of continuing this condition after he or she reaches maturity (National Conference of State Legislatures, 2008).

There is an obvious physical price associated for those persons suffering with obesity, issues that include having an increased risk of sickness like heart disease and diabetes. However, there is also a fiscal cost that is passed along to the individual as well as society as a whole. The cost of obesity-related medical expenditures reached \$75 billion dollars in the United States for 2003 (National Conference of State Legislatures, 2008). Until this health epidemic abates, increased annual health care cost-increases should be expected to continue.

Also, the practice of improving test scores through wholesome food is not an inexpensive proposition as fresh fruit and vegetable costs have increased on a yearly basis like health care costs. However, providing such food should be a primary goal as research has shown that consumption of both food groups does provide protection against diseases generally associated with obesity (Cox, Whichelow, & Prevost, 2000). For example, during the 2007-2008 school year, the USDA reimbursement rates for breakfast and lunch, respectively, were \$1.35 and \$2.47 (United States Department of Agriculture, 2007). According to the National Food Service Management Institute (2010), expenses such as labor and equipment accounted for over 50% of the total meal reimbursement. Therefore, school nutrition supervisors do not have an ample supply of funds to spend on expensive foods that are generally considered healthy.

Caloric intake is not the only area of concern when talking about obesity because a lack of movement over the course of a normal day can prevent good health. As Smith (1999) noted, because K – 12 schools have decreased physical education classes, lack of physical activity plays a vital role in the increase of childhood obesity. Nevertheless, this reduction in physical exercise can have negative ramifications. Hedley et al. (2004) showed that recent increased obesity rates could be tied to increased calorie consumption while physical exercise has been reduced over the past 2 decades. In Tennessee these concerns have been addressed by requiring schools to offer at least 90 minutes a week of physical activity to students in both elementary and secondary schools (Tennessee Department of Education, 2011). It is imperative that school administrators focus both on decreasing children's calories and increasing their periods of motion. The war on obesity should be fought on two fronts as caloric intake and physical activity both must be monitored to maintain a healthy body weight.

School systems that are defined as rural, such as Unicoi County, face their own unique challenges in trying to combat obesity. For example, Graves, Haughton, Jahns, Fitzhugh, and Jones (2008) found in their study of four rural schools in east Tennessee that biscuits and gravy, items not found as frequently in urban school systems, were among the most popular breakfast items for students participating in the SBP. Researchers analyzed the meal that included those items with total calories for breakfast falling within an acceptable range despite the unhealthy nature of these food options. According to researchers schools in rural locations should emphasize nutrition education as a preventive measure to combat obesity. Also, rural school administrators, guidance counselors, and teachers should be mindful that their schools are located within a *food desert*, an area that has no stores that carry fresh fruits and vegetables within a manageable distance (Schafft, Jensen, & Hinrichs, 2009).

In comparison, the populace who reside in cities and towns also face their own unique nutritional challenges because of location. According to Sturm (2009) children who inhabit urban areas are living in areas referred to as *food swamps*. These swamps are so named because they feature too much fast food that provides very little nutrient value to a daily diet and increases obesity levels in people when consumed in large quantities (Chen, Florax, & Snyder, 2009). Hence, it is possible to have the paradox of a child who is obese but who is severely lacking in regards to nutritional attainment.

The United States government uses *food insecure* as the official classification for a food desert, but the latter term is now often used interchangeable in common vernacular (Connelly & Ross, 2007). As stated by Morton and Blanchard (2007), “Although there is no universally accepted definition of ‘food deserts,’ one way to approach the concept is to begin with access, or the degree to which individuals live within close proximity to a large supermarket or

supercenter” (p. 2). Recent research indicates that people who make their homes in food deserts have to travel farther distances or suffer the consequences of having far fewer quality food choices, which are priced much more exorbitantly when compared to the same item purchased in a more densely populated region (Boyer, PruD’Homme, & Chung, 2009). However, grocery companies argue that it is far too costly to their bottom lines to put stores in sparsely populated locations (Winne, 2007).

In conclusion, the concept of school nutrition predates our country’s mandate to provide school meals by several hundred years. Georgia Senator Richard B. Russell was instrumental in the passage of the 1946 legislation that gave us the NSLA, and produced the SBP in 1975. The USDA and FNS are integral to insure that school feeding programs run smoothly and efficiently. Researchers have linked good nutritional habits with the improvement of cognitive performance in students, with breakfast playing a significant role in daily nutrient intake. Universal breakfast programs promise to raise vital participation rates. Finally, childhood obesity has risen over the last 20 years, and our government needs to take action immediately to avoid a potential national health care catastrophe.

#### *Developmental Levels Unique to Students in Third and Fourth Grades*

In this section students are observed from another perspective in order to look at cognitive development through the lens of the educational psychologist. The theories of Jean Piaget, Lev Vygotsky, and Barbara Rogoff are examined for children who fall within these age parameters.

Orlich (2000) wrote that students in third and fourth grades were classified in the concrete operational stage in Piaget’s stages of development, which he believed that each child advanced through at unique rates. According to Piaget this stage was characterized by children

who understand the concrete world around them but have trouble identifying with abstract thoughts and ideas or hypothetical situations. Geiger (2000) noted that teachers with students in the concrete operational stage should incorporate hands-on and cooperative activities into their lessons. Oakley (2004) concurs, “Thus the child can solve problems they can see or manipulate” (p. 22). Furthermore, teachers should limit the amount of classroom time spent using a traditional lecture method of instruction for this student, as it proves very inefficient for the way students in this stage need to learn.

Additionally, Van Scoy (1995) found it is imperative for students in the third and fourth grade levels be given observable experiences to promote optimal learning because they remain in the later part of the concrete operational stage. Owens (1995) found that children entrenched in this stage must achieve in school while being able to socialize with their peers to have high self-esteem. It is vital that this self-esteem be genuine because a bogus version of such will not sustain the scrutiny of others as they come into contact with the child. Finally, Calvert (2008) asserts that in the concrete operational stage students for the first time begin to comprehend their world in a more pragmatic manner.

Vygotsky developed his own theory of cognitive development while living in his native Russia. Hollins (1996) contends that Vygotsky believed a person’s cultural background shaped his or her cognitive development rather than the biological and psychological reasons favored by Piaget. Wallace and Knotts (2004) agreed with Vygotsky’s work “...which stressed the importance of social interactions for overall cognitive development” (p. 136).

At the heart of Vygotsky’s cognitive developmental theory lies what he termed the zone of proximal development. Children can develop knowledge by using various cultural tools that surround them. A primary example of this concept would be that a parent reads to a child. The

child eventually becomes adept at recognizing the various words and in due time is able to piece them all together (McArthur, Adamson, & Deckner, 2005).

According to Smith (1996) Rogoff was able to update the world of educational psychology with a contemporary view on the subject. She is able to put a modern spin on Vygotsky's *zone of proximal development* by using the term guided participation. This expression incorporates both guidance and culture in regards to cognitive development (Smith, 1996). Thus, ordinary activities provide the novice learner the opportunity to obtain and hone valuable skills.

Educational psychologists have taken the stance that either Piaget's or Vygotsky's theory is correct, but few seem willing to merge the two developmental theories into a new hybrid. Daniels (2001) contended such a position was not necessary as "...statements drawn from Piaget's writing affirm the poverty of an analysis which asserts the need for an 'either – or' position on the Piaget – Vygotsky debate" (p. 38).

Nevertheless, it is easy for daily practicing educators to lose focus of what is important within these cognitive developmental levels. Romey (2000) argued that school systems would be wise to consider a student's developmental level more so than age level with respect to decisions on retention and promotion. Besides that, Zucker, Donovan, Masten, Mattson, and Moss (2009) have noted that by the time a child reaches third grade many of the basic adaptive systems are fully functioning and constant. School district curriculum planners should always be mindful of those points.

To summarize, students in the third and fourth grade were the focus of this developmental observation. First, Piaget observed that children in this age group fell into his concrete operational stage where students had little to no concept of the abstract. Next,

Vygotsky concluded that children learned best in what he called the zone of proximal development where children use their surrounding culture as learning devices. Also, Rogoff, whose cognitive theoretical roots lie close to Vygotsky, coined the term guided participation to explain how development occurred within guidance and culture. Finally, educational psychologists do not have to discard either Piaget's theory or Vygotsky's theory as they can combine what they feel works from both theories.

### *Standardized Testing*

It is difficult to examine any aspect of current concepts on the educational front without discussing the impact of standardized testing. It seems that no matter who are queried, school administrators, guidance counselors, teachers, staff, parents, or students, each appears to have strong opinions on standardized testing. In fact, Klein, Zevenbergen, and Brown (2006) reported that teachers felt standardized testing constrained their classroom teaching and were overwhelmingly against this form of assessment.

Standardized tests show the researcher two categories of analysis, either norm-referenced tests or criterion-referenced tests. Norm-referenced tests permit evaluation of a student versus another group of test-takers (Foshay, 2001). Blasi (2005) noted that a key function of this type of test was to purposefully sort pupils. On the other hand, criterion-referenced tests are written to reflect if a student meets a particular standard. Hence, the child either does or does not meet proficiency with this assessment (Ediger, 1998). For example, in Tennessee, the Tennessee Comprehensive Assessment Program (TCAP), which is given to students who are in the third through eighth grades, is a criterion-referenced assessment.

Critics of standardized testing typically are not against the use of this type of assessment; however, their argument is centered on using this as the only evaluation tool. Shaker (2004)



argued that standardized testing can be useful, but it must not be the only measurement of education. Jensen (2005) contended that there was minimal research confirming that test-taking skills shift seamlessly to other areas of a student's life. According to Flanagan and Harrison (2005), "The important factor to consider is what abilities are being measured by a certain test and to what aspects of academic performance these abilities are most related" (p. 271). Stevens, To, Stevenson, and Lochbaum (2008) wrote that by recognizing student achievement only through standardized test scores, true learning experiences cultivated throughout the year are not truly reflected.

When the subject of standardized testing is broached among kindergarten through 12th grade educators, it takes minimal time before the No Child Left Behind Act (NCLB) emerges. This seminal piece of legislation tends to stir the passions of those for and against standardized assessments. For instance, "When student achievement is discussed, it has now come to mean test results. Yet the least sophisticated citizen among us understands that there is much more to education than what can be tested" (Houston, 2007, p. 745).

Accountability for school systems was addressed in NCLB legislation with a measure mandated as Adequate Yearly Progress (AYP). Schools can be classified as either a target or a high-priority school if AYP standards are not met and are provided assistance by the Tennessee Department of Education (TDOE). According to Saiger (2005), "The NCLBA makes 'adequate yearly progress' its central accountability metric, defining it as annual improvement in the number of students scoring at or above a cutoff on criterion-referenced tests" (p. 1681). Individual states are allowed to determine their own AYP standards and then create the standardized tests that are aligned with those specific expectations. This arrangement has made it impossible for researchers to compare AYP data from state to state and reach any meaningful

conclusions (Daggett, 2010). Critics have argued over the significance of AYP because this arrangement has created a loophole for this metric, as states can construct artificially low standards in order to enhance their own adequate yearly progress (Mooney, Denny, & Gunter, 2004). Educators are concerned that AYP is measured almost entirely on student results on standardized tests (Colombo & Fontaine, 2009).

Criticism of NCLB extends to perceived effects on classroom teaching that occur in schools on a daily basis. Harriman (2005) found that teachers felt this legislation had taken away some spontaneity in the classroom as pressure increased to cover material to be tested. Solley (2007) reported that the emphasis put on standardized testing as a result of NCLB has taken away the autonomy of teachers regarding the instruction of curriculum. Furthermore, high-performing teachers who typically have more academic-friendly options from which to choose tend to avoid working in schools that have been sanctioned under NCLB because of negative public sentiment of teachers working in these schools (Sanders, 2008).

In fact, fear of sanctions has led some states to choose a path of least resistance in order to avoid schools' appearing on targeted lists. NCLB allows states to choose their own levels of assessment, and these levels vary widely (Lynn, 2006). For instance, Peterson and Hess (2008) found that in 2007, Tennessee showed a majority of its students as proficient even though they fell far below the admittedly more stringent National Assessment of Educational Progress (NAEP) standard. Ryan's (2008) research found the following:

More than a dozen states have tinkered with their scoring systems in order to increase the number of students who pass the tests. Tennessee provides as good an illustration as any other. Every year since the passage of the NCLB, Tennessee has lowered the number of questions students must answer correctly to be deemed proficient. (p. 1238)

For example on the reading portion of the TCAP, eighth-graders had to answer 36 out of 70 questions, 50%, to meet proficiency in 2003. However, that number had fallen to 22 out of 55 questions, 40%, by 2005 (Ryan, 2008).

This increased emphasis on standardized test scores may bring some unintended positive consequences as the links among sound nutrition, physical activity, and cognitive development emerge into mainstream consciousness. Castelli and Hillman (2007) cited findings that showed an encouraging association between aerobic capacity and higher achievement on standardized tests. In fact, legislation is being passed around the country that requires that students receive daily physical exercise for specific periods of time (Lewis & Filpes, 2008). Shahid (2003) showed that by educating school administrators on the relationship between sound nutrition and increased test scores, more emphasis will be placed on both subjects at some point during the school day. On the other hand, Smith and Lounsbery (2009) discovered that NCLB has forced most schools to add class time for core subjects, which are tested and scrutinized more, while at the same time cutting physical education classes. It does appear that school administrators need to strike a balance between the time spent on classroom instruction and time spent on areas that benefit the holistic body of students such as nutritional and physical education (Smith & Lounsbery, 2009).

One common misconception among the public and often educators is that all standardized testing is high-stakes testing. Cizek (2005) wrote that high-stakes tests come with either positive or negative outcomes, and not all standardized-test-situations meet this definition. Moreover, Tucker and Stronge (2005) said, "Given the grave, unintended consequences of high-stakes testing, tests must be used with great care and concern for those involved in the enterprise and with the goal of better educational outcomes for students" (p. 17). Perhaps the sentiments of

many educators on the topic are best expressed by Frost (2007), “Politicians, not educators, are framing the U.S. education system and radically changing the culture of education, and standardized tests are becoming the curriculum of schools” (p. 226).

Nevertheless, a new era of testing and accountability was ushered in with the Race to the Top (RTTT). This new \$5 billion program was carved from the American Recovery and Reinvestment Act (ARRA) and was awarded to states that showed originality in their approach to school reform (Fletcher, 2009). Tennessee and Delaware were the only two states awarded RTTT funds in the first phase of competition in March 2010. Tennessee Governor Phil Bredesen credited bi-partisan legislative support along with assistance from the Tennessee Education Association (TEA) for the state’s successful bid (Brill, 2010).

Legislative support in Tennessee culminated in the First to the Top Act of 2010. First to the Top (FTTT) is often used as a synonymous term with RTTT but is Tennessee’s educational plan of action which was deemed aggressive while retaining achievability (United States Department of Education, 2010). The following four areas are targeted for improvement under FTTT because of their deemed educational importance:

1. Implementing standards and measurements to prepare students to succeed and who are college-and-career ready.
2. Constructing data systems that measure student growth and achievement in a way that helps educators to improve classroom instruction.
3. Locating, retaining, and rewarding the most effective teachers and principals in areas with the highest need.
4. Reversing current data trends of the lowest-performing schools (Tennessee Department of Education, 2010, ¶ 2).

An integral component of educational reform in order to receive RTTT funds was for states to attach teacher pay, in some manner to students' standardized test scores (Flannery, 2010). This type of pay system is commonly referred to as merit pay. The state of Tennessee experimented with this sort of pay plan with the Career Ladder Evaluation System nearly 2 decades prior to the new educational funds (Dee & Keys, 2004). However, researchers have made some interesting discoveries after delving into these pay systems. Dee and Keys (2004) researched the Tennessee Career Ladder Evaluation System and found that teachers on the higher rungs of the ladder, who should be the state's best performing teachers, did not produce better test scores than their peers below them on the ladder. Furthermore, Lavy (2007) wrote that a negative aspect of merit pay would be that teachers might narrowly focus their lessons only on skills they believed would be on standardized tests at the expense of other functional skills. In addition, a Vanderbilt University National Center on Performance Incentives study of fifth through eighth grade math teachers from 2007 until 2009 in the Metropolitan Nashville Public Schools (MNPS) found that teachers who received merit pay recorded similar standardized test score gains as teachers not provided this added inducement (Turner, 2010). Obviously, additional data will be available on these pay plans as more and more states modify existing teacher compensation systems in the chase for more federal education dollars.

In conclusion, standardized testing is indeed a controversial topic that can evoke a great deal of passion from supporters and critics. Test scores can be analyzed as either norm referenced or criterion referenced. Critics argue assessment needs to take different forms and not be reliant solely on standardized test scores. NCLB legislation focused the nation's attention to standardized test scores with accountability standards for schools. However, individual states were able to choose their assessment level, which inevitably took some bite out of the program's

stringency. Not all standardized testing is in actuality high-stakes testing, which must involve a positive or negative consequence for the test results. In 2010 a new cycle of educational reform began as Tennessee and Delaware became the first two states to win RTTT funds. In Tennessee the RTTT effort became known as FTTT after bi-partisan legislative support brought restructuring to the states educational foundation along with a wave of federal education money. A vital component for both states' winning applications was to modify teacher compensation plans into a merit pay system.

### *Summary*

A review of literature was completed in Chapter 2 on the history and scope of the NSLP and the SBP, on the developmental levels unique to students in third and fourth grades, and on the increased importance and emphasis of standardized testing. It is critically important that school leaders remain cognizant of recent obesity problems, which will affect the health and well-being of the nation's children both now and in the future. They also should be mindful of how such health problems can affect cognitive performance in these same students. Educational administrators should keep abreast of recent research, which can result in a positive impact on their students overall quality of life.

## CHAPTER 3

### METHODOLOGY

#### *Introduction*

The purpose of this study was to determine how Unicoi County's Tennessee Comprehensive Assessment Program (TCAP) mathematics and reading and language arts scores at third and fourth grade levels compared with the overall Tennessee TCAP averages in mathematics and reading and language arts at third and fourth grade levels in both public and private schools for the 2007-2008 school year. Unicoi County features a universal breakfast program that indicates all students may eat a free breakfast each school day regardless of their free, reduced, or paid status in all four of the county's elementary schools. Chapter 3 describes the methodology and procedures used in the research. This chapter contains the following sections: research design, population, procedures, instrumentation, research questions, data analysis, and summary of the chapter.

#### *Research Design*

According to McMillian and Schumacher (2006), "A research design describes how the study was conducted" (p. 22). Educators generally consider good nutritional habits to be an important component for students to achieve at a higher cognitive level. Descriptive and inferential statistics are used to analyze collected TCAP data in this nonexperimental study (McMillan & Schumacher, 2006). Quantitative research is defined as a way of investigating objective theories by studying connections among variables (Creswell, 2009). This quantitative research is an instrument designed to examine Unicoi County's TCAP scale scores in mathematics and reading and language arts for the entire third and fourth grades weighed against the overall state TCAP mean scores in mathematics and reading and language arts for students in

the third and fourth grades. This function determines if the county's universal breakfast program is a possible factor in increasing those specific test scores over the Tennessee state mean.

### *Population*

The population for this study consisted of all third and fourth grade Unicoi County students who participated in the TCAP in mathematics and reading and language arts for the school year of 2007-2008. There were 404 individual students who took the TCAP in their specified areas in Unicoi County. Those students attended the following Unicoi County Elementary Schools: Love Chapel Elementary School, Rock Creek Elementary School, Temple Hill Elementary School, and Unicoi Elementary School. Also, the comparison population consisted of third and fourth grade students who took the 2007-2008 mathematics and reading and language arts TCAP tests in all Tennessee public and private schools.

### *Procedures*

Permission to perform this research was acquired from the Institutional Review Board (IRB) at East Tennessee State University (ETSU) prior to the commencement of this project. The Unicoi County Board of Education and the Tennessee State Department of Education completed the data collection for this study. Appendix E contains a letter of permission that obtained from Denise Brown, Unicoi County Director of Schools, for access to individual raw scale TCAP scores of third and fourth grade students in mathematics and reading and language arts for 2007-2008. Chris Bogart, who is the Supervisor of the Unicoi County Department of Special Education and Curriculum, printed the Unicoi County 2007–2008 Tennessee State Report Card, which was retrieved from the Tennessee State Department of Education website. The names and social security numbers of each individual student were encrypted to ensure student anonymity.



Soo-Hee Park, who serves as the Director of Assessment, Evaluation and Research for the Tennessee State Department of Education, provided the overall mean scores for the State of Tennessee in mathematics and reading and language arts for students in the third and fourth grades in the 2007–2008 school year. He calculated these means using data from all 222 public and private school systems within Tennessee. These data did not include the name and social security number for any individual students attached to ensure that the identity of each student remained confidential.

### *Instrumentation*

The instrument used for data collection in this study was the Tennessee Comprehensive Assessment Program (TCAP) achievement score for the test taken by each pupil as partial fulfillment of the requirements for grade promotion during the 2007-2008 school year. The Tennessee State Department of Education presents snippets of this information for public inspection on its website for tests administered the previous spring. Schools throughout the state of Tennessee test students in third through eighth grades in a timed format with multiple-choice questions in each of the following areas: mathematics, reading and language arts, science, and social studies (Tennessee Department of Education, 2009). For the purposes of this study only the mathematics and reading and language arts scores were used.

### *Research Questions*

The following research questions and null hypotheses guided this study.

#### *Research Question 1:*

Is there a significant difference between the Unicoi County mean of third grade mathematics TCAP scores and the statewide mean of third grade mathematics TCAP scores?

Ho<sub>1</sub>:

There is not a significant difference between the Unicoi County mean of third grade mathematics TCAP scores and the statewide mean of third grade mathematics TCAP scores.

*Research Question 2:*

Is there a significant difference between the Unicoi County mean of third grade reading and language arts TCAP scores and the statewide mean of third grade reading and language arts TCAP scores?

Ho<sub>2</sub>:

There is not a significant difference between the Unicoi County mean of third grade reading and language arts TCAP scores and the statewide mean of third grade reading and language arts TCAP scores.

*Research Question 3:*

Is there a significant difference between the Unicoi County mean of fourth grade mathematics TCAP scores and the statewide mean of fourth grade mathematics TCAP scores?

Ho<sub>3</sub>:

There is not a significant difference between the Unicoi County mean of fourth grade mathematics TCAP scores and the statewide mean of fourth grade mathematics TCAP scores.

*Research Question 4:*

Is there a significant difference between the Unicoi County mean of fourth grade reading and language arts TCAP scores and the statewide mean of fourth grade reading and language arts TCAP scores?

Ho<sub>4</sub>:

There is not a significant difference between the Unicoi County mean of fourth grade reading and language arts TCAP scores and the statewide mean of fourth grade reading and language arts TCAP scores.

#### *Data Analysis*

This study used the Version 18.0 of the Statistics Package for Social Sciences (SPSS) to analyze the descriptive data. The data for every third and fourth grade Unicoi County student and for each system in the state of Tennessee were arranged into a SPSS data file. Names of individual students were not disclosed in the study. For examination of the four research questions, one-sample *t* tests were used to evaluate any associations between Unicoi County students' TCAP performance compared with the Tennessee average on the same TCAP tests. The .05 level of significance was used as the alpha level to test the hypotheses. Also, the effect size was calculated and reported.

#### *Summary*

Chapter 3 presents the research design for this study. Standardized tests have become an important part of education since the No Child Left Behind Act was enacted in 2001, and this educational trend shows clear signs of continuing as we enter the second decade of the new century. This study makes use of the criterion-referenced TCAP to determine the effectiveness of a universal breakfast program on a portion of these scores. An analysis of the data is discussed in Chapter 4.

## CHAPTER 4

### ANALYSIS OF DATA

Standardized testing with criterion-referenced tests became of critical importance to educators after the No Child Left Behind Act (NCLB) was enacted as a means of measuring student assessment requirements under the law. The Tennessee Comprehensive Assessment Program (TCAP) is used for students in grades third through eighth to comply with this federal mandate. Also, in Tennessee the First to the Top Act (FTTT) of 2010 strengthened this often contentious relationship between educators, standardized testing, and student measurement. According to Daggett (2010) the trend of tying federal education monies to student performance on criterion-referenced tests will only increase in the future. Therefore, it behooves all educators to explore every avenue available for any promise in increasing the standardized test scores of students in their charge.

The purpose of this study was to investigate the relationship of how standardized test scores on the Tennessee Comprehensive Assessment Program (TCAP) of students who are enrolled in a school system, Unicoi County, that offers a universal breakfast program, compared with average scores on identical tests of students from across Tennessee during the 2007–2008 school year. This study uses only the mathematics and reading and language arts TCAP scores of all 404 Unicoi County third and fourth graders for the respective school year. Also, the state means used in this research were comprised of only third and fourth grade mathematics and reading and language arts TCAP scores given in the spring of 2008.

The four research questions presented in Chapter 1 were used to guide the study. The four hypotheses presented in Chapter 3 were used to test the data. Analysis and discussion of the findings for each question and hypotheses follows.

## *Analysis of Research Questions*

### *Research Question 1*

Is there a significant difference between the Unicoi County mean third grade mathematics TCAP scores and the statewide mean third grade mathematics TCAP scores?

$H_{01}$ :

There is not a significant difference between the Unicoi County mean of third grade mathematics TCAP scores and the statewide mean of third grade mathematics TCAP scores.

A one-sample  $t$  test was conducted on the Unicoi County third grade mathematics TCAP scores to evaluate whether their mean score was significantly different than the State of Tennessee mean score of 480.3. The sample mean of 478.43 ( $SD = 21.37$ ) was not significantly different from 480.30,  $t(205) = 1.25$ ,  $p = .211$ . The null hypothesis was not rejected. The 95% confidence interval for Unicoi County third grade mathematics TCAP scores range from 475.50 to 481.37. The strength of the relationship between Unicoi County third grade mathematics TCAP scores and the state mean score effect size  $d$  of .09 indicates a small effect. Results indicate that Unicoi County third grade mathematics TCAP scores were not higher than the state average. Figure 1 shows the distributions of Unicoi County third grade mathematics TCAP scores.

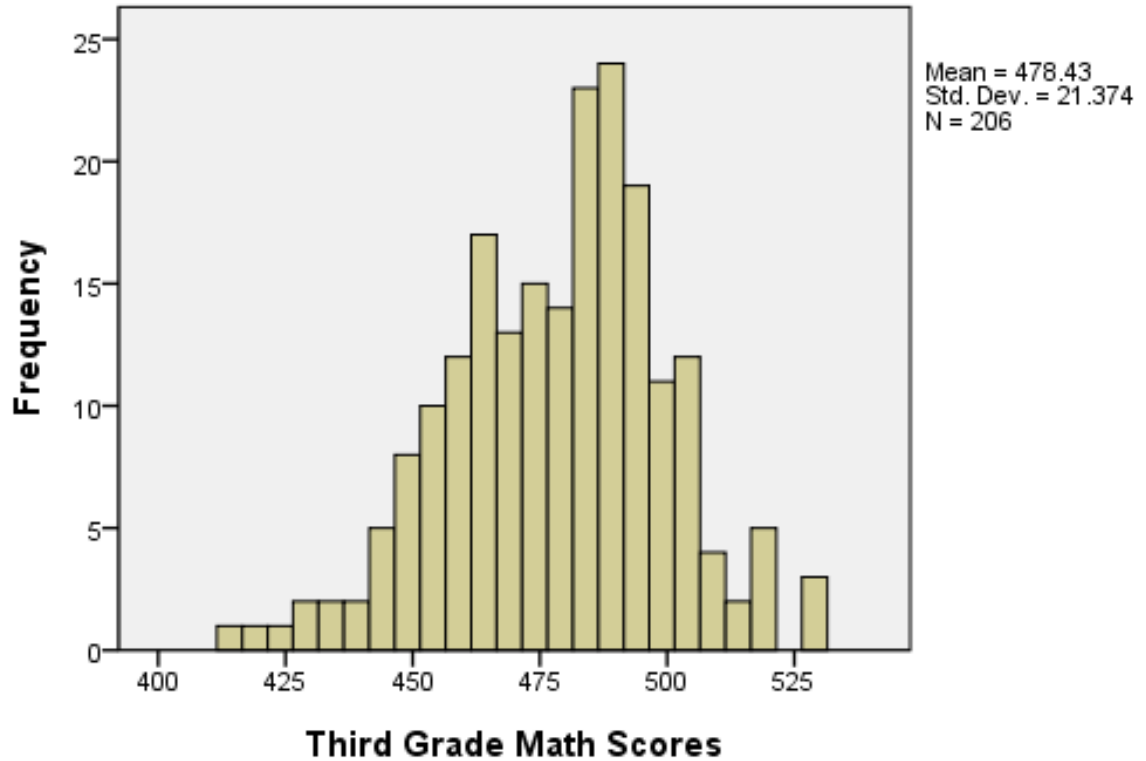


Figure 1. Distributions of Unicoi County Third Grade Math TCAP Scores

Research Question 2

Is there a significant difference between the Unicoi County mean third grade reading and language arts TCAP scores and the statewide mean third grade reading and language arts TCAP scores?

H<sub>0</sub>:

There is not a significant difference between the Unicoi County mean of third grade reading and language Arts TCAP scores and the statewide mean of third grade reading and language arts TCAP scores.

A one-sample *t* test was conducted on Unicoi County third grade reading and language arts TCAP scores to evaluate whether their mean score was significantly different than the State of Tennessee mean score of 491.20. The sample mean 492.14 (*SD* = 21.42) was not significantly

different from 491.20,  $t(205) = .63$ ,  $p = .529$ . The null hypothesis was not rejected. The 95% confidence interval for Unicoi County third grade reading and language arts TCAP scores range from 489.20 to 495.08. The strength of the relationship between Unicoi County third grade reading and language arts TCAP scores and the state mean score effect size of  $d$  of .04 indicates a small effect. Results indicate that Unicoi County third grade reading and language arts TCAP scores were not significantly higher than the state average. Figure 2 shows the distributions of Unicoi County third grade reading and language arts TCAP scores.

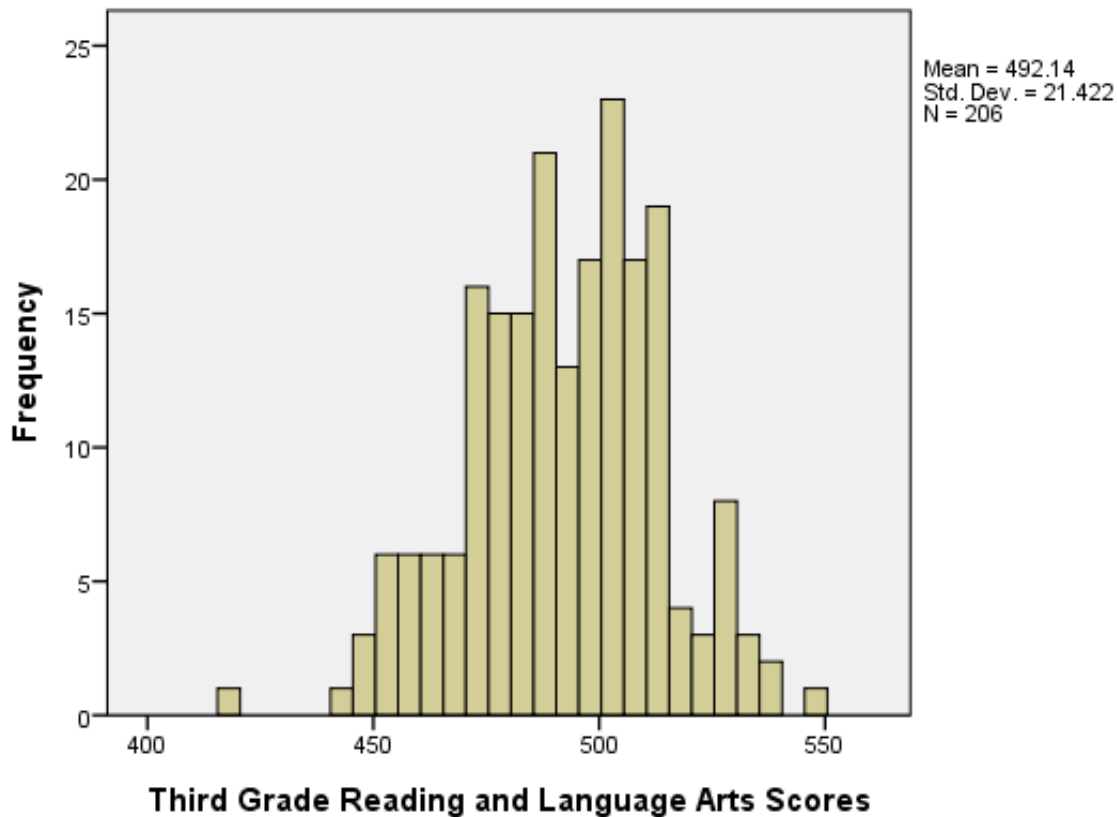


Figure 2. Distributions of Unicoi County Third Grade Reading and Language Arts TCAP Scores

### *Research Question 3*

Is there a significant difference between the Unicoi County mean fourth grade mathematics TCAP scores and the statewide mean fourth grade mathematics TCAP scores?

H<sub>03</sub>:

There is not a significant difference between the Unicoi County mean of fourth grade mathematics TCAP scores and the statewide mean of fourth grade mathematics TCAP scores.

A one-sample *t* test was conducted on the Unicoi County fourth grade mathematics TCAP scores to evaluate whether their mean score was significantly different than the State of Tennessee mean score of 498.80. The sample mean of 504.25 (*SD* = 27.84) was significantly different from 498.80,  $t(196) = 2.75$ ,  $p = .007$ . The null hypothesis was rejected. The 95% confidence interval for Unicoi County fourth grade mathematics TCAP scores range from 500.34 to 508.17. The strength of the relationship between the Unicoi County third grade mathematics TCAP scores and the state mean score effect size *d* of .20 indicates a small effect. Results indicate that the Unicoi County fourth grade mathematics TCAP scores were significantly higher than the state average. Figure 3 shows the distributions of Unicoi County fourth grade mathematics TCAP scores.



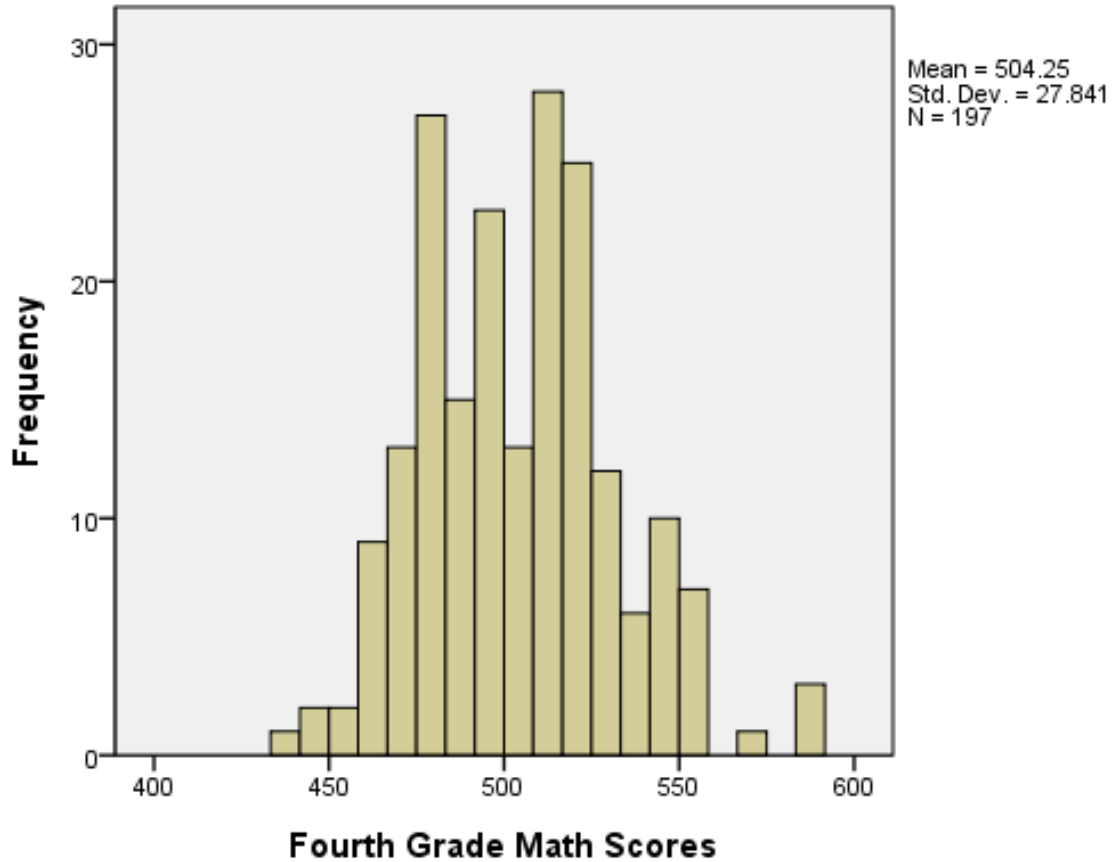


Figure 3. Distributions of Unicoi County Fourth Grade Math TCAP Scores

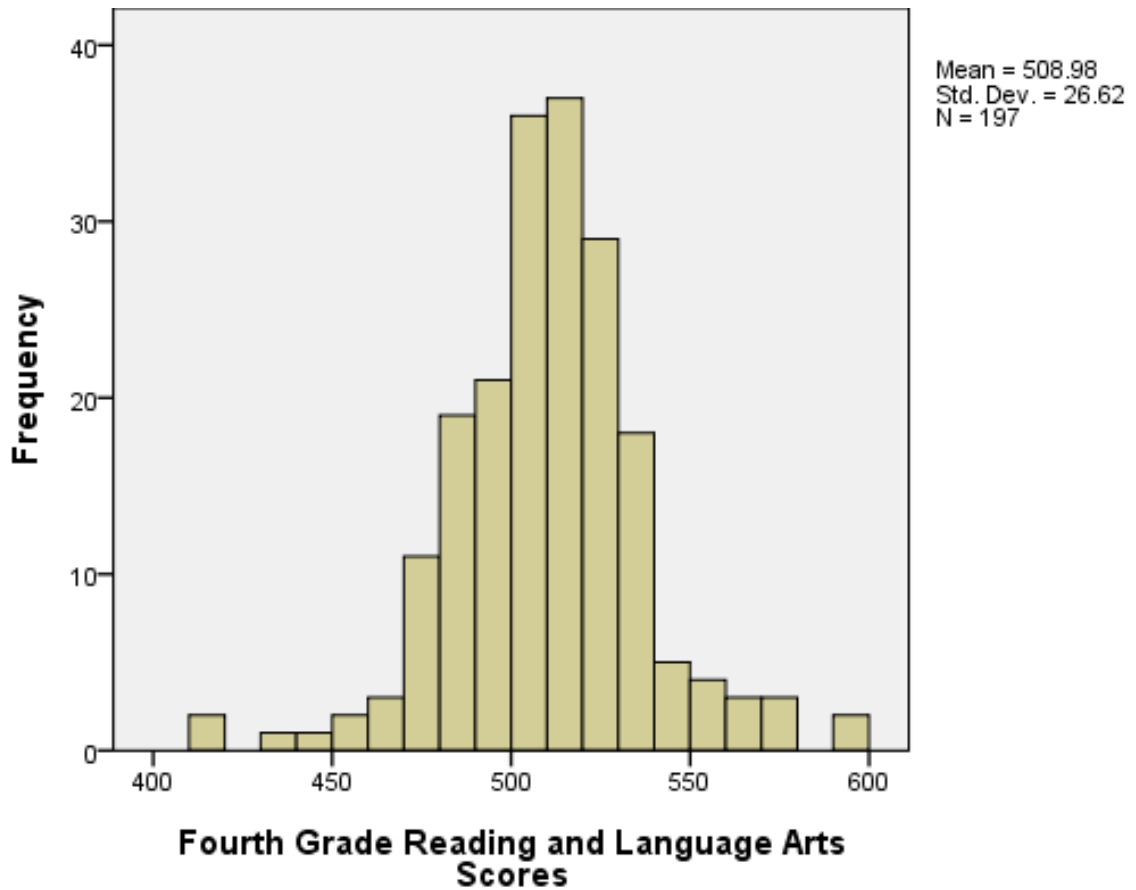
Research Question 4

Is there a significant difference between the Unicoi County mean fourth grade reading and language arts TCAP scores and the statewide mean fourth grade reading and language arts TCAP scores?

H<sub>04</sub>:

There is not a significant difference between the Unicoi County mean of fourth grade reading and language arts TCAP scores and the statewide mean of fourth grade reading and language arts TCAP scores.

A one-sample  $t$  test was conducted on Unicoi County fourth grade reading and language arts TCAP scores to evaluate whether their mean score was significantly different than the State of Tennessee mean score of 503.30. The sample mean of 508.98 ( $SD = 26.62$ ) was significantly different from 503.30,  $t(196) = 3.00$ ,  $p = .003$ . The null hypothesis was rejected. The 95% confidence interval for Unicoi County fourth grade reading and language arts TCAP scores range from 505.24 to 512.73. The strength of the relationship between Unicoi County fourth grade Reading and Language Arts TCAP scores and the state mean score effect size of  $d$  of .21 indicates a medium effect. Results indicate that the Unicoi County fourth grade reading and language arts TCAP scores were significantly higher than the state average. Figure 4 shows the distributions of Unicoi County fourth grade reading and language arts TCAP scores.



*Figure 4.* Distributions of Unicoi County Fourth Grade Reading and Language Arts TCAP Scores

*Summary*

Chapter 4 was an analysis and presentation of data related to this research study. There were four research questions and four null hypotheses included in this chapter. Chapter 5 includes a summary of findings, conclusions about this research study, implications for educators, and recommendations for future study.

## CHAPTER 5

### SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS FOR FUTURE RESEARCH AND TO IMPROVE PRACTICE

The purpose of this study was to investigate the relationship of standardized test scores on the Tennessee Comprehensive Assessment Program (TCAP) of students who are enrolled in a school system, Unicoi County, that offers a universal breakfast program, compared with average scores on identical tests of students from across Tennessee during the 2007-2008 school year. This study was conducted using only data from the mathematics and reading and language arts TCAP scores of all Unicoi County third and fourth graders for the respective school year. Also, the state means used in this research were comprised of only third and fourth grade mathematics and reading and language arts TCAP scores given in the spring of 2008. Statistical measures were used to conclude if there was a significant difference between Unicoi County third and fourth grade mathematics and reading and language arts TCAP scores compared with average scores on identical tests of students from across Tennessee. Chapter 5 contains a summary of the study, a summary of the findings, conclusions, recommendations for practice, and recommendations for further research.

#### *Summary of the Study*

This quantitative study examined whether a universal breakfast program would impact a criterion-referenced test in a statistically significant manner. The population for this study consisted of 404 Unicoi County third and fourth graders who participated in the TCAP mathematics and reading and language arts TCAP scores during the 2007-2008 school year. The Unicoi County scores were compared with the overall mean scores for the State of Tennessee in

mathematics and reading and language arts for students in the third and fourth grades during the 2007-2008 school year.

### *Summary of Findings*

The purpose of this study was to determine how Unicoi County's TCAP mathematics and reading and language arts scores at the third and fourth grade levels compared with the overall Tennessee TCAP averages in mathematics and reading and language arts at third and fourth grade levels in both public and private schools for the 2007-2008 school year. The statistical analysis detailed in the study was centered on four research questions presented in both Chapters 1 and 3. The four null hypotheses that concentrated on a universal breakfast program's association on standardized test scores were listed in Chapter 3. A one-sample  $t$  test was used to answer each research question. The level of significance used in the test was .05. Presented in this section are each research question and a summary of the related results.

#### *Research Question 1*

Is there a significant difference between the Unicoi mean third grade mathematics TCAP scores and the statewide mean third grade mathematic TCAP scores?

A one-sample  $t$  test was conducted to evaluate whether there was a significant difference between the Unicoi County mean of third grade mathematics TCAP scores and the statewide mean of third grade mathematics TCAP scores. The null hypothesis was not rejected. Results indicated that that Unicoi County third grade mathematics TCAP scores were not significantly higher than the State average.

#### *Conclusion*

There was not a statistically significant relationship between Unicoi County's third grade mathematics TCAP scores and the State mean. In fact, the Unicoi County mean was below the

State mean in this category. The findings in this group of the study did not support earlier conducted research (Connors, 1989; David, 2009; Florence et al., 2008) that found eating breakfast resulted in greater cognitive performance and higher academic achievement on standardized test outcomes. However, other studies have found that standardized test results should not be the sole factor in determining what students learned during a given time frame. Shaker (2004) warned school administrators that the key to understanding student attainment was to use a variety of measurements over the course of the school year and not to depend on an annual standardized test as a barometer of total student progress. Also, using standardized testing as the lone measurement tempers the actual learning that takes place on a daily basis in schools (Stevens et al., 2008). Jensen (2005) added that there is little evidence of a seamless transition of skills needed to be successful at taking standardized examinations to other more functional areas of a student's life.

### *Research Question 2*

Is there a significant difference between the Unicoi County mean third grade reading and language arts TCAP scores and the statewide mean third grade reading and language arts TCAP scores?

A one-sample *t* test was conducted to evaluate whether there was a significant difference between the Unicoi County mean of third grade reading and language arts TCAP scores and statewide mean of third grade reading and language arts TCAP scores. The null hypothesis was not rejected. Results indicated that Unicoi County reading and language arts TCAP scores were not significantly higher than the State average.

### *Conclusion*

There was not a statistically significant relationship between Unicoi County's third grade reading and language arts TCAP scores and the State mean. In this instance, however, the Unicoi County mean was above the State mean. The findings for this cluster contradict previous research on the topic of breakfast and improved cognition. For example, researchers (Chandler et al., 1995; Taras, 2005) documented a link between improved cognitive ability in students who ate breakfast compared with their peers who did not eat the morning meal. Nevertheless, researchers have questioned the importance of variables that are often given little consideration by educators in regards to standardized assessments but could have an impact on scores. Flanagan and Harrison (2005) found that it was imperative for standardized tests to measure students' abilities tied to academic performance to retain any relevance. In addition, Romey (2000) documented that school systems should consider the developmental level of the student rather than the grade level when selecting a means of standardized assessment to measure student achievement.

### *Research Question 3*

Is there a significant difference between the Unicoi County mean fourth grade mathematics TCAP scores and the statewide mean fourth grade mathematics TCAP scores?

A one-sample *t* test was conducted to evaluate whether there was a significant difference between the Unicoi County mean of fourth grade mathematics TCAP scores and statewide mean of fourth grade mathematics TCAP scores. The null hypothesis was rejected. Results indicated that Unicoi County fourth grade mathematics TCAP scores were significantly higher than the State average.

### *Conclusion*

There was a statistically significant difference between Unicoi County's fourth grade mathematics TCAP scores and the State mean. These findings coincide with several prior research studies. Worobey and Worobey (1999) found that school breakfast participation improved children's scores on standardized achievement tests. Also, students who ate breakfast earned almost a letter grade higher in mathematics when compared with peers who did not participate in a school breakfast program (Murphy et al., 1998). Bellisle (2004) added that the breakfast nutrient composition and size impacted cognitive ability in students.

### *Research Question 4*

Is there a significant difference between the Unicoi County mean fourth grade reading and language arts TCAP scores and the statewide mean fourth grade reading and language arts TCAP scores?

A one-sample *t* test was conducted to evaluate whether there was a significant difference between the Unicoi County mean of fourth grade reading and language arts TCAP scores and statewide mean of fourth grade reading and language arts TCAP scores. The null hypothesis was rejected. Results indicated that Unicoi County fourth grade reading and language arts TCAP scores were significantly higher than the State average.

### *Conclusion*

There was a statistically significant difference between Unicoi County's fourth grade reading and language arts TCAP scores and the State mean. This study finding is supported through several distinct research studies. Mouser and Worley (2003) found that breakfast in the classroom increased meal participation while improving the whole academic climate of an observed elementary school. Moreover, research has demonstrated that children in the fourth



grade had slower memory functions after missing breakfast (Pollitt, 1995). Following this further, Lent (2007) discovered that 60% of teachers in Milwaukee Public Schools found positive student qualities in behavior, absenteeism, and tardiness rates only a short time after a universal breakfast program was implemented.

### *Recommendations for Practice*

This study provided insight into the associations that a universal breakfast program may have on standardized test scores in the Unicoi County School System. The following recommendations for practice are a result of the findings and conclusions of this research:

1. School systems should implement breakfast programs in all schools. The litany of research that supports the positive aspects of eating this meal for students should not be ignored by school administrators. In fact, increased school breakfast participation rates have coincided with improvements to a school's academic climate (Mouser & Worley, 2003). Pollitt (1995) found that children in the third and fourth grade had memory functions that were slower after missing breakfast. Moreover, Alaimo, Olson, and Frongillo (2001) noted that third and fourth grade students who were considered food-insecure had lower mathematics scores when compared to their peers who maintained adequate nutrition. School administrators should offer the opportunity for each student to eat a nutritionally sound breakfast every morning in all schools in their district.
2. School systems should implement universal breakfast programs in all schools with a 70% free and reduced rate or above. Teachers at schools with universal breakfast programs have reported improved behavior, attendance, and tardiness rates after only a short time of program implementation (Lent, 2007). Additionally, Chmelynski (2007) found that schools reported improved learning environments with fewer incidents of disobedience in comparison to before program implementation. Howell and Stenberg (2002) noted that a heightened alertness while learning was among the benefits of a universal breakfast program for students. Furthermore, the financial risk

of losing money is minimal to the School Food Authority at this particular percentage or higher (Murphy et al., 1998). Hence, this is an opportunity to potentially improve students' standardized test scores at little or no cost to the school system as well as enhance the overall school community.

3. School districts should provide mandatory nutrition education to all students.

According to the National Conference of State Legislatures (2008), obesity rates have more than quadrupled over the past 30 years for third and fourth grade students.

Also, Coyl (2009) noted that obesity has recently become a major health threat to children who are in the later elementary grades. Younger adults will be afflicted with severe life-threatening illnesses associated with the elderly in previous years as a result of the rise of childhood obesity (Olfman, 2005). Pursuing this further,

Anderson and Butcher (2006) found that childhood obesity rates could be associated with increasing adult obesity rates in the United States. Researchers have noted that an overweight juvenile has a 70% chance of continuing this condition after he or she reaches adulthood (National Conference of State Legislatures, 2008). According to Haskins (2005) the NSLP was started as a matter of national defense because of malnourished soldiers in World War II. Ironically, that program is now being blamed for feeding school children an abundance food, which has allowed to pendulum to swing from underweight soldiers to obese students in the span of 60 years.

4. School districts should provide staff development for teachers, administrators, and decision-makers. Education should focus on decreased calorie consumption along with increased physical activity. Hedley et al. (2004) demonstrated that increased obesity rates could be tied to increased calorie consumption while physical exercise

has been reduced over the past 2 decades. In addition, another concern of obesity is the financial ramifications that burden society. For example, the cost of obesity-related medical expenditures reached \$75 billion dollars in the United States for 2003 (National Conference of State Legislatures, 2008).

### *Recommendations for Future Research*

The study provided a narrow scope of focus as only one school system, Unicoi County, and one state, Tennessee, was examined to determine if a universal breakfast program was one variable which had an effect on standardized test scores. The following represent recommendations for additional study:

1. A similar study can be conducted to compare a school system that has a universal breakfast program that is located in an urban setting.
2. This study addressed only student TCAP performance in mathematics and reading and language arts. A comparable study could investigate the associations of a universal breakfast program on TCAP science and social studies scores.
3. Further research can be conducted that seeks other factors such as class size, teacher to pupil ratio, and teacher efficacy, that contribute to increased test scores.
4. A comparable study can be conducted that investigates if students who eat a breakfast that is deemed healthy by dieticians and nutrition professionals score higher on standardized tests than their peers who consume what is considered an unhealthy breakfast.
5. An additional study can be conducted to determine if breakfast in the classroom has any impact on students' standardized test scores.

6. Qualitative studies should be performed to investigate teachers' perceptions of the learning abilities of their students who receive free or reduced priced breakfast and lunch.
7. A similar study can be conducted to determine if universal lunch programs are more successful at improving student academic performance when compared to universal breakfast programs.
8. An additional study can be conducted to investigate whether including questions about sound nutritional practices on standardized assessments would improve student retention of this information along with lower childhood obesity rates.
9. This study can be replicated with data from Unicoi County and other Tennessee school systems that have universal breakfast programs omitted from the State mean.

#### *Summary*

This study, which is organized and presented over five chapters, used a quantitative research design and centers on the associations of Unicoi County's universal breakfast program on their third and fourth grade mathematics and reading and language arts TCAP scores when compared with the statewide Tennessee mean in these respective TCAP areas. Chapter 1 contained an introduction, statement of the problem, research questions, significance of the study, limitations and delimitations, the definition of terms, and an overview of the study. In Chapter 2, a review of related literature delved into the history and scope of the NSLP and SBP, the developmental levels of third and fourth grade students, and the increased importance and emphasis of standardized assessments. Chapter 3 presented the research design for this study that makes use of the criterion-referenced TCAP to determine the effectiveness of a universal breakfast program on a portion of these test results. Chapter 4 contained an analysis and

presentation of data related to this research study along with the four research questions and null hypotheses that guided this investigation. Chapter 5 included a summary of findings, conclusions about this research study, implications for educators, and recommendations for future study. The results indicated that there was not a significant difference between Unicoi County third grade mathematics and reading and language arts TCAP scores and the State mean. However, the findings showed a significant increase between Unicoi County fourth grade mathematics and reading and language arts TCAP scores and the State mean. School administrators were urged to consider implementing a universal breakfast program. Also, schools with a free and reduced percentage of 70% or above were advised to start universal breakfast programs as a means to improve standardized test results at little or no cost to the school district. Future research should be focused on the importance of sound student nutritional practices on their cognitive ability.

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APPENDICES

APPENDIX A

School Systems That Participate in System-Wide Universal Breakfast

By Field Service Area

First Tennessee FSC

Unicoi County

East Tennessee FSC

Clinton City

Morgan County

Southeast FSC

Athens City

Meigs County

Upper Cumberland FSC

Grundy County

Jackson County

Van Buren County

Mid Cumberland FSC

Stewart County

Memphis-Shelby FSC

Memphis City

Northwest FSC

Alamo City

Bells City

Benton County

Bradford SSD

Crockett County

Hollow Rock-Bruceton SSD

Humboldt City

Milan SSD

Obison County

Trenton SSD

Weakley County

APPENDIX B

Minimum Quantities for Traditional Meal Pattern Lunch

Meal Components	Required		Recommended Quantities
<u>Milk</u> (as a beverage)	8 fl. oz.	8 fl. oz.	8 fl. oz.
<p><u>Meat or Meat Alternate</u> (quantity of the edible portion as served)</p> <p>Lean meat, poultry or fish Cheese Large egg Cooked dry beans or peas Peanut butter or other nut or seed butters Yogurt, plain or flavored, Unsweetened or sweetened</p> <p>The following may be used to meet no more than 50% of the requirement and must be used in combination of the above: Peanuts, soy nuts, tree nuts, or seeds, as listed in program guidance, or an equivalent quantity of any combination of the above. Meat/meal alternate (1 ounce of nuts/seeds = 1 ounce of cooked lean meat, poultry or fish)</p>	<p>1 1/2 oz. 1 1/2 oz. 3/4 3/8 cup 3 Tablespoons 6 oz. or 3/4 cup  3/4 oz = 50%</p>	<p>2 oz. 2 oz. 1 1/2 cup 4 Tablespoons 8 oz. or 1 cup  1 oz. = 50 %</p>	<p>3 oz. 3 oz. 1 1/2 3/4 cup 6 Tablespoons 12 oz. or 1 1/2 cups  1 1/2 oz. = 50%</p>
<u>Vegetables/Fruits</u> (2 or more servings of vegetables or fruits or both to total)	1/2 cup	3/4 cup	3/4 cup

<p><u>Grains/Breads</u> (Must be enriched or whole grain)</p> <p>A serving is determined by the correct weight (ounces/grams) of the Grains/Breads item. Refer to appendix 4, pages 237-242, <i>A Menu Planner for Healthy School Meals</i>.</p>	<p>8 servings per week</p> <p>Minimum of 1 per day</p>	<p>8 servings per week</p> <p>Minimum of 1 per day</p>	<p>10 servings per week</p> <p>Minimum of 1 per day</p>
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## APPENDIX C

### Minimum Breakfast Quantities K-12

MILK – 8 oz. fluid milk (K-12)

JUICE/FRUIT/VEGETABLE – 1/2 cup (K-12)

MEAT/MEAT ALTERNATE and/or GRAINS/BREADS

The meal pattern calls for a minimum of two servings of Meat/Meat Alternate OR two servings of Grains/Breads OR one of each

*For Meat/Meat Alternate:*

- ◆ 1 oz. Meat/poultry or fish; cheese
- ◆ 2 Tablespoons Peanut Butter
- ◆ 4 oz. or 1/2 cup Yogurt
- ◆ 4 Tablespoons cooked dry beans and peas (such as breakfast burrito may count as a Vegetable or Meat Alternate but not as both in the same meal)

*For Grains/Breads:*

- ◆ Must meet the quantities specified in USDA's Grain/Breads Instruction; (minimum serving size required) or
- ◆ Provide the minimum required quantity of enriched flour/whole grain in each serving
- ◆ Must be whole-grain or enriched or made from whole-grain or enriched flour or meal
- ◆ Must be whole-grain, enriched, or fortified, if it is a cereal

(Reference: pages 48-51, Chapter 2, FOOD-BASED MENU PLANNING)

*A Menu Planner for Healthy School Meals*

APPENDIX D

Traditional Food Based Menu Planning Breakfast

FOOD COMPONENTS AND FOOD ITEMS	MINIMUM REQUIREMENTS		
	Ages 1-2	PRESCHOOL	Grades K-12
<u>Milk</u> (fluid) (as a beverage, on cereal or both)	4 fl. oz. (1/2 cup)	6 fl. oz. (3/4 cup)	8 fl. oz. (1 cup)
<u>Juice/Fruit/Vegetable</u> Fruit and/or vegetable; or full-strength fruit juice or vegetable juice	1/4 cup	1/2 cup	1/2 cup
<b>SELECT ONE SERVING FROM EACH OF THE FOLLOWING COMPONENTS; TWO FROM ONE COMPONENT; OR AN EQUIVALENT COMBINATION</b>			
<u>Grains/Breads</u> <i>One of the following or an equivalent combination:</i>  Whole-grain or enriched bread Whole-grain or enriched biscuit/roll/muffin, etc. Whole-grain, enriched or fortified cereal	1/2 slice 1/2 serving 1/4 cup or 1/3 oz.	1/2 slice 1/2 serving 1/3 cup or 1/2 oz.	1 slice 1 serving 3/4 cup or 1 oz.
<u>Meat or Meat Alternate</u> <i>One of the following or an equivalent combination:</i>  Lean Meat/poultry or fish Cheese Egg (large) Peanut butter or other nut or seed butters Cooked dry beans and peas Nut and/or seeds (as listed in program guidance) Yogurt, plain or flavored, unsweetened or sweetened	1/2 oz. 1/2 oz. 1/2 large egg 1 Tablespoon 2 Tablespoons 1/2 oz. 2 oz. or 1/4 cup	1/2 oz. 1/2 oz. 1/2 large egg 1 Tablespoon 2 Tablespoons 1/2 oz. 2 oz. or 1/4 cup	1 oz. 1 oz. 1/2 large egg 2 Tablespoons 4 Tablespoons 1 oz. 4 oz. or 1/2 cup

APPENDIX E

Letter of Permission

October 9, 2009

Mrs. Denise Brown  
Director of Schools  
Unicoi County School System  
600 North Elm  
Erwin, TN 37650

Dear Mrs. Brown,

I am a student at East Tennessee State University. I am in the Educational Leadership and Policy Analysis doctoral program. The study I am interested in compares the TCAP scores for Math, Reading and Language arts for third and fourth grade students in Unicoi County, which features a systemwide universal breakfast program, against overall state means in those respective areas.

I would like to request permission to obtain and analyze TCAP Math, Reading and Language Arts scale scores for third and fourth grade students in all Unicoi County Schools for school year 2007-2008. I do not need the names or social security numbers for these students.

I trust that the findings of this study may be beneficial to other school systems when determining methods to increase student achievement when considering implementing a systemwide universal breakfast program.

Sincerely,

Lamar Smith

Permission is granted to Lamar Smith to obtain and analyze TCAP mathematics, reading and language arts scale scores for third and fourth grade students in Unicoi County for school year 2007-2008.

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Signature

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Date

