

THE EFFECTS OF LAUGHTER YOGA ON SECOND GRADE MATH
ACHIEVEMENT

By
Deborah Lezanic Nagy

A Dissertation
Submitted in Partial Fulfillment
of the Requirements for
the Degree of Doctor of Education
in Curriculum and Leadership

Columbus State University
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The Effects of Laughter Yoga on Second Grade Math Achievement

Deborah Lezanic Nagy

Columbus State University

Dedication

I dedicate this paper in loving memory to two people who would have been the most proud, my dad and mom, Charles and Darlene Lezanic, who did not make it here on earth to see the finished product. Without their financial assistance and encouragement, I would not be writing this today. They believed in me many times when I did not believe in myself and my hope is that they are celebrating in heaven as they see that I have painstakingly, finally reached my goal.

Acknowledgements

Though only my name appears on the cover of this dissertation, a great many people have contributed to its production. I owe my gratitude to all those people who have made this document possible through their love, support, and encouragement.

During the course of writing this document, I lost my mother, lost my grandmother, was diagnosed with cancer, suffered a major car accident which resulted in two surgeries, and then lost my father. My sister, Caren Falascino, became my caregiver and biggest cheerleader. I owe her my undying gratitude for stepping in when I was at my weakest.

This document would not have been possible without the advice and coaching from my dissertation chair, Dr. Iris Saltiel. Her relentless prodding and poking got me to this point and words cannot describe how appreciative I am.

I am hugely indebted to Dr. Kyle Christianson for his knowledge of numbers and patience with my lack of statistics expertise, and Dr. Ellen Roberts for her kind words, encouragement, suggestions and last minute intervention, without which I do not know if I would have had the strength to finish.

I owe sincere and earnest thankfulness to Dr. Robert Waller who stepped in when I suddenly needed a new committee member and I appreciate the time he invested in this document.

Above all, I would like to acknowledge my husband, Joe, for his personal support and his unwavering patience every time I announced I wanted to go back to school. This is it, Joe, my terminal degree.

I would like to give a special shout-out to my son, Joey, who spent many hours editing this paper. Without his assistance, I may still be revising. I am glad I raised such a smart son.

My son, Matt, has always encouraged me in all my endeavors to further my education even when I missed important events.

None of this would have been possible without my family and friend's encouragement, support, love, and patience. I am so thankful I have a circle of amazing people.

School's out forever!

Vita

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Dissertation Topic
 The Effects of Laughter Yoga on Second Grade Math Achievement
 Education

Ed.D., Educational Leadership Columbus State University	2016
EdS., Educational Leadership Troy State University	2002
MEd., Elementary Education Troy State University	1998
BSEd., Early Childhood Education Columbus State University	1995

Achievements

Increased student achievement each year as principal
 School recognized by state as a Title I Platinum award winner, 2010
 Attended Oxford Roundtable discussions on education in Oxford, England, 2007
 School recognized by state as Bronze Award winner for greatest gains, 2005
 Title I Distinguished School for 8 years
 Principal's Award, 1997

Abstract

The purpose of this study was to investigate the effects of laughter yoga on the mathematic achievement of second grade students as measured by the math Mock Criterion Reference Competency Test (CRCT). According to Hoffman (2008), laughter can provide positive benefits to children and adults impacted by autism, epilepsy, and even diabetes. Hoffman (2008) conducted research on humor in early childhood education settings and found little research on laughter and the benefits to young children in the academic setting. Most humor research deals with how humor progresses through the developmental stages of children (Hoffman, 2008). In the last ten years, there has been an abundance of research on laughter. However, not much of the research is on elementary students. There is a great need for studies on the laughter of early childhood students because laughter has so many benefits to the mind and body. This study used the procedures of laughter yoga, set forth by Dr. Madan Kataria (2005), on second grade children before math class and standardized testing to investigate if it had any effect on their math Mock CRCT scores. The results indicated the laughter intervention was unlikely to positively affect second grade math scores as demonstrated by the math Mock CRCT.

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CHAPTER 1

INTRODUCTION

“The best way to cheer yourself up is to try to cheer somebody else up.”

Mark Twain

Imagine the sound of silly giggling, muffled snickers, or robust belly laughs. To many, this is a glorious sound to hear, knowing children are happy, content, and relaxed. Laughter can be contagious, and many children respond to humor (Crook, 2008; Skinner, 2010). Children have the basic tools needed for humor. They are playful, have the ability to play with language, and possess a love of humor. However, many parents fail to nurture this and become annoyed by children’s constant riddles and jokes. Children need to be shown that humor is an effective coping mechanism to adapting to difficult circumstances (McGhee, 1996).

Statement of the Problem

Math scores have remained stagnant over the last few years. The National Assessment of Educational Progress (NAPE) reports a three-point increase in the mathematics test scores of nine year-olds in the last eight years (U.S. Dept of Ed.) and a two point overall drop in 2015. Because math scores were not rapidly increasing, many changes took place in public schools. Children spend weeks taking standardized tests and months preparing for them. Hennick (2016) reported children spend between 20 and 25 hours per years taking standardized tests and children as young as six years old are tested. This may cause anxiety in some children. Many times when children do not understand difficult

concepts, they experience headaches, stomachaches, or physical weakness caused by stress (Okhuizen-Stier, 2008).

Purpose of the Study

The purpose of this study was to investigate the effects of laughter yoga on the mathematic achievement of second grade students as measured by the Mock Criterion Reference Competency Test (CRCT). Laughter tends to remove the side effects of stress experienced by children such as anxiety and behavioral problems (Okhuizen-Stier, 2008; Skinner, 2010). Research suggests 25-40% of children display test anxiety (Salend, 2011). School leaders, counselors, and teachers identified possible triggers of test anxiety and utilized different strategies to reduce stress in children (Salend, 2011). Previous studies suggest laughter can release positive hormones in the brain that can reduce stress, lower blood pressure, boost immunity, mask pain, and elevate one's mood (Adams & Mylander, 1998; Crook, 2008; Griffiths, 1992; Skinner, 2010; Okhuizen-Stier, 2008). Mathematics builds on previous concepts and children may experience anxiety if the teacher moves on to more difficult concepts before they master the prerequisites. Laughter may reduce these symptoms, making children better prepared to learn and test. Adams and Mylander (1998) suggest that although laughter is difficult to evaluate, the response to humor can be studied.

According to Hoffman (2008), laughter can provide positive benefits to children and adults impacted by autism, epilepsy, and even diabetes. Hoffman (2008) conducted research on humor in early childhood education settings and stated there is little research on laughter and the benefits to young children in the academic setting. Most humor research deals with how humor progresses through the developmental stages of children (Hoffman, 2008). In

the last ten years, there has been an abundance of research on laughter. However, very little of the research is on elementary students. There is a great need for studies on the laughter of early childhood students because laughter has so many benefits to the mind and body. This study used the procedures of laughter yoga, set forth by Dr. Madan Kataria (2005), on second grade children before math class and standardized testing to determine if it had any effect on their math Mock CRCT scores.

Research Questions and Hypotheses

RQ1: Is there a statistically significant difference in the math Mock CRCT scores of second grade students who participated in laughter yoga sessions as compared to second grade students who did not participate in the sessions?

H1₀: There will be no statistically significant difference in the math Mock CRCT scores of second grade students who participated in laughter yoga sessions as compared to second grade students who did not participate in the sessions.

H1_A: There will be a statistically significant difference in the math Mock CRCT scores of second grade students who participated in laughter yoga sessions as compared to second grade students who did not participate in the sessions.

RQ2: Is there a statistically significant difference in the math Mock CRCT scores of second grade males who participated in laughter yoga sessions as compared to second grade males who did not participate in the sessions?

H2₀: There will be no statistically significant difference in the math Mock CRCT scores of second grade males who participated in laughter yoga sessions as compared to second grade males who did not participate in the sessions.

H2_A: There will be a statistically significant difference in the math Mock CRCT scores of second grade males who participated in laughter yoga sessions as compared to second grade males who did not participate in the sessions.

RQ3: Is there a statistically significant difference in the math Mock CRCT scores of second grade, minority students who participated in laughter yoga sessions as compared to second grade, minority students who did not participate in the sessions?

H3₀: There will be no statistically significant difference in the math Mock CRCT scores of second grade, minority students who participated in laughter yoga sessions as compared to second grade, minority students who did not participate in the sessions.

H3_A: There will be a statistically significant difference in the math Mock CRCT scores of second grade, minority students who participated in laughter yoga sessions as compared to second grade, minority students who did not participate in the sessions.

RQ4: Is there a statistically significant difference in the math Mock CRCT scores of second grade, low socio-economic students who participated in laughter yoga sessions as compared to second grade, low socio-economic students who did not participate in the sessions?

H4₀: There will be no statistically significant difference in the math Mock CRCT scores of second grade, low socio-economic students who participated in laughter yoga sessions as compared to second grade, low socio-economic students who did not participate in the sessions.

H4_A: There will be a statistically significant difference in the math Mock CRCT scores of second grade, low socio-economic students who participated in laughter yoga sessions as

compared to second grade, low socio-economic students who did not participate in the sessions.

Rationale

This study is important as school systems across the nation try to raise test scores and close the achievement gap in the age of the *No Child Left Behind Act, 2002* and the *Race to the Top Act, 2012* (Jahng, 2011). National and state governments are holding school personal accountable for raising student achievement, yet funding sources are being cut (Anderson, 2005). The pressure placed on children to pass one test is immense and many children and parents dread testing week, knowing achievement on the test is vital to promotion to the next grade. This study presented a unique approach to investigate the effects of laughter yoga on the mathematic achievement of second grade students. This information is critical for administrators, teachers, and policy makers because the results of this study may be used to influence a change in educational practices. The results of this study may be used to suggest the need for implementing humor- based interventions at the early childhood level, thus reducing anxiety on high-stakes tests (U.S. Department of Education, Title I, 2004).

Laughter has many benefits to the body and mind. This study investigated the impact of laughter on learning in a specific subject area, i.e., the effects of laughter yoga on the criterion-referenced math scores of second-grade children.

Theoretical Framework

The theoretical framework for this study was guided by the theories of laughter. Studies have revealed that laughter provides many physiological benefits to children and

increases their ability to socialize with others (Adams & Mylander, 1998; Crook, 2008; Griffiths, 1992; Okhuizen-Stier, 2008; Skinner, 2010). Some suggest that learning is improved when it is enjoyable (Crook, 2008; McGhee, 1996; Rogers, 1984). This exploration was framed around the benefits of laughter and the possible gains to the achievement of children.

Scientists believe that when a person laughs, neurons fire within the brain's frontal lobe, sending messages to one's facial muscles, throat and diaphragm (D'Alto, 2013). If the laughter is intense, tear ducts become stimulated along with muscles in the arms, legs, and torso (D'Alto, 2013). However, differences in personality, intelligence, mental state, and mood are all factors that influence laughter (Mitchell, 2005).

The superiority theory of laughter involves one seeing another's misfortune or stupidity. It is laughter at someone else's expense and often ridicules or mocks individuals or groups (D'Alto, 2013; Mitchell, 2005; Perks, 2012; Restak, 2013). After laughing by making fun of another, one's self worth is often elevated. This can be hurtful to the target and often causes harm to emotional wellbeing (Perks, 2012). Beard (2014) states the superiority theory is a form of derision or mockery. Aristotle is thought to be a main source of this view. Beverly Cleary utilized the superiority theory of laughter from the 1950s through the 1990s, when she created the character Ramona. Children enjoy reading about a younger version of themselves and feel superior to the character that appears so foolish (Cart, 2003). Authors, such as Judith Viorst and her book about Alexander and his horrible day (1972) and the Cynthia Rylants series about Henry and Mudge (1987-2001), are children's favorites because they relate their own siblings and family members to those in

the stories. Repetition, word play, use of forbidden words, and funny names are frequently used in these books and they continue to be children's favorites (Cart, 2003).

The relief theory of laughter involves the release of built-up tension and is used largely by filmmakers (D'Alto, 2013; Mitchell, 2005). This theory maintains a good laugh releases built-up tension and nervousness and provides mental relief (Perks, 2012). The relief theory of humor is most associated with the work of the psychoanalyst, Sigmund Freud. Starchy (1960) wrote that Sigmund Freud saw humor as a way of releasing suppressed aggression or energy and believed it was linked to the unconscious (Strachy, 1960). In his works for children, author Ronald Dahl (1942-1990) is masterful in using the relief theory in his books, as is Gordon Korman (2006) in his series of books, *Nose-Picker*. Dav Pilkey also uses this theory in his *Captain Underpants* (1997-2015) books (Cart, 2003).

The incongruity theory of laughter involves faulty logic or contradiction and is cognitive in nature. (D'Alto, 2013; Mitchell, 2005; Perks, 2012). It is creating unexpected humor. One anticipates certain outcomes based on cognitive framework or past experience but the opposite occurs. Intellect and recognition of incongruities are essential parts of this theory. Puns are an example of the incongruity theory. An element of surprise is utilized by authors such as Walter R. Brooks when Freddy the Pig rides a motorcycle in the *Freddy the Pig* series (1927-1958), Arnold Lobel's *Toad* (1996) is dressed in an ill-fitting bathing suit, and J.K. Rowling's *Harry Potter* series (1997-present) when Harry misses the train back to school and the train station with the 8 ½ track remains invisible to almost all other passengers (Cart, 2003).

Perks (2012) maintains most humor involves all three of these theories. After a joke is understood, emotional responses occur within the brain involving the reward or pleasure network. This network lights up when a person does something pleasant. This same reaction happens when one looks at a funny cartoon or laughs at a joke (Perks, 2012).

Although the above theories of humor contain similar characteristics, they apply mainly to adults; however they can be used to study children (D'Alto, 2013; Mitchell, 2005; Perks, 2012). Hoffman (2008) used the research of Bergen (2001), Church (2005), McGhee (1971), and Piaget (2011) and described three theories of humor related to children: the psychoanalytic, cognitive, and social interaction theories. These three theories may be the most appropriate to use when studying children.

Freud was the forefather of psychoanalytic thought and viewed humor as a mechanism for coping with challenging situations and expressing emotion. This theory benefits children by helping them cope with anxiety (Hoffman, 2008). Strachy (1960) translated Freud's major works into English, under the approval of Freud, in his book *Jokes and Their Relations to the Unconscious* (1960). He stated that Freud proposed many theoretical approaches to understanding wit built around the framework that joking is not only about replacing anxiety and fear with laughter, but also a way of expressing unconscious thoughts, social control, sexuality, and aggression in life (1960).

According to Hoffman (2008), the psychoanalytic theory of laughter is based on intrinsic motivation and involves three stages. Hoffman (2008) said the first stage of psychoanalytic development occurs between two and three years of age and deals with play.

In this stage, the child performs incongruous acts or uses absurd combinations of words, ideas, or objects. The next stage happens between ages four and six years and is called jesting. Jestering is the beginning of humorous expression without meaning and begins when a child demonstrates a desire or social pressure to make incongruities more meaningful. Hoffman (2008) reports the final stage of Freud's theory occurs at age seven and is called joking. It allows the child to express feelings he normally would suppress (Hoffman, 2008).

Another theory of humor is the cognitive theory. Piaget's (2011) work on the stages of cognitive development in children had a great influence on researchers of humor in children. McGhee (1971) aligns his theory of humor much like the stages of Piaget's theory on cognitive development, although McGhee (1971) believes young children begin to think logically earlier than what Piaget believed. Nevertheless, both theories maintain that once children reach preoperational thought, they are able to understand incongruous acts. McGhee (1971) determined that children must acquire a certain amount of cognition before they can understand jokes. His study of 96 girls at four different age levels revealed the girls' cognitive levels determined how humorous they found jokes. However, when the same jokes were given to college students, they did not find the jokes amusing, as it did not provide a significant level of cognitive challenge. Simply put, the level of cognition determines the degree to which someone finds something amusing (Church, 2005). Children experience pleasure in the mastery of understanding humor, and they utilize their cognitive skills in order to build the experience (Hebert, 1991).

Greenberg (2002) asserts that children are not receptive to adult humor because it is over their heads. It involves unknown words and experiences they have not yet had. Many

times adult humor involves the use of sexually sophisticated material. When children do not understand the humor, they feel stupid. Greenberg (2002) adds that many times children do not understand the use of sarcasm. When an adult says, "Great job," after a child spills her milk, the child, a concrete thinker, takes the adult's words at face value.

The social interaction theory of humor development in children involves social exchanges between children, between children and adults, and the impact of others on the child's ability to find humor in situations (Herbert, 1991). Bergen (2001) studied the intermingling of social interaction and humor. She contends that humor relates to play. She claims play increases cognitive skills and helps children learn a tremendous amount about their world. When children enter playtime together, they use negotiation skills to interact (Bergen, 2001).

One of man's basic needs is the need for affiliation (Ziv, 2009). Humor can be used to open interpersonal relations. For example, if one wants to become a member of a social group, he may use humor to win momentary affection (Bergen, 2001). If the group members laugh, it is highly probable the new person will be accepted into the group. Humor can also help a person gain social hierarchy and attention in a group. People like to be entertained and are drawn to others who are humorous (Ziv, 2009).

According to Johnson (2005), laughter is an expression of being able to look at things in different ways. She claims this ability allows students to see two sides of an argument. In turn, students are trained to be citizens of a democracy. Cognitive dissonance occurs when children stand outside the norm, observe the difference, and laugh at the disparity. She further stresses the need for laughter as a unifying experience. Laughter

empowers the individual with autonomy, self-awareness, and self-esteem. Laughter shows learning is taking place within the educational process.

This study investigated the effects of laughter yoga on the mathematic achievement of second grade students as measured by the Mock CRCT, and contains elements of each of the laughter theories. However the psychoanalytic theory is the one on which this research was largely based. Using the premise that joking and laughing can lessen the effects of stress such as anxiety and fear, the researcher created laughter sessions for children before mathematics instruction and testing.

Definition of Terms

Title I School: The largest federal educational funding source for kindergarten through grade 12. Title I provides grants to school districts to improve educational programs in schools with high concentrations of students from low-income families (Scott, 2011).

CRCT: Criterion Referenced Content Test (Georgia Department of Education).

Mock CRCT: State-released test questions released by the Georgia Department of Education given to students in grades one and two to determine their readiness for the next grade. The test serves as dual purpose – to provide a diagnosis of individual student and program strengths as related to the instruction of the state-mandated standards and a measure of the quality of education of the state (Georgia Department of Education).

Laughter Yoga: An exercise routine combining group laughing with the techniques of yoga breathing, which causes people to laugh without the aid of jokes or humor (Kataria, 2005).

Limitations

Limitations are described by Gay, Mills, and Airasian (2009), as “...some aspect of the study that the researcher cannot control but believes may negatively affect the results of the study” (p. 109). Two common limitations are sample size and length of study. There was little peer-reviewed literature on the relationship between laughter and the mathematical achievement of young children (Hoffman, 2008) and minimal research on laughter and elementary students. The students were grouped according their socio-economic status, but it is possible some parents whose households qualified did not state their income accurately. It was difficult to calculate the amount of laughter, and its effect, produced by each student. All the participants in this study were enrolled during the laughter yoga sessions and testing, but might not have been present the full academic year. The laughter sessions lasted for only five minutes and the duration of the treatment was four weeks. The laughter yoga occurred every morning at 10:00 a.m., immediately before math instruction began. This study did not use attendance during the study period as an independent variable and some of the children may have been absent during the four-week period but were allowed to participate in the study. Also, the principal, with an already established rapport with the children, conducted the laughter sessions.

The laughter yoga sessions lasted for a four-week time period from March 23, 2013 and ended April 22, 2013 immediately before the math Mock CRCT administration. The laughter yoga sessions were conducted during the first five minutes of math class and began promptly at 10:00 a.m. each day. All of the participants were enrolled the majority of the school year and all special education students were included in this study. The researcher

was unable to determine if the participants were enrolled in any type of laughter sessions after school or had ever attended any. The study was conducted in a rural, South Georgia school system. The researcher followed with fidelity, the procedures and protocol outlined in Dr. Kataria's book, *Laugh for No Reason* (2005).

As previously stated, there is not an abundance of research on laughter in the early grades. Even though this study failed to indicate that laughter positively affected standardized test scores, it should be noted the effect of attendance was not examined and could be included in research similar to this. A larger population might produce different results, as might a test without so much at stake. The results of the CRCT were a crucial part of whether each child passed to the next grade and was essential to the success of teacher evaluations. Testing week is no laughing matter in today's schools.

Overview of Study

Chapter one of this study introduces the research and contains the problem statement, purpose of the study, and rationale. The theoretical framework is established and describes the laughter theories most frequently used to study children.

Chapter two contains a thorough review of related literature, which consists of research in the domains of laughter therapy and standardized testing. The domain of laughter therapy begins with a historical overview and contains research pertaining to the development and benefits of laughter therapy. Next, conditions needed for laughter, laughter in schools, and laughter yoga were examined. This domain concludes with literature on anxiety related to math. Under the domain of standardized testing, the history of

standardized testing in the United States was examined followed by the standardized testing movement in Georgia.

Chapter three discusses the methodology. Included are the research design and the setting. Next, the participants, along with a detailed description of procedures, are discussed including the laughter yoga sessions. Validity is examined along with a description of how the data were analyzed. The research questions and hypotheses are also reviewed. The chapter ends with a brief summary.

In chapter four, the results of the statistical analyses are presented along with a description of the Mock CRCT and the teachers involved. The structure of the study is presented, as is an explanation of descriptive statistics and independent variables.

Chapter five includes the conclusion along with an overview of the study and implications for further research. The chapter ends with a discussion of the findings.

Summary

There is little research on laughter and the benefits to young children in the academic setting. Many times when children do not understand difficult concepts, they experience headaches, stomachaches, or weakness. Laughter may reduce these symptoms, making children better prepared to learn.

Teachers who bring humor into their classroom uplift the spirits of students leaving them more energized and hopeful. Laughter provides neurological benefits such as masking pain, elevating mood, boosting immunity, reducing stress, and exercising one's brain. Laughter increases the secretion of chemicals that make people feel good, stimulates the immune system, oxygenates the blood, and creates positive effects on respiratory and

cardiovascular problems. After a good laugh, anxiety and muscle relaxation can show benefits for up to forty-five minutes.

Humor can bring people together and provide amusement. It can also help children cope with stress. Because laughter has so many proven benefits to the body and mind, this study investigated the effects of laughter on the criterion referenced math scores of second-grade children.

CHAPTER II

REVIEW OF RELATED LITERATURE

*“Laughter is the most inexpensive and the most effective wonder drug.
Laughter is a universal medicine.”*

Bertrand Russell

Introduction

In the age of testing students and improved instruction, the achievement in math has lagged behind that of reading. When the achievement gap in either discipline is scrutinized closely, gender, socio-economic status and race account for many of these differences. Stressors in the lives of children may also add to the gap. Laughter is one technique used to alleviate stress, and possibly help close the achievement gap.

Chapter two contains a thorough review of related literature, which consists of research in the domains of laughter therapy and standardized testing. The review of laughter therapy begins with a historical overview and contains research pertaining to the development and benefits of laughter therapy. Next, conditions needed for laughter, laughter in schools, and laughter yoga are examined. This section concludes with literature on anxiety related to math. In the area of standardized testing, the history of standardized testing in the United States is examined followed by the standardized testing movement in Georgia.

Historical Overview and Development of Laughter

According to D'Alto (2013), laughter has been studied for many years. Aristotle and Sigmund Freud were gelotologists, scientists who studied laughter. Gelotologists conduct experiments to discover what makes people laugh. Today, many gelotologists come from backgrounds such as neurology, anthropology, or psychiatry. Gelotologists embrace three theories of laughter: the superiority theory, the relief theory, and the incongruity theory (D'Alto, 2013; Perks, 2012; Restak, 2013).

Cornett (2001) reports students enjoy teachers who smile a lot. Teachers who bring humor into their classroom lift the spirits of students leaving them more energized and hopeful (Cornett, 2001). Humor can bring people together and provide amusement. It can also help children cope with stress (Banas, Dunbar, Rodriguez, & Liu, 2011). Perhaps if teachers want their students to learn to their fullest potential, they should consider the use of laughter in the classroom (Kataria, 2005; Skinner, 2010).

Smith (2007) suggests teachers consider humor to create a cheerful climate, enhance bonding, add variety, decrease anxiety, and provide enjoyment to the learning process. Within each classroom, there may be dozens of learning styles, socio-economic levels, and children with immensely different background knowledge (Anderson, 2005). Limited resources, higher numbers of English as second language students, and larger pupil-to-teacher ratios are factors that must be addressed within today's modern society (Anderson, 2005). Regardless, teachers are expected to educate each child to the best of their ability and to close the achievement gap. In addition, stressors such as student achievement, classroom

management, and discipline issues experienced by the teacher may carry over in the delivery of instruction and be felt by the children. Even in the most supportive families and classrooms, children experience pressure to conform to the expectations of others (Greenberg, 2002).

Laughter is a huge part of living. Today's obsessions with children meeting standards, efficiency, effectiveness, time-on-task, test scores, and fear of failure have become a focus in society. Teachers should nurture a sense of humor in their students so they can become more flexible, unconventional, playful, and more humble. This will lead our younger generation to become healthier and happier human beings (Rogers, 1984).

One way to alleviate some of the stressors of daily life is to laugh. Crook (2008) reports that laughter provides neurological benefits such as masking pain, elevating mood, boosting immunity, and exercising one's brain. Adams and Mylander (1998) suggest that laughter is difficult to evaluate; however the response to humor can be studied. Laughter increases the secretion of chemicals that make people feel good, stimulates the immune system, oxygenates the blood, and creates positive effects on respiratory and cardiovascular problems. After a good laugh, anxiety and muscle relaxation can show benefits for up to forty-five minutes. (Adams & Mylander, 1998; Cousins, 1979; McGhee, 1996).

However, it is imperative that one distinguishes between laughter and humor. Humor is one of the stimuli that can help people laugh whereas laughter is a psychophysiological response to humor or other stimulus with the following characteristics:

1. Powerful contractions of the diaphragm together with repetitive vocal sounds produced by the action of the resonating chambers of the pharynx, mouth, and nasal cavities
2. Typical facial expression (motion of about 50 facial muscles mainly around the mouth), which may include the release of tears
3. Motion of several groups of muscles of the body (more than 300 may be distinct)
4. A sequence of associated neurophysiological processes (cardiovascular and respiratory changes, activation of neuroendocrine and immune circuits)

(Mora-Ripoll, 2010, p. 57)

Surprisingly, most research on laughter falls under the field of psychology as opposed to medicine (Mora-Ripoll, 2010). Although laughter can provide many benefits to the body and brain, there is currently not enough evidence to conclude that it is a healing agent. Further empirical research is needed on the physiological benefits of laughter and the quantifiable effect it has on certain aspects of health (Mora-Ripoll, 2010).

Laughter begins at a very young age and is a result of both nature and nurture (Rogers, 1984). One inherits a predisposition toward what one thinks is funny, however cultural background, intelligence, and fantasy all relate to individual differences in humor (McGhee, 1996). According to Greenberg (2002), parents and teachers can develop the cathartic benefits of laughter by maintaining a warm and supportive environment. Adults

should also build children's self-esteem and share humorous stories with their children. It is important that parents and teachers allow children to act silly (Greenberg, 2002).

Test anxiety can result in academic failure. Austin, Partridge, and Bitner (1995) report that relaxation techniques along with cognitive coping skills, medication, and behavior management plans are helpful in calming stressed children. Once children's anxiety is lowered, they are free to learn as well as tackle tests in a stress-free manner.

Stress is only one obstacle that may block student achievement. Children living in poverty are more likely to perform below grade level in reading, and statistics indicate one in six of those children do not graduate from high school on time (Hernandez, 2011).

Abbott, Hart, Lybrand, & Nouri, (2009) suggest that low income is a better predictor of student achievement when compared with ethnicity. They tested students in grades three through ten. They found math scores gradually decreased across all grade levels and were lower than reading scores. He also found ethnicity variance was not near that of low-income students.

Along with stress, socioeconomic status and gender may play a part in low math achievement (Robinson & Copur, 2011; Voyer and Voyer, 2014). Voyer & Voyer (2014) found females scored higher in most core subjects. Reading showed the most variance; however females scored only slightly higher in math.

Humor is one of many strategies used to reduce stress to persuade, clarify, and make material more memorable. Teacher initiated, playful and innocent humor creates a positive learning environment and makes students feel comfortable (Cornett, 2001). Laughter provides many benefits to the human body. Laughter also improves one's mood (Adams &

Mylander, 1998; Crook, 2008; Digney, 2009; Griffiths, 1992; O'Meara 2004; Okhuizen-Stier, 2008).

Humor is the result of nature and nurture. Everyone progresses through developmental stages that determine how we interpret and produce humor. One inherits a predisposition to what one thinks is funny, however as this sense matures, it relies on outside stimulation (Rogers, 1984). Cultural and educational background, intelligence, and fantasy are positively correlated with humor and account for the largest source of individual differences in sense of humor (McGhee, 1996). As humor develops, one learns to laugh at oneself and at life's absurdities. Unfortunately, the creative, mirthful laughter of young children becomes more constrained as they mature. The average five year-old laughs more than 400 hundred times per day while the average adult laughs fewer than 15 (Morreall, 1981).

Laughter first occurs at a very young age. Levine (1972) studied the smiles and laughter of infants. Although some theorists believe laughter occurs at the age of six months, Wilson (2009) and Levine (1972) contend that young infants begin to smile shortly after birth, at about four months of age. This implies smiling is an automatic response to pleasant internal stimuli. However, soon the infant begins to smile at external objects, such as a doting mother's face. According to Levine (1972) this is the beginning of socialization and interpersonal interaction.

Poole, Miller and Church (2005), faculty members in the infant-parent development program at Bank Street College of Education, describe the developmental stages of humor in children. A baby's first interaction with humor is response to playful interaction. They

believe children show a humorous reaction as early as three months particularly when an adult coos, bounces, or tickles the infant. By the age of 12 months, children realize imitation can cause an outbreak of laughter. Caregivers can also use laughter to get children to do things they do not want to do such as eat or come inside after a morning of play. Toddlers love imitating each other and use silly jokes, noises, and gestures to amuse others. Poole et al. (2005) further added that by preschool, humor is used to ward off fears and uncertainties. Humor is evident in the play of young children. Preschool-age children find many things humorous as they play and interact with each other. Cognitive psychologists note that adults do not always find the same things humorous that children do. Conversely, children do not always find adult humor funny (Klein, 1986).

Addyman and Addyman (2013) studied laughter patterns of over 500 babies from over 25 countries to determine the primary cause of babies' laughter. They state with certainty that one's sense of humor begins to develop far earlier than previously thought. Babies laugh long before they can talk or walk. It is a way of communicating with others. Parents welcome smiles and laughter as opposed to cries, and encourage laughter with their babies. Throughout the different nationalities, peek-a-boo overwhelmingly ranked as the ultimate in baby entertainment. A disappearing and reappearing face along with the element of surprise caused the most laughter. Addyman and Addyman (2013) indicated this suggests humans are social creatures.

Sroufe and Wunsch (1972) conducted observations on more than 150 infants in their first year of life to examine laughter patterns. All of the babies were observed in their homes with their mother serving as the stimulus. Sroufe and Wunsch's (1975) research

suggests environment plays a huge part of an infant's laughter. Also, as the infant matures, laughter becomes more frequent. However, the authors noted stimuli that were once effective became less successful over time. Sroufe and Wunsch (1975) also noted distressed infants would not produce laughter in response to the same stimuli they once found amusing. The once-funny stimuli actually elicited increased crying rather than laughter. Sroufe and Wunsch (1975) further suggest that laughter increases social interaction between an infant and his environment, as amused, happy babies tend to reach for an object or person that makes them laugh.

Hoicka (2012) conducted a study involving two and three year olds and their humor production with their parents. The first goal was to determine whether early humor production was primarily intuitive or novel. The second goal was to examine how children cue their humor, and the last goal was to study the types of humor young children produce. The study revealed that three year olds were more likely to produce novel humor when compared to two year olds. This suggests that as children mature, they become better able to produce humor and use cognitive understandings of the world to produce humor. Parents reported most children smiled, laughed, or looked for a reaction from their parents when joking. Children produced such acts as peek-a-boo, hide and seek, chasing, tickling, funny body actions, and talking about taboo topics. The authors concluded that toddlers produce novel and imitated humor, cue their humor, and produce a mixture of humorous acts. During play sessions, children copied humorous acts, which suggests that children imitate humor. However, three-year-olds were more likely to produce novel humor. They performed such acts as putting a dinosaur in a pot, which may not have been previously observed by the

children. This made it unlikely the children were imitating something they had already experienced or previously learned. A two-year-old child may repeat an older sibling's knock-knock joke and not deliver the punch line correctly, however the child still expects everyone to laugh (Hoicka, 2012).

In a similar study, Bainum,(1984) analyzed the laughter of five-year-olds, studying the frequency of occurrence and the surrounding conditions of children's smiling and laughter. Perhaps the most intriguing result from this study is that the vast majority of smiling and laughter in the students occurred when others surrounded the children. Their results indicated that only 5% of the children's laughter occurred when they were alone. This finding suggests that laughter involves interpersonal and social interactions, and with increasing age, children's humor becomes more intentional.

Paul McGhee, author of *Health, Healing and the Amuse System* (1996), wrote that almost all children have a general love of humor. Parents can stifle humor in young children as they may become annoyed by their children's constant riddles and jokes to the point that humor becomes discouraged. McGhee (1996) added that parents should actively engage their children in humorous activities and playfulness that will ultimately nurture their sense of humor. This will teach children that humor may be used as a coping technique when they must adapt to difficult situations and make them better able to handle social circumstances (McGhee, 1996). Paul McGhee has published 15 books on laughter and is known for scientific research on laughter, practical application of humor in the workplace, and keynotes and workshops on humor. His workshops on humor help people to deal with job/life stress and develop the resilience to make it through the tough days. He offers

suggestions for implementing humor into one's life such as trying to find humor in stressful situations. He contends that it is easier to laugh at other people's problems, but maintaining a light attitude when commonly occurring hassles arise will ease tension when situations appear hopeless. McGhee recommends seeing the glass as "half full" as opposed to "half empty." He advises seeking help from friends when trying to make light of a difficult situation and looking for cartoons related to daily job hassles. He encourages people to anticipate what might be funny about next week and to visualize others in a ridiculous way (McGhee, 1996).

Laughter Therapy

Benefits of Laughter

Public speakers often begin their speeches with a humorous anecdote, which puts the audience at ease, lessens tension, and makes the audience feel relaxed (Rogers, 1984).

Rogers (1984) provides an example to which many people can relate. While moving a heavy piece of furniture, if one begins to laugh, all others must put down the furniture when they begin to laugh. Muscles become relaxed and one cannot perform a task that requires muscle tension. Rogers (1984) further states that the brain secretes over two thousand substances and the mind controls these secretions, thus resulting in a powerful physical and social relaxant.

Much of the research on laughter is done on adults. Research conducted by McGhee (1996) shows that laughter improves adults' mood, job satisfaction, productivity, and relationships with others. In his book, McGhee (1996) shows the importance of leaders using laughter in order to form family-like relationships. McGhee (1996) also teaches

people how to become funny, when to be funny, when it is anti-social, and what might be offensive to others. He further describes the benefits of laughter on stress and how it improves people's medical issues.

Researchers in the medical field have done extensive research on the effects of laughter on pain and healing. O'Meara (2004) reports that an area of the brain called the nucleus accumbens is activated when a person laughs. This area receives more blood flow when rewarding feelings are experienced. Additionally, laughter causes a chemical reaction within the brain that helps improve one's mood, exercises the brain, and masks pain (Adams & Mylander, 1998; Crook, 2008; Griffiths, 1992; Skinner, 2010; Okhuizen-Stier, 2008).

Biochemical reactions occur in the body during laughter, as reduced cortisol levels and increased heart rate and circulation, along with reduction of tension and stress, help the body to move nutrients and oxygen to the body's tissues. Laughter also has positive effects on one's mood and improves negative emotions (Adams & Mylander, 1998; Griffiths, 1992). The mind has the ability to make one ill, so why not use the mind to heal? Health psychologists study how one's mental and emotional state affect one's health.

In normal breathing, there exists a balance between the amount of air one takes in and lets out. When people are stressed, their breathing becomes shallow and a considerable amount of residual air remains in the lungs. This type of breathing occurs from the chest as opposed to the diaphragm and reduces the amount of oxygen taken in, producing an even greater amount of residual air in the lungs. As the residual air remains in the lungs, the oxygen-level drops and the level of water vapor and carbon dioxide increases. Laughter triggers a respiratory response that empties out the lungs of residual air. Each time one

laughs, carbon dioxide and water vapor empty out of the lungs and are replaced with oxygenated air (McGhee, 1996).

Research has demonstrated the beneficial effects of laughter on terminally ill patients. In his book, *Anatomy of an Illness* (1979), Norman Cousins writes about his use of laughter to cure his terminal illness. In 1964, Cousins developed a slight fever while flying home from abroad. It soon became difficult to move his neck, arms, hands, fingers, and legs. Doctors confirmed he was suffering from a serious collagen illness, a disease of the connective tissue, and gave him a one-in-five-hundred chance of survival. Sick of hospital procedures, Cousins shut himself up in a hotel room and literally laughed his way back to health. To ease his immense pain, he watched humorous videos. The effects of the laughter eased his pain for a short time. When the pain resumed, Cousins would watch more videos until the effects of the laughter stayed with him for a longer period of time. Cousins (1979) wrote:

I made the joyous discovery that ten minutes of genuine belly laughter had an anesthetic effect and would give me at least two hours of pain-free sleep. When the pain-killing effect of laughter wore off, we would switch on the motion-picture projector again, and, not infrequently, it would lead me to another pain-free sleep interval. (p. 43)

Many experts in the medical field were amazed at his results. Some compared it to the effects of administering a placebo to a patient. Either way, the importance of mind over matter is evident. Cousins (1979) wrote:

If negative emotions produce negative chemical changes in the body, wouldn't the positive emotions produce positive chemical changes?

Is it possible that love, hope, faith, laughter, confidence, and the will to live have therapeutic value? Do chemical changes only occur on the downside? (pp. 37-38)

Patch Adams, M.D. (Adams & Mylander, 1998) describes hospitals as somber places where people talk in muted voices and the goal of the staff seems “to fight the suffering with suffering” (p. 66). Adams and Mylander (1998) reference Cousins and his unorthodox humor experiment in their book *Gesundheit!* Much to the dismay of his colleagues, Dr. Adams practiced a rather unconventional approach to healing patients. He believes one's health is based on happiness. One day he wore a clown's nose and a red fireman's hat to treat his patients, and the response was overwhelming. It brought joy and laughter into their lives. Dr. Adams believes “Humor is an antidote to all ills” (p. 65).

One of the most important tenets of Patch Adams' philosophy is that health is based on happiness. For him, healing is not only prescribing medicine and therapies, but also sharing in a spirit of joy and cooperation. As Dr. Adams entered a hospital room smiling and vibrant, his patient would immediately perk up. His appearance alone made people smile, as he was 6'4 with long hair, mustache, and a black patch on his coat signifying the Vietnam War. He would talk to the patients, cry with them, massage them, and joke with them. The patients loved it. However, he clashed with other medical professionals who thought they needed to preserve the façade a doctor personifies. Yet, Dr. Adams felt close to his patients and natural sitting by their bedsides and sharing his life with them. He

believes that humor is vital in healing individuals, communities, and society. Making others laugh is a magnet for building friendships and preventing burnout. It can also potentially deflect violent situations. Dr. Adams was so adamant about incorporating laughter in every patient's life that he wanted hospitals to have a straight, solemn ward and a goofy ward. The goofy wards would be playful environments where people would interact with each other and laugh their pain away. Medical clowns would be present to entertain patients, families, and hospital staff (Adams & Mylander, 1998).

Medical clowning is a concept that is being increasingly used in medical centers and hospitals. A medical clown is defined as one who uses humor to help people who have severe pain and/or medical issues. It was developed to help children ease suffering and pain by the utilization of diversion tactics (Nuttman-Shwartz, Scheyer, & Tzioni, 2010).

Nuttman-Shwartz et al. (2010) conducted an exploratory study in which they interviewed two medical clowns. Initially, the clowns felt the medical staff saw them as a hindrance, interfering with the procedures they were expected to carry out. However, the clowns persisted and continued to visit many terminally ill patients. Interestingly, both clowns reported the rewards of getting through to a depressed patient, ultimately seeing the first glimmer of a smile, and even witnessing a patient in total despair sitting up. Relatives of the patients, overcome with hope and encouragement, described a gleam of life in their loved ones.

Medical clowns grapple with hopelessness, despair, and depression in patients facing imminent death. It is difficult for the clowns to stay positive and focused. Some clowns begin by crying with the patient and holding hands. One clown said of a dying patient

“...on the last day of his life, he laughed and even danced a little” (Nuttman-Shwartz et al., 2010, p. 589).

An article in *IDEA Fitness Journal* investigated preliminary evidence of medical clowning with children age two through 16 who were having urological surgery. The study was conducted in Jerusalem at the Shaare Zedek Medical Center. A medical clown visited one group while the other group underwent surgery as usual. The children entertained by the clown experienced less anxiety before and after surgery, and left the hospital earlier than the control group. They experienced better physical, emotional, and financial success, as fewer days in the hospital resulted in less money spent. This study was presented at the 2015 annual meeting of the American Urological Association (The Power of Laughter, 2015).

In a similar pilot study, 18 children between the ages of 7 and 16 watched humorous videos before placing their hands in cold water. Although the humor indicators were not associated with pain tolerance, the children showed significantly greater pain tolerance (submersion time) while they were watching the videos as opposed to watching them immediately before or after the cold-water task. The results indicate distraction is helpful when children or adults experience pain (Laughter, Humour and Pain Perception in Children: A Pilot Study, 2010).

Therapies involving laughter have been used in health care for centuries. Therapeutic laughter is mostly used with patients in pediatrics, geriatrics, mental health, and oncology. It is also suspected that laughter can be genuine, spontaneous, induced, and/or

pathological. All laughter causes physiological and/or psychological benefits within the body.

Bennett, Parsons, Ben-Moshe, Weiberg, Neal, Gilbert, Rawson, Ockerby, Finlay, and Hutchinson (2014) discuss how medical clowning in pediatric cases and state that clowns are very common in children's hospitals. There have been numerous rigorous studies with measurable results. The use of clowns during the peri-operative period has been shown to reduce anxiety in children and parents. Conversely, in a study of 61 Spanish children, laughter was not able to reduce stress even though a trend toward improved post-operative behavior was noted. Laughter has also been shown to increase social interaction and contributes to the increased activity of senior citizens. The use of medical clowns for people with chronic diseases such as diabetes, cancer, heart failure, arthritis, and respiratory disease has been studied with varying outcomes (Bennett, et al (2014). Laughter has also been used to treat depression and other mental health disorders. Laughter stimulates the cerebral region of the brain, recalibrating the hypothalamic pituitary adrenocortical system, which controls stress.

Laughter stimulates the release of endorphins, one of the body's natural painkillers, into the blood stream. Laughter also reduces muscle tension. Nurses will sometimes tell a joke before giving patients a shot because it keeps the patients from tightening their muscles. Many pain centers around the country use relaxation techniques and meditation to reduce the pain medication needed by their patients (McGhee, 1996). Along with pain reduction, McGhee (1996) claims laughter benefits physical health in specific ways. He lists benefits, such as reduction of stress hormones, immune system enhancement, and reduction of blood

pressure, and even equates the result of a good belly laugh to performing cardiac exercise (McGhee, 1996).

Recently, some studies have been published on the medical benefits of laughter. The first laughter study to demonstrate that laughter can help the heart was conducted at the University of Maryland and published in 2000. Heart patients are 40% less likely to laugh, as opposed to individuals the same age without heart problems. The researchers studied 150 people who had a heart attack or heart surgery and compared them to 150 people without heart disease (Eckenrode, 2016).

Eckenrode (2016) reports on another study at the University of Maryland in which some patients were shown humorous films while others watched disturbing ones. The participants who watched the humorous films had enhanced blood vessel health.

Southern California was the site of yet another recent laughter study of men and woman taking medications for diabetes, high blood pressure, and high cholesterol. The participants showed a remarkable decrease in stress hormones after 30 minutes of mirthful laughter every day (Eckenrode, 2016).

Moonkyoo, Sung Hee, Eunmi, and Eun Kyoung, (2014), conducted a study on breast cancer patients who were undergoing radiation. The participants were comprised of 37 patients, with 18 assigned to the control group and the other 19 in the experimental group. Laughter therapy was administered to the experimental group while receiving radiation. The control group received radiation only. The authors admitted laughter is very difficult to study, as each person finds different situations funny, resulting in no standard measurement of laughter. However, an observer made sure each person in the experimental group

laughed at least ten minutes during their radiation. The laughter group showed that those in laughter therapy greatly benefited by preventing radiation dermatitis, thus reducing their level of discomfort (Moonkyoo, et al. 2014).

If laughter can provide these changes in the medical conditions of sick people, the question can be asked whether it can help relieve the stressors some children display while learning and testing in math. Laughter has many unique qualities that can help promote changes in the body. Humor also creates socialization, which leads to relationships. It is a social equalizer, and children ultimately feel they belong (Digney, 2009).

Michael Skinner (2010), a professor in the School of Education in Charleston, South Carolina, writes of college freshman taking an essay exam in his history class. Skinner took a few minutes to tell humorous stories about the events which the students spent numerous hours studying. He describes how the students were visibly more relaxed after their brief episode of laughing, and, although Skinner (2010) cannot scientifically prove it, he states that the students more than likely scored better on the test. As beneficial as laughter is to the body, the use of humor has not always been embraced by academia. However, research shows how humor can positively affect students, and Skinner (2010) describes five important reasons for integrating humor into the classroom:

1. Students learn and retain more when humor is used.
2. Humor creates a positive environment for learning.
3. Humor maintains students' attention.
4. Humor can be especially effective when teaching difficult subject matter.
5. Positive effects of humor are likely to be reflected on course evaluations. (pp. 19-21)

According to Skinner (2010), most college students retain approximately 70% of material taught within the first ten minutes of class. The statistic drops to 20% during the last ten minutes. Utilizing humor is an excellent way to keep students' attention throughout the length of the teaching time, thus increasing learning. Laughter occurs in classrooms where students feel safe, valued, and feel free to participate. These classrooms are healthy climates, where learning is taking place, even if the subject taught is deemed difficult. A growing body of research is emerging that emphasizes the beneficial effects of laughter in college classrooms (Skinner, 2010).

Conditions for Laughter

Wilson (2009) theorized that although every civilization is capable of laughter, it is not everywhere. He believes that the "potential" for laughter is everywhere but it can only be achieved when the conditions are right. For example, people living in poverty, war, famine, and disease do not laugh; the conditions are not met. Wilson (2009) claims that their central nervous systems are wired for laughter, but they are unable to laugh because their basic needs have not been met. He relates this to the five levels of Abraham Maslow's Hierarchy of Needs. The lowest level describes one's basic physiological needs such as food, water, sleep, and warmth while the highest level is associated with self-actualization needs. Wilson (2009) contends "...spontaneous or mirthful laughter would be a higher need and would only become available when the more basic needs – food, safety, freedom from threats, etc.-are met" (p. 3).

Wilson (2009) states that even when physical conditions are met, there exist circumstances that can block laughter. Poor health, pain, deprivation of being loved, helplessness, pessimism, distrust, and trauma are examples of conditions that may ultimately block laughter. Even though laughter shows up in the infant at an early age, Wilson (2009) contends certain conditions must be met in order for a child to laugh. He believes babies need to be healthy, calm, and feel a sense of safety in order to laugh. Children need to feel loved and have adequate nourishment. Disturbed environments, such as those involving alcoholism, mental disorders, screaming, bombs bursting overhead, do not invite mirthful laughter. Poverty and disturbed environments are usually not breeding grounds for laughter (Wilson, 2009).

Laughter in Schools

Laughter clubs are popping up everywhere and the work of Dr. Madan Kataria (2005) from Mumbai explains this phenomenon. Dr. Kataria (2005), a motivational and inspirational speaker, is popularly known as the “Laughter Guru” in India and has founded many laughter yoga clubs. While researching the benefits of laughter, he was amazed by the number of studies showing profound physiological and psychological benefits to patients. Much of today’s research on laughter is on older students. However, Zbaracki (2003) conducted an experiment on 22 third, fourth, and fifth grade students to determine how humor affects children’s reading engagement. He found that when children read humorous books they were more actively engaged in their reading. They displayed more intrinsic motivation, social involvement, and were more apt to use reading strategies such as

visualization and reading critically. The children even began imagining different voices for the characters. In his research, Zbaracki (2003) encouraged teachers to utilize humorous books when motivating students, which will build bridges to other forms of literature.

Cart (2003) suggests that laughter is a temporary escape from emotional wounds and tension and children instinctively choose books that will make them laugh. Because of this, more humorous children's literature is needed. He further suggests that the evaluators of the Newberry Medal should recognize humorous books as serious literature because those books are so enormously popular.

Steele (1998) surveyed 65 high school sophomores to determine if laughter reduced tension and fostered a positive learning environment. Seventy-five percent of participants rated humor as positive and effective in reducing tension and stress, while over half believed humor fostered a positive learning environment. Sixty-five percent felt a teacher who used humor was much more approachable, which enhanced the relationship between student and teacher. Overall, the majority of students reported their educational experience was greatly enhanced through the use of humor (Steele, 1998).

Much of the research on humor in schools has been done at the collegiate level. Javidi, Downs, and Nussbaum (1988) conducted a study of 45 award-winning teachers and 15 non-award winning teachers from college, high school, and middle school. The award-winning teachers had received recognition for outstanding teaching within the last five years.

When comparing middle school and high school classes with college level classes, Javidi et al. (1998) found award-winning college professors made 7.2 humorous attempts

during a fifty-minute lecture. The researchers found award-winning high school teachers used humor 2.8 times per fifty-minute lecture, and middle school teachers used it 2.4 times. This compared to .26 incidents of humor for non-award-winning teachers. Javidi et al. (1988) found that teachers with more experience tend to use humor in the classroom and intertwine it with the course content to enhance clarification. This makes the lecture more pleasurable for the students. The authors further suggest that teachers at the lower grades may be more content-oriented and less concerned with the style used to present material (Javidi et al. 1988).

Sixteen years later, a similar study was done by Torok, McMorris, and Lin (2004). They studied 124 college students to determine if they appreciated laughter during their classes. Seventy-four percent of students appreciated their instructors' use of humor, 59% strongly agreed humor promoted a sense of community, and 80% said an instructor's use of humor helped them to grasp difficult concepts (Torok, McMorris, & Lin, 2004).

Lei, Cohen, and Russler (2010) state that the most effective college instructors incorporate humor into their classrooms. Some college professors believe one must be serious and solemn in the classroom. However, Lei et al. (2010) believe humor is an appreciated teaching tool if it is used appropriately, constructively, and in moderation. Like many others, they claim humor alleviates stress, tension, and depression and can elevate self-esteem. Humor can increase the motivation, attention, and comprehension of students (Lei, et al., 2010).

Humor has shown to provide both psychological and physiological benefits to the human body. Garner (2006) studied 117 students at the collegiate level to determine

whether humor enhanced learning and enjoyment in a statistics class. Students were divided into two groups and watched three 40-minute videos presented by the same instructor. One group viewed videos that were embedded with humorous stories at the beginning and approximately 15 and 35 minutes into the lecture. An analysis of variance revealed a significant difference between the groups with the humor groups having a greater opinion of the lesson, how the lesson was communicated, and rating of the instructor. Most importantly, the humor group recalled and retained more of the information presented. Students reported the use of humor provided a respite from the stressful atmosphere, provided a cognitive break, and made the subject more interesting.

Matthews (2011) sees humor as an instructional tool that should be utilized by teachers, especially in the era of fast-paced video games, the Internet, and television shows. She further states that today's child is accustomed to being entertained. If the curriculum is the product, then teachers need to apply the strategies of a good salesperson (Matthews, 2011).

Rothwell, Siharath, Bell, Nguyen, and Baker (2011) observed six groups enrolled in challenge courses to study the dynamics of groups and the impact of humor on small group culture. They reported that when humor happened repeatedly, it helped to smooth group interaction, formed a collective identity, separated the group from others, and secured appropriate behavior. During their observations they found that groups that bonded through laughter developed a camaraderie that other groups did not experience. Inside jokes were formed within these groups that made them more cohesive. Rothwell et al. (2011) found that facilitators who led groups utilized humor to enhance the experience, as this helped the

members enjoy a sense of community, especially if this was done at the beginning of the group experience.

Blooms taxonomy (Guskey, 2007) implies students' basic needs must be met before learning can occur. Hackathorn, Garczynski, Blankmeyer, Tennial, and Solomon (2011) conducted a study to determine if the use of humor improved learning at the first three levels of Bloom's taxonomy (i.e. knowledge, comprehension, and application). Fifty-one students were studied over the course of a semester using a repeated measures research design to determine if humor affected learning. The authors used a teaching assistant, who was blind to the hypothesis, to record the number of times the instructor utilized humor within his/her classroom. The results indicated that the use of humor significantly increased the students' overall performance on tests, particularly at the comprehension level. These findings suggest that not only are recall and recognition enhanced through the use of humor, but also that humor increases one's ability to understand. Interestingly, that was where the benefits ended. At the application level, students performed the same whether or not humor was utilized in the instruction; there existed no difference in the test scores of the control group and the test group. One might infer from this that laughter may not increase learning at the higher order thinking levels, but it does provide empirical research that supports the use of humor in the learning process (Guskey, 2007).

Okhuizen-Stier (2008) conducted a study on 106 children, aged nine through 12, to determine the use of humor as a coping strategy. The author found that subjects with a higher sense of humor-coping experienced lower anxiety. Participants with greater appreciation for humor displayed lower anxiety, and subjects who used humor to cope with

stress exhibited lower symptoms of behavioral stress. However, when comparing the boys, Okhuizen-Stier (2008) discovered the higher cognitive level did not enhance laughter. However, there was a significant difference in the girls' groups. She concluded that humor should be used as a stress-management technique in school, home, and health care settings as this may alleviate such symptoms as headaches, stomachaches, shakiness, tiredness, and weakness (Okhuizen-Stier, 2008).

Teaching is a stressful profession. It is common for many novice teachers to leave the profession. In today's classroom, the emphasis on testing has become a constant reminder for teachers to make sure all their students pass the test or they and their students will be labeled a failure. According to Miller (2008), teacher education programs do not adequately prepare pre-service teachers to use humor in their classrooms. Today's teachers deal with issues such as apathy, unruliness, violence, and drugs. Even experienced teachers have a stressful time dealing with these problems. In 2008, Miller conducted a mixed methods study in an elementary school to explore teachers' perceptions of humor in an elementary school. She surveyed 20 teachers concerning the use of humor in the workplace. The fairly close-knit faculty reported that 75% of teachers witnessed humor often or very often during the workday. The teachers wrote that humor was used to relieve tension and provide relief. Teachers further reported that the use of humor helped to build trust and develop friendships. The faculty members also described stories of incongruity and pranks they played on each other during their workday.

Humor at another's expense, an example of superiority theory, was described in Miller's (2008) study. This type of humor is usually negative and sarcastic. This type of

humor may tend to create more tension in the workplace and should be avoided. However, the superiority theory of laughter can be effective in the workplace when one uses it to poke fun at oneself. Self-deprecating humor is socially acceptable (Miller, 2008).

The participants in Miller's (2008) study had a good relationship with their principal and liked and admired him. On numerous occasions teachers at the school jokingly imitated a habit he had when making the morning announcements. The light sarcasm never occurred when the principal was present; however they thought that, even if he overheard them, he would find their mockery humorous. The principal consistently made jovial remarks that tended to lighten the mood and created a positive environment. Perhaps this is why the teachers felt they could joke about him and he would not take offense.

The educators also admitted using humor to "lighten things up" after a stressful misunderstanding with another. However, the most frequent use of humor occurred when a humorous story was shared about students. Teachers tended to share these stories with each other when they participated in focus groups. They reported that laughter energized them and lifted their spirits. The teachers remarked that sharing these stories built camaraderie, made them feel better about themselves, and made others feel better.

Teachers of elementary age students rarely have time to interact with other adults during the workday, and brief, chance meetings in the hallway or bathroom area energized them and helped to diminish their feelings of isolation. However, many of them felt only other school personnel appreciated school humor and stories. Family members did not find their school stories humorous. Overall, Miller (2008) summed up her study by stating that teaching in an elementary school is an isolating experience, and the occasional interactions

with colleagues during the day helps to create a positive environment and aids in teacher satisfaction. This promotes teacher retention and makes a pleasurable workplace and effective learning community. When teachers are happy, their students tend to be happy and Miller (2008) suggests this happiness might ultimately affect student achievement.

Some schools offer stress-relieving workshops to their teachers; however most systems do not have the resources to provide this option. Teachers need to socially interact with each other to share concerns, talk, and know others are experiencing the same tribulations. Teachers need to laugh together at the end of day and use each other for support (Botwinik, 2007). Bringing humor into the workplace may take some time, but according to Paul McGhee (2000), it is essential to relieve stress and reduce anger. In order to increase laughter in the workplace, he suggests having a “fun” committee, weird clothes/hat day, displaying daily jokes, and playing games and contests (McGhee, 2000).

People create more mistakes when they are stressed (McGhee, 1996). Because laughter has so many benefits to the body and mind, children should experience it when at all possible. Teachers must create an atmosphere conducive to laughter in a democratic environment where children will not be scolded for their laughter. Children who appreciate laughter are quick to use it in solving their problems if they feel appreciated and respected in their surroundings (Sluder, 2016). Teachers should not view laughter as disruptive or they will miss the opportunity of learning that occurs after it. Laughter can actually help in establishing rapport while maintaining interest (Stengal, 2014).

Laughter Yoga

Laughter yoga is a combination of breathing exercises along with unconditional laughter. Madan Kataria (2005), an Indian doctor, first suggested forming laughter clubs where people would practice laughter yoga together. At the beginning of the session, laughter is artificial and performed in chant-like phrases. The laughter quickly changes to natural laughter. Laughter increases the oxygen levels in the brain and throughout the body. The increased oxygen level promotes a feeling of calmness, which produces numerous positive effects on the body. Yazdani, Esmaeilzadeh, Pahlavanzadeh, and Khaledi (2014) used the work of Kataria (2005) and his laughter session and applied them to 38 male nursing students. The authors believe nursing students in a clinical environment experience an enormous amount of stress. They stated that people working in hospitals are considered to have one of the most stressful working environments. Experiencing life and death situations for the first time can cause emotional stress and tension for young university students and may affect their personality growth causing some inappropriate behaviors to form.

Along with the clinical stressors, college students, in general, deal with being far away from their families, economic problems, and, a high volume of studying, which may make them less able to cope. The researcher conducted the laughter sessions that began with ten minutes of relaxation techniques, deep breathing exercises, and warm up. Next, laughter techniques were practiced for 30 minutes followed by ten minutes of rest. The session then included ten minutes of laughter meditation. Eight, one-hour sessions were completed. The control group consisted of male nursing students who did not participate in

laughter sessions. The findings showed that laughter yoga had a positive effect on students' general health, improved physical sleep disorders, lowered anxiety and depression, and helped with social interaction. Yazdani et al, (2012) suggest the use of laughter therapy is a cost-effective, efficient way to help others.

In a similar study, laughter yoga was implemented for four men and two women who were awaiting either lung or heart transplantation. Participants served as both the control and experimental groups. They completed seven laughter yoga sessions over a period of three weeks from a certified laughter yoga instructor. The laughter sessions lasted for 20 minutes and contained three parts: (1) simple breathing and stretching exercises (5 minutes); (2) alternation of laughter exercises with rhythmic clapping, chanting, and, movement while containing eye contact with others, gentle stretching, and deep breathing (10 minutes); (3) quiet, seated, deep breathing and guided meditation (5 minutes). Participants and researchers sat in a circle and discussed topics in an open format. Each participant's personal history and medical needs were discussed. The researchers measured blood pressure, heart rate, and attenuated heart rate variability (HRV). Participants were also given the Profile of Moods States, Beck Anxiety Inventory, and Beck Depression Inventory II (Beck, 1988), to evaluate immediate and long-term moods. The six participants in the study showed immediate mood improvement and increased HRV after laughing. Both the control and the laughter interventions improved long term anxiety. The authors concluded that laughter yoga warranted further research (Dolgooff-Kaspar, Baldwin, Johnson, Edling, & Sethi, 2012).

In 2011, Shahidi, Mojtahed, Modabbernia, Mojtahed, Shafiabady, Delavar, and Honari, performed a study on laughter yoga and mental illness. The authors examined 70 depressed women between the ages of 60-80. Many women in the study regularly took prescription medications and those drugs sometimes caused adverse reactions. They chose to experiment using laughter yoga with an experimental group, while the other group served as the control. Shahidi et al. (2011) followed the teachings of Dr. Kataria (2005) combining laughter with rhythmic breathing. Their research was the first study examining the effect of laughter yoga technique on mental illness. Ten 30-minute sessions were taught by a person trained in the techniques set forth by Dr. Kataria. The research yielded improvement in both depression and life satisfaction and was comparable to exercise therapy in results.

The effect of laughter yoga was also tested on blood glucose levels in type two diabetic patients (Čokolič, Herodež, Sternad, & Krebs, 2013). Diabetes is a chronic disease that requires clinical observation and constant adherence to medication. Negative factors such as fear, anxiety, and sorrow can raise glucose levels. Because of the benefits of laughter yoga previously studied, the authors had an interest in examining whether laughter would affect glucose levels. The study involved 211 newly discovered diabetic individuals not receiving insulin therapy. The researchers found that the laughter sessions significantly reduced the increase of blood glucose levels in people with type 2 diabetes. They also found that laughter had a favorable impact on enthusiasm, positive attitude, breathing, energy, mood, ability to laugh for no reason, optimism, stress, and physical and mental relaxation. In conclusion, the researchers recommended laughter sessions to be used as a nonpharmacological treatment in the treatment of diabetes.

If laughter is so beneficial to the body, perhaps it should be utilized more in schools. With the pressures of testing students and teachers are facing today, perhaps laughing should be encouraged in the classroom on a daily basis. According to Trunfio (2011), many veteran teachers do not believe in implementing laughter in the classroom. It is not about what one teaches, but how one teaches. He states that teachers need to move out of their comfort zones and receive training in the implementation of laughter. Trunfio (2011) continued by indicating that educators need to keep students' interest by increasing students' enjoyment of learning. Laughter makes teachers more human to their students. Teachers can utilize humor by incorporating jokes, puzzles, juggling, and magic among many other techniques, however teachers need the proper training to do so (Trunfio, 2011).

Some teachers may find adding humor into their classroom difficult. The National Education Association (NEA) realizes the importance of laughter in the classroom as they offer the following suggestions to teachers to add humor into their classrooms:

1. Create a comfortable learning environment. Teachers should smile, laugh, joke, and develop positive relationships with their students. This will help create a positive learning environment.
2. Fire up their brains. Brain scan research shows high levels of activity in multiple areas of the brain when humor was used in conversation and instruction.
3. Bring content to life. Students will appreciate the additional effort the teacher took to utilize humor into instruction (Hummell, 2015. p. 22).

Jacobson (2008) contended that teachers today are under tremendous pressure due to deadlines, assessments, and accountability. Teachers have adopted more straightforward

methods of teaching, and classrooms have become more streamlined and standardized. In many districts, recess has been eliminated from the school day. This does not allow the students to relieve their stresses throughout the day (Jacobson, 2008).

Math Anxiety

Math anxiety is more than just simply reacting to poor math skills. Math anxiety is defined as a feeling of tension, apprehension, or fear that interferes with math performance (Ashcraft, 2002). Individuals who exhibit math anxiety experience sweaty palms, become nauseous, have heart palpitations, and experience paralysis of thought (Malinsky, Ross, Pannells, & McJunkin, 2006). Highly apprehensive, math-anxious people tend to avoid math. They tend to take fewer elective math classes in high school and college and generally receive lower grades when they do. Math-anxious individuals have negative attitudes towards math and hold negative self-perceptions about their math abilities. However, math-anxiety is weakly related to intelligence. Females tend to experience more anxiety, although the difference is small. Ashcraft (2002) further suggested that people who experience math anxiety and perform poorly on math exams, may experience poor performance due to low competence and achievement as opposed to heightened math anxiety. Many individuals with math anxiety avoid math courses, limiting certain academic tracks and pursuing higher academic degrees (Jameson, 2014).

Geist (2015) conducted a study on math-anxiety and how it affects students as young as preschool. Anxiety about math has interwoven influences such as low socio-economic status, gender, teacher's perception of math, and parents' perception of math. In 2015, Geist

studied thirty-one Head Start teachers from rural Appalachia to determine their comfort level with mathematics. The teachers were all female, Caucasian, and taught children from low socioeconomic backgrounds. Surveys questioned the teachers on their personal perceptions of math and other aspects of teaching math to young students, such as their comfort levels and their practices in planning math instruction. The authors reported that math anxiety effected how teachers assessed their ability at mathematics. The more math anxiety, the lower they rated their mathematics ability. Conversely, the more confident teachers are in math, the more frequently they teach it and value it. The more confident teachers are in their ability in mathematics combined with their knowledge of mathematics content, the more likely they were to use developmentally appropriate methods of teaching mathematics in the classroom (Geist, 2015).

The findings of this study indicated that math-anxiety and negative teacher attitudes towards math are related and have an effect on children. Negative teacher attitudes towards math may affect curricular choices as well as their ability to teach math to young children. Thus, instructor's behavior could possibly exacerbate math-anxiety in their students. The authors suggested two actions for further research. First, teachers should be provided an in-service training to make them more confident in math. Additionally, teachers should be encouraged and trained to reflect on their feeling about math and its effect on their curricular decisions. Many teachers who experienced math anxiety inadvertently passed it on to their students (Geist, 2015).

Most research on math anxiety deals with high school and college age students. Studies on younger students generally begin with grade four. Because research on math-

anxiety in early childhood is so sparse, there are varying findings. Ramirez, Gunderson, Levine, & Beilock (2013) conducted research on 88 first and second grade students to determine if math anxiety related to their math achievement. The authors believed it was important to recognize math-anxiety as early as possible so that interventions may be put in place to counteract children's fear in math. The authors reported that math-anxiety existed in children as early as first and second grades. The math-anxiety was not related to the children's reading achievement, suggesting the anxiety was not a proxy for general education. Ramirez, et al (2013) reported that the association between math-anxiety and math achievement was not present in first and second grade students rather the negative relationship between math-anxiety and achievement was present among children who exhibited high working memory skills. Children with lower working memories tended to not experience math-anxiety. High working memory children were more likely to use direct retrieval as compared to low working memory children who used their fingers to compute a math problem. Ramirez, et al (2013) suggested that the high working memory children might have experienced math-anxiety because math-anxiety disrupted the basic facts from the long-term memory. The authors admitted these results may have occurred because children with higher working memories may have exhibited stress because they got further in the test where they would need to rely on their working memory. Another possibility is that children with higher working memories may be more emotionally aware of the math difficulties that would cause them to report more math-anxiety.

A longitudinal study was conducted by Harari, Vukovic, and Bailey (2013) on urban, high minority elementary students in first grade. The children attended Title I schools and

93% received free/reduced lunch. The authors suggest that math-anxiety exists as early as first grade. Many students reported their stomach hurting or their heart beating fast when they were instructed to take out their math books. The children did not like to put math problems on the board and did not like being called on during math. Some reported being scared in math class.

Standardized Testing

History of National Standardized Testing

Calls for standardized testing happened almost as soon as public school was established. Standardized testing began in the United States in 1845 (Maranto, 2015). Horace Mann designed and administered the first standardized test in Boston. Only 35.5% of students answered the questions correctly. Public concern was that students were memorizing facts without understanding them, and the effectiveness of the tests was never questioned. Standardized testing grew in popularity over the decades, but became the craze after it was used to categorize the military recruits during World War I. Concern developed when it was realized that only one-fourth of the recruits had obtained a fifth grade education and could not write a letter or read a newspaper. It was then that Americans felt that education was a vital component of national security (Maranto, 2015).

As a result, the National Education Association (NEA) endorsed standardized testing in 1914 and Fredrick Kelly invented the multiple-choice-test. However, the single biggest influence on testing began in 1926 when colleges began testing prospective students in math, science, literature, and Latin. This test was given in a multiple-choice format (Maranto, 2015). In 1941, college boards began using the Scholastic Aptitude Test (SAT).

National interest grew with the release of “A Nation at Risk” (1983) by the Reagan administration. The report recommended that standardized test scores be used as a way of evaluating and diagnosing the progress of students in order to resolve the situation. Reading and math took a forefront in testing while other subjects were reduced to secondary status (Maranto, 2015).

President’s Reagan’s ominous address caused a mass media frenzy when he announced that 23 million Americans were functionally illiterate and that high school students’ standardized test scores were lower than they were before the launch of Sputnik in 1957 (Graham, 2013). Reagan claimed that America’s industry and commerce were threatened as other countries began manufacturing items previously made in the United States. Leaders began taking drastic steps to adopt more rigorous and measurable standards. As a result, standards based curriculum was born (Graham, 2013).

Other presidents each presented their own version of education reform. George H.W. Bush implemented “America 2000,” Clinton’s reform was titled, “GOALS 2000,” and George W. Bush introduced “No Child Left Behind” (NCLB) in 2001. President Obama implemented “Race to the Top” in 2009 but the constant variable in each of the reforms was the use of standardized testing to evaluate math and reading to gauge success (Maranto, 2015).

Reading and math testing was intensified during 2002-2003 when the NCLB Act enacted the measurement of Adequately Yearly Progress (AYP) and imposed accountability on schools and teachers. The effects on curriculum shifted learning to a greater intensity on reading and math, leaving other subjects by the wayside. Failure to achieve the AYP

standards resulted in harsh consequences for schools and became highly controversial (Maranto, 2015). The Criterion Referenced Competency Test (CRCT) was established in Georgia as a result of the “A+ Education Reform Act” and “No Child Left Behind Act” (Brookhart, 2013).

Since the inception of NCLB, there have been insignificant gains in student achievement, and policymakers came to realize the impossibility of all children meeting a standardized proficiency level. Yet standardized testing of students continued. Replacing teachers, administrators, and restructuring a school could not overcome poverty and violence. Negative physical and emotional consequences were put into place for teachers and students who did not meet the expectations of the lawmakers. When a test explicitly directed a teacher what to do with a test on which a child had vomited, something was wrong. Reportedly, young children experienced bouts of crying, vomiting, and insomnia during testing week and children were deeming themselves as failures as early as pre-kindergarten (Croft, Roberts, & Stenhouse, 2016).

When NCLB became law in January 2002, it required standardized testing for all students in grades three through eight. The law required all schools to report to the national government percentages of students who were not proficient in reading and mathematics. The law required all children in the United States to be proficient in reading and math by the year 2014. It also became mandatory for states to devise a system for determining Adequate Yearly Progress (AYP) so schools could be compared (Miller, 2014). Sanctions were invoked for schools that failed to make AYP two years in a row. AYP is the cornerstone of NCLB, but as schools failed to meet the requirements, the government added flexibility to

the sanctions. NCLB's heavy emphasis on testing brought forth many positive and negative changes. For the first time, school systems were required to track each student's progress and disaggregate data into sub-groups. But many thought it involved too much testing and teachers were teaching to the test (Brookhart, 2013).

The debate concerning the effectiveness of standardized tests continued. Proponents believed schools and teachers needed to remain accountable, while opponents said too much time was spent on testing and that it narrowed the curriculum (Map & Kennedy, 2015). There existed public concern over children's educational careers being solely based on one assessment. Schools were graded on the success of their students, and students were given the ability to switch schools if they attended a failing school. Presently, teacher monetary supplements are being implemented in some school systems if children score well on the tests. It has caused a huge dilemma in public education (Brookhart, 2013).

Standardized Testing in Georgia

The Quality Basic Education Act of 1985 established the state's official curriculum for public schools, the Quality Core Curriculum (QCC). The QCC's were revised in 2003 after an external audit conducted by Phi Delta Kappa International. This audit revealed crucial gaps in the curriculum and a general lack of rigor. As a result of these findings, state teachers and other education experts developed a new curriculum, known as the Georgia Performance Standards (GPS), which was implemented in 2005 (Mewborn, 2004) and completed July 1, 2008.

Georgia's response to NCLB was the implementation of the Criterion Referenced Competency Tests (CRCT), which was given in grades one through eight beginning in 2000-2001. The CRCT measured how well students mastered the state mandated content standards. All students in grades one through eight were assessed in reading, language arts, and mathematics. Students in grades three through eight also were tested in science and social studies (Brookhart, 2013).

In 2013, students in grades one and two did not take the CRCT because of budget constraints. In 2013, the Georgia Department of Education released a bank of previously used questions for grades one and two, allowing school systems to devise their own tests to assess the learning of their early elementary students. Teachers in grades one and two administered these tests according the guidelines set forth by the state of Georgia using the data to guide their instruction. These tests became known as the Mock CRCT. The last year any form of the CRCT was administered was 2013-2014. Beginning with the 2014-2015 school year, the Georgia Milestones Assessment System was implemented for students in grades three through eight (Brookhart, 2013).

Summary

When laughter occurs, it brings people together. Laughter should happen between teachers and also between teachers and students. It makes people feel comfortable and included and relieves built up tension. However, conditions must be right for laughter to occur. All basics needs must be met in order for one to laugh. Teachers should recognize the importance of laughter and value it in order to make teaching and learning fun.

Although a considerable amount of research has been done at the collegiate level, on medical patients, and on special needs children, there is presently little research on how humor effects students' academic achievement at the elementary level. This study used the second grade math Mock CRCT scores as the dependent variable to determine if laughter yoga affected them. Laughter has some powerful benefits. Once laughter's worth is recognized, it may open up a field of future research in young children. While we may not be sure if laughter can improve academics, this exploration may provide interesting results.

CHAPTER III

METHODOLOGY

“One who is humorless is lifeless.”

Virginia Ziegler

Introduction

This quantitative study focused on second grade math achievement, as measured by math Mock CRCT scores, when children performed laughter yoga before instruction and testing. This chapter outlines the research methodology used to determine the effects of laughter on second-grade math achievement. It discusses the participants, procedures, research design, and setting. This chapter also describes how each laughter yoga session was conducted as well as the validity and analysis of the data.

Research Questions and Hypotheses

RQ1: Is there a statistically significant difference in the math Mock CRCT scores of second grade students who participated in laughter yoga sessions as compared to second grade students who did not participate in the sessions?

H1₀: There will be no statistically significant difference in the math Mock CRCT scores of second grade students who participated in laughter yoga sessions as compared to second grade students who did not participate in the sessions.

H1_A: There will be a statistically significant difference in the math Mock CRCT scores of second grade students who participated in laughter yoga sessions as compared to second grade students who did not participate in the sessions.

RQ2: Is there a statistically significant difference in the math Mock CRCT scores of second grade males who participated in laughter yoga sessions as compared to second grade males who did not participate in the sessions?

H2₀: There will be no statistically significant difference in the math Mock CRCT scores of second grade males who participated in laughter yoga sessions as compared to second grade males who did not participate in the sessions.

H2_A: There will be a statistically significant difference in the math Mock CRCT scores of second grade males who participated in laughter yoga sessions as compared to second grade males who did not participate in the sessions.

RQ3: Is there a statistically significant difference in the math Mock CRCT scores of second grade, minority students who participated in laughter yoga sessions as compared to second grade, minority students who did not participate in the sessions?

H3₀: There will be no statistically significant difference in the math Mock CRCT scores of second grade, minority students who participated in laughter yoga sessions as compared to second grade, minority students who did not participate in the sessions.

H3_A: There will be a statistically significant difference in the math Mock CRCT scores of second grade, minority students who participated in laughter yoga sessions as compared to second grade, minority students who did not participate in the sessions.

RQ4: Is there a statistically significant difference in the math Mock CRCT scores of second grade, low socio-economic students who participated in laughter yoga sessions as compared to second grade, low socio-economic students who did not participate in the sessions?

H4₀: There will be no statistically significant difference in the math Mock CRCT scores of second grade, low socio-economic students who participated in laughter yoga sessions as compared to second grade, low socio-economic students who did not participate in the sessions.

H4_A: There will be a statistically significant difference in the math Mock CRCT scores of second grade, low socio-economic students who participated in laughter yoga sessions as compared to second grade, low socio-economic students who did not participate in the sessions.

Research Design

This comparative study was based on the relief theory of laughter (D'Alto, 2013; Mitchell, 2005). The mean scores of two groups were compared to determine if laughter yoga sessions affected the test scores of second grade math students. The relief theory involves the release of built-up tension and is used largely by filmmakers (D'Alto, 2013; Mitchell, 2005). Relief theory maintains a good laugh releases built up tension and nervousness and provides mental relief (Perks, 2012). Researchers suggest the relief of tension may contribute to the reduction of anxiety before a test. Test anxiety has been shown to negatively affect students' test performance (von der Embse, Barterian, & Segool, (2013). Laughter tends to remove the stressors experienced by children such as anxiety and behavioral problems (Okhuizen-Stier, 2008; Skinner, 2010). The purpose of this study was to investigate the effects of laughter yoga on the mathematic achievement of second grade students as measured by the math Mock CRCT.

Raw scores of both groups were used to determine if the math achievement scores of the second grade class were affected. The means were compared after controlling for such factors as socio-economic status, race, and gender. Four weeks prior to testing, all second-grade children gathered for laughing sessions every day before math instruction began. Based on the work of Dr. Kataria (2005) and his laughter yoga clubs, the researcher used techniques described in his book to make the children laugh every morning before math instruction began. When the session was complete, children returned to their classrooms and teachers began math instruction. The math Mock CRCT scores were entered into SPSS 17.0 for Windows along with demographic data, such as gender, socio economic status, and minority status. Test scores from 2011-2012 were compared to those of 2012-2013. Coding for students in 2011-2012 was 1, 2012-2013 = 2, male = 1, female = 0, minority = 0, non-minority = 1, free/reduced = 1, non-free/reduced = 0.

Data were entered into SPSS 17.0 for Windows. The researcher used descriptive statistics along with an independent samples *t*-test to analyze the data. The researcher examined the effects of all variables and examined the relationship of the variables. Data were interpreted to establish if the intervention of laughter yoga before learning and testing affected the math achievement of second grade students on the math Mock CRCT while controlling for race, gender, and socio-economic status.

Setting

The school made Annual Yearly Progress (AYP) as specified in the No Child Left Behind federal statute since FY 2004-2005. It was recognized as a Title I Distinguished School for eight years and awarded the 2010 Platinum Award by the Governor's Office of

Student Achievement for the greatest gain in the percentage of students meeting and exceeding standards. The school was accredited by the state accrediting commission and AdvancEd.

The school had approximately 330 students, 59% White and 41% Black. Thirty-eight percent of the student body was enrolled in compensatory programs, 7% in special education and 31% in the Early Intervention Program. Gifted students comprised 2% of the student body. Sixty-nine percent of the student body qualified for free or reduced price meals. School personnel consisted of 29 certified teachers/support personnel with an average of 13 years experience. Eighty percent of the staff held a graduate degree or higher.

Selection of Participants

The participants in this study were selected using purposeful sampling and included all of the second-grade students (N=98) enrolled at a small, rural school in South Georgia. The experimental group was comprised of all 2012-2013 second-grade students in the school and had 98 participants (55 male, 43 female; $M_{age} = 7.29$ years; 58 non-minority, 40 minority). Under federal income eligibility guidelines, seventy-four children received free lunch while three qualified for reduced. Four children are served in the gifted program. The mean, raw math score of this group of students on the math Mock CRCT represented the achievement of the experimental group.

The control group was comprised of the second-grade class in 2011-2012. The demographic composition of the class was similar to that of the experimental group. One hundred children (N=100) took the math portion of the CRCT in 2012-2013. Participants included 55 male, 45 female; 65 non-minority, and 45 minority. Sixty-one children received

free lunch while twelve qualified for reduced-price lunches. Five of the children were served through gifted classes. The mean, raw math scores of this group of children on math the Mock CRCT represented the achievement of the control group.

Procedures

Initially, a meeting with the superintendent discussing the study, procedures, and confidentiality occurred. Formal letters were written to the superintendent of the school system and the Board of Education (Appendices A, B, and C). Permission to conduct this study (Appendix D) was obtained from the Board of Education. Second grade teachers were then briefed about the research and were given the opportunity to participate. All teachers agreed to participate in the study. Next, a meeting was held with all second grade students explaining laughter sessions. Parent letters (Appendix E) and informed consent forms (Appendix F) were sent to parents to explain the study and to request participation of their child. Parents of all children in the study elected to sign the consent form. Once all consent forms were collected, a schedule for the research was devised. Laughter yoga sessions began March 23, 2013 and ended April 21, 2013 the day the mathematics portion of the Mock CRCT was administered. In accordance with the guidelines of Columbus State University regarding the protection of human participants, a request for review of the study was submitted to the Institutional Review Board (IRB), which was approved. Confidentiality was maintained by reporting group results only. The researcher stored all data separately so the participants' confidentiality was maintained. The requirements of the IRB process were strictly followed and the students and parents did not receive any gifts, tokens, or rewards for participating throughout the study.

Laughter Yoga Sessions

The laughter yoga sessions were modeled after the techniques described by Dr. Madan Kataria in his book, *Laugh for No Reason* (2005). The children were lined up on both sides of the second grade hall while the laughter yoga sessions were being conducted. The sessions lasted for five minutes and began promptly at 10:00 a.m. The first Monday of the study, the children were instructed on the basic procedure. The children chanted, “Ho-Ho-Ho-Ha-Ha-Ha.” while clapping with arms fully outstretched towards the sky. Children were instructed to maintain a smile and eye contact with others. After 45 seconds, the researcher stopped the children and instructed them to perform deep breathing exercises. Two deep breaths were taken with an upward movement of the arms. The entire procedure was repeated for a total of five minutes. The children ended each session with the closing technique consisting of shouting three slogans: “We are the happiest [children] in the world, Y...E...S. We are the healthiest [children] in the world, Y...E...S. We are Laughter Club members, Y...E...S.” (Kataria, 2005), p. 43.

Subsequent Mondays included “Lion Laughter” (p. 42). Lion Laughter involved opening the eyes wide with hands stretched out like claws. The mouth is kept open and the tongue is fully extended. Participants were instructed to roar like a lion and then laugh. Lion Laughter provides exercise to the facial muscles, tongue and throat. It also improves the blood supply to the thyroid gland.

Tuesday’s session began with a short Ho-Ho-Ha-Ha-Ha chant and deep breathing exercises. Next, the children were instructed to perform “Greeting Laughter” (p. 42).

Children were allowed to walk among the others and greet them with a smile, handshake or wave while maintaining eye contact. The session ended with chanting, deep breathing, and the closing technique as described above.

“Hearty Laughter” (p. 42) was the focus on Wednesday. The researcher gave the cue, “1...2...3,” and everyone began laughing at the same time. Children were instructed to throw their arms upward when they laughed. The arms should not remain extended, but should be brought back down and then raised again. At the end, the researcher began chanting the Ho-Ho-Ha-Ha-Ha routine and the exercise ended with deep breathing and the closing technique.

Thursday’s laughter session involved “Silent Laughter without Sound” (p. 43). After chanting and deep breathing, the children were instructed to open their mouths wide and laugh without making a sound. Participants were instructed to look into each other’s faces. Funny gestures were added next while maintaining eye contact with others. The closing technique ended the session.

“Argument Laughter” (p. 43) was the focus on Friday. The students were in two lines facing each other. The session began with the opening warm-up. While laughing, the children were instructed to pretend to be angry at one another by pointing fingers and gesturing as if arguing. Once again, eye contact was maintained throughout the exercise. Chants and deep breaths followed along with the closing technique. The entire process was repeated every day for four weeks. Attempts were made to prolong the laughter for five minutes. The children returned to their respective classrooms to receive math instruction.

At the end of the four weeks, a laughter yoga session was conducted in the morning prior to the administration of the math Mock CRCT.

Validity

All second grade students participated in the study to control for threats of selection error. Testing was conducted according to the regulations of the state so that each teacher used a standard administration format. There was no teacher turnover during the duration of this study. The same teachers instructed both the experimental group and the control group. The teachers shared a common planning time and planned instruction together. They all used the same instructional materials and spent the same amount of time on math instruction. Five of the six teachers had been teaching for 15 years or more.

The math Mock Criterion Referenced Competency Test (CRCT) scores were used in this study. The CRCT was implemented in spring 2000 as a result of the A+ Education Reform Act (Georgia Department of Education, 2014). It was specifically designed to measure the state's performance standards as outlined by the Common Core Standards. In 2012, Georgia eliminated funding for the CRCT in grades one and two, and offered all school systems a bank of on-line questions at each grade level to construct the Mock CRCT (Georgia Department of Education, 2014). The test was administered according to the standards and procedures devised by the Department of Education. Table 3.1 shows the state required scores for all grade levels.

Table 3.1

<i>State Required Scores</i>
Performance Level 1
(Does not meet)
650-799
Performance Level 2
(Meets)
800-849
Performance Level 3
(Exceeds)
850 +

(Georgia Dept. of Ed)

To control for threats to internal validity, the researcher, with already established rapport, conducted the five-minute laughter period for all participants so all participants in the experimental group received the same laughter session. Educators wrote the CRCT, based on the state-mandated performance standards. Each question was field-tested. After field-testing, educators reviewed the questions and answers and determined the number of students who answered each question correctly. If any bias was detected, the question was not used on the CRCT. The Georgia Department of Education reported that consistent results of reliability ensured a valid educator- created test (GaDOE).

The state of Georgia did not validate the Mock CRCT as an instrument; therefore there was no reliability coefficient for this exam. However, three-year results of third grade mean test scores of the school under study were examined to establish continuity. In 2014, the mean third grade math score was 842.06. In 2013, the third grade, mean math score was 835.97, and in 2012 it was 840.11. Second grade Mock CRCT math data used in this study reveal the mean score as 840.97. In this school system, math scores have little change over time. Using the state-released test questions, the Mock CRCT was created by Chattahoochee Flint Regional Educational Service Agency (RESA) staff for use in grades one and two throughout the RESA district.

Data Analysis

An independent samples *t*-test was performed using SPSS 17.0 for Windows. The Alpha level of significance was set at $p \leq .05$. Analysis of each research question is found below.

RQ1: Is there a statistically significant difference in the math Mock CRCT scores of second grade students who participated in laughter yoga sessions as compared to second grade students who did not participate in the sessions?

H_{1o}: There will be no statistically significant difference in the math Mock CRCT scores of second grade students who participated in laughter yoga sessions as compared to second grade students who did not participate in the sessions.

H_{1a}: There will be a statistically significant difference in the math Mock CRCT scores of second grade students who participated in laughter yoga sessions as compared to second grade students who did not participate in the sessions.

Data Source

Students' math Mock CRCT test scores from the 2011-2012 and 2012-2013 school years from all second grade students were used in this study.

Method of Analysis

An independent samples *t*-test was used in SPSS 17.0 for Windows. The Alpha level of significance was set at $p \leq .05$.

Findings

To investigate whether there was a statistically significant difference in the math Mock CRCT scores after laughter yoga was administered an independent samples *t*-test was conducted. The independent samples *t*-test revealed that there was no statistically significant difference between the control group ($M = 840.97$, $SD = 30.6$) and the laughter yoga group ($M = 834.82$, $SD = 31.1$), $t = 1.46$, $p = .169$. The results of the data interpretation indicate that it is appropriate to accept the null hypothesis.

RQ2: Is there a statistically significant difference in the math Mock CRCT scores of second grade males who participated in laughter yoga sessions as compared to second grade males who did not participate in the sessions?

H₂₀: There will be no statistically significant difference in the math Mock CRCT scores of second grade males who participated in laughter yoga sessions as compared to second grade males who did not participate in the sessions.

H2_A: There will be a statistically significant difference in the math Mock CRCT scores of second grade males who participated in laughter yoga sessions as compared to second grade males who did not participate in the sessions.

Data Source

Students' math Mock CRCT test scores from the 2011-2012 and 2012-2013 school years from all second grade students were used in this study.

Method of Analysis

An independent samples *t*-test was used in SPSS 17.0 for Windows. The Alpha level of significance was set at $p \leq .05$.

Findings

To investigate whether there was a statistically significant difference in the males' math Mock CRCT scores after laughter yoga was administered an independent samples *t*-test was conducted. The data in this study were analyzed using SPSS 17.0 for Windows. An independent samples *t*-test performed during this study revealed that there was no statistically significant difference between the control group ($M = 841.5, SD = 31.1$), (and the laughter yoga group ($M = 835.39, SD = 31.57, t = .51, p = .604$)). The results of the data interpretation indicate that it is appropriate to accept the null hypothesis.

RQ3: Is there a statistically significant difference in the math Mock CRCT scores of second grade, minority students who participated in laughter yoga sessions as compared to second grade, minority students who did not participate in the sessions?

H3₀: There will be no statistically significant difference in the math Mock CRCT scores of second grade, minority students who participated in laughter yoga sessions as compared to second grade, minority students who did not participate in the sessions.

H3_A: There will be a statistically significant difference in the math Mock CRCT scores of second grade, minority students who participated in laughter yoga sessions as compared to second grade, minority students who did not participate in the sessions.

Data Source

Students' math Mock CRCT test scores from the 2011-2012 and 2012-2013 school years from all second grade students were used in this study.

Method of Analysis

An independent samples *t*-test was used in SPSS 17.0 for Windows. The Alpha level of significance was set at $p \leq .05$.

Findings

To investigate whether there was a statistically significant difference in the minority math Mock CRCT scores after laughter yoga was administered an independent samples *t*-test was conducted. The data in this study were analyzed using SPSS 17.0 for Windows. An independent samples *t*-test performed during this study revealed that there was no statistically significant difference between the control group ($M = 841.5, SD = 31.1$), (and the laughter yoga group ($M = 835.39, SD = 31.57, t = 2.8, p = .06$). The results of the data interpretation indicate that it is appropriate to accept the null hypothesis.

RQ4: Is there a statistically significant difference in the math Mock CRCT scores of second grade, low socio-economic students who participated in laughter yoga sessions as compared to second grade, low socio-economic students who did not participate in the sessions?

H4₀: There will be no statistically significant difference in the math Mock CRCT scores of second grade, low socio-economic students who participated in laughter yoga sessions as compared to second grade, low socio-economic students who did not participate in the sessions.

H4_a: There will be a statistically significant difference in the math Mock CRCT scores of second grade, low socio-economic students who participated in laughter yoga sessions as compared to second grade, low socio-economic students who did not participate in the sessions.

Data Source

Students' math Mock CRCT test scores from the 2011-2012 and 2012-2013 school years from all second grade students were used in this study.

Method of Analysis

An independent samples *t*-test was used in SPSS 17.0 for Windows. The Alpha level of significance was set at $p \leq .05$.

Findings

To investigate whether there was a statistically significant difference in the low socio-economic math Mock CRCT scores after laughter yoga was administered an independent samples *t*-test was conducted. The data in this study were analyzed using SPSS 17.0 for Windows. An independent samples *t*-test performed during this study revealed that

there was no statistically significant difference between the control group ($M = 835.47$, $SD = 31.56$) and the laughter yoga group ($M = 841.66$, $SD = 31.07$), $t = -1.64$, $p = .102$. The results of the data interpretation show that it is appropriate to accept the null hypothesis.

Summary

This chapter outlined the research methodology used to determine the effects of laughter on second-grade math achievement. It discussed the participants, procedures, research design, and setting. This chapter also described how each laughter yoga session was conducted as well as the validity and analysis of the data.

CHAPTER IV

RESULTS

“A merry heart doeth good like medicine, but a broken spirit drieth the bones.”

Holy Bible, Proverbs 17:22, King James Version

Introduction

This quantitative study focused on laughter yoga and second grade math achievement, as measured by the math Mock Criterion Referenced Competency Test (CRCT) scores. The CRCT was implemented in Georgia spring 2000 as a result of the A+ Education Reform Act (Georgia Department of Education, 2014). It was specifically designed to measure the state’s performance standards as outlined by the Common Core Standards. In 2011, Georgia eliminated funding for the CRCT in grades one and two, and offered all school systems a bank of on-line questions at each grade level to construct the Mock CRCT (Georgia Department of Education, 2014). The test was administered according to the standards and procedures devised by the Georgia Department of Education.

This study examined two years of math Mock CRCT test scores with approximately 100 students per year. This study was quantitative and controlled for characteristics such as race, gender, and socio-economic level (lunch status).

Restatement of the Purpose of the Study

The purpose of this study was to investigate the effects of laughter yoga on the mathematic achievement of second grade students as measured by the math Mock Criterion

Reference Competency Test (CRCT). Laughter tends to remove the side effects of stress experienced by children such as anxiety and behavioral problems (Okhuizen-Stier, 2008; Skinner, 2010). Research suggests 25-40% of children display test anxiety (Salend, 2011). School leaders, counselors, and teachers identified possible triggers of test anxiety and utilized different strategies to reduce stress in children (Salend, 2011). Previous studies suggested laughter can release positive hormones in the brain that can reduce stress, lower blood pressure, boost immunity, mask pain, and elevate one's mood (Adams & Mylander, 1998; Crook, 2008; Griffiths, 1992; Skinner, 2010; Okhuizen-Stier, 2008). Mathematics builds on previous concepts and children may experience anxiety if the teacher moves on to more difficult concepts before they master the prerequisites. Laughter may reduce these symptoms, making children better prepared to learn and test. Adams and Mylander (1998) suggested that although laughter is difficult to evaluate, the response to humor could be studied.

According to Hoffman (2008), laughter can provide positive benefits to children and adults impacted by autism, epilepsy, and even diabetes. Hoffman (2008) conducted research on humor in early childhood education settings and stated there is little research on laughter and the benefits to young children in the academic setting. Most humor research deals with how humor progresses through the developmental stages of children (Hoffman, 2008). In the last ten years, there has been an abundance of research on laughter. However, very little of the research is on elementary students. There is a great need for studies on the laughter of early childhood students because laughter has so many benefits to the mind and body. This study used the procedures of laughter yoga, set forth by Dr. Madan Kataria (2005), on

second grade children before math class and standardized testing to determine if it had any effect on their math Mock CRCT scores.

Validity and Reliability

A reliable test does not have to be valid, however for a test to be considered valid, it must be reliable. The state of Georgia established the validity and reliability of the CRCT. The Cronbach's alpha coefficient and the standard error of measurement (SEM) were used to measure reliability. The Georgia Department of Education reported that a reliable test would produce stable scores if the same students repeatedly took the assessment. The Cronbach's alpha for the math CRCT ranged from .92 to .93 with an average of .925. The SEM for the math CRCT ranged from 2.99 to 3.15 for an average of 3.08. These scores showed strong reliability and consistent scores. The test served the purpose for which it was created. The CRCT measured the mastery of the state's curriculum and the strong indicators of reliability implied that the test was also valid.

In 2011, state required testing of grades one and two were suspended by the Georgia Department of Education due to budgetary constraints. At that time, the state released a bank of questions for systems to create their own mock tests for grades one and two. The math Mock Criterion Referenced Competency Test scores were used in this study (Georgia Department of Education, 2014). The test was administered according to the standards and procedures devised by the Georgia Department of Education.

Restatement of Research Questions

The underpinnings of this study produced the following research questions and hypotheses:

Restatement of Research Question One

Is there a statistically significant difference in the math Mock CRCT scores of second grade students who participated in laughter yoga sessions as compared to second grade students who did not participate in the sessions?

Restatement of null hypothesis

H₁₀: There was no statistically significant difference in the math Mock CRCT scores of second grade students who participated in laughter yoga sessions as compared to second grade students who did not participate in the sessions.

Data Source:

Students' math Mock CRCT test scores from the 2011-2012 and 2012-2013 school years from all second grade students were used in this study.

Method of Analysis

An independent samples *t*-test was used in SPSS 17.0 for Windows. The Alpha level of significance was set at $p \leq .05$.

Findings

To investigate whether there was a statistically significant difference in the math Mock CRCT scores after laughter yoga was administered an independent samples *t*-test was conducted. The independent samples *t*-test revealed that there were no statistically significant difference between the control group ($M = 840.97, SD = 30.6$) and the laughter yoga group ($M = 834.82, SD = 31.1$), $t = 1.4, p = .169$. The results of the data interpretation

indicate that it is appropriate to accept the null hypothesis. Table 4.1 shows the results of the descriptive statistics *t*-test.

Table 4.1

Descriptive Statistics t-test

	<i>M</i>	<i>SD</i>	<i>n</i>	<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>
Control	840.1	30.6	98		197	
Laughter	834.8	31.07	100	-1.46	197	.169

Note M=Mean. SD=Standard Deviation. n=sample size. df=Degrees of freedom

Restatement of Research Question Two

Is there a statistically significant difference in the math Mock CRCT scores of second grade males who participated in laughter yoga sessions as compared to second grade males who did not participate in the sessions?

Restatement of null hypothesis

There was no statistically significant difference in the math Mock CRCT scores of second grade males who participated in laughter yoga sessions as compared to second grade males who did not participate in the sessions.

Data Source

Students' math Mock CRCT test scores from the 2011-2012 and 2012-2013 school years from all second grade students were used in this study.

Method of Analysis

An independent samples *t*-test was used in SPSS 17.0 for Windows. The Alpha level of significance was set at $p \leq .05$.

Findings

To investigate whether there was a statistically significant difference in the math Mock CRCT scores of males after laughter yoga was administered an independent samples *t*-test was conducted. The data in this study were analyzed using SPSS 17.0 for Windows. An independent samples *t*-test performed during this study revealed that there was no statistically significant difference between the control group of males ($M = 841.5$, $SD = 31.1$), and the laughter yoga group of males ($M = 835.39$, $SD = 31.57$; $t = .519$, $p = .604$). The results of the data interpretation indicate that it is appropriate to accept the null hypothesis. Table 4.2 shows the results of the group statistics for males.

Table 4.2
Comparison of Males

	<i>M</i>	<i>SD</i>	<i>N</i>	<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>
Control	841.5	31.1	55	-1.379	109	.410
Laughter	831.39	31.57	55	.519	109	.604

Note. *M*=Mean. *SD*=Standard Deviation. *n*=sample size. *df*=Degrees of freedom.

Restatement of Research Question Three

Is there a statistically significant difference in the math Mock CRCT scores of second grade, minority students who participated in laughter yoga sessions as compared to second grade, minority students who did not participate in the sessions?

Restatement of null hypothesis

There was no statistically significant difference in the math Mock CRCT scores of second grade, minority students who participated in laughter yoga sessions as compared to second grade, minority students who did not participate in the sessions.

Data Source

Students' math Mock CRCT test scores from the 2011-2012 and 2012-2013 school years from all second grade students were used in this study.

Method of Analysis

An independent samples *t*-test was used in SPSS 17.0 for Windows. The Alpha level of significance was set at $p \leq .05$.

Findings

To investigate whether there was a statistically significant difference in the minority math Mock CRCT scores after laughter yoga was administered an independent samples *t*-test was conducted. The data in this study were analyzed using SPSS 17.0 for Windows. An independent samples *t*-test performed during this study revealed that there was no statistically significant difference between the control group ($M = 841.5, SD = 31.1$), (and the laughter yoga group ($M = 835.39, SD = 31.57, t = 2.8, p = .06$). The results of the data interpretation indicate that it is appropriate to accept the null hypothesis. Table 4.3 shows the results for the descriptive statistics for minority students.

Table 4.3

Comparison of Minority Students

	<i>M</i>	<i>SD</i>	<i>n</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> (2-tailed)
Control	841.5	31.17	45		84	
Laughter	835.39	31.57	40	2.8	84	.06

Note. *M*=Mean. *SD*=Standard Deviation. *n*=sample size. *df*=Degrees of freedom

Restatement of Research Question Four

Is there a statistically significant difference in the math Mock CRCT scores of second grade, low socio-economic students who participated in laughter yoga sessions as

compared to second grade, low socio-economic students who did not participate in the sessions?

Restatement of null hypothesis

There will be no statistically significant difference in the math Mock CRCT scores of second grade, low socio-economic students who participated in laughter yoga sessions as compared to second grade, low socio-economic students who did not participate in the sessions.

Data Source

Students' math Mock CRCT test scores from the 2011-2012 and 2012-2013 school years from all second grade students were used in this study.

Method of Analysis

An independent samples *t*-test was used in SPSS 17.0 for Windows. The Alpha level of significance was set at $p \leq .05$.

Findings

To investigate whether there was a statistically significant difference in the math Mock CRCT of low socio-economic students' scores after laughter yoga was administered, an independent samples *t*-test was conducted. The data in this study were analyzed using SPSS 17.0 for Windows. An independent samples *t*-test performed during this study revealed that there was no statistically significant difference between the control group ($M = 831.42, SD = 31.56$) and the laughter yoga group ($M = 841.66, SD = 31.07$), $t = -1.64$,

$p = .102$. The results of the data interpretation show that it is appropriate to accept the null hypothesis. Table 4.3 shows the results of the descriptive statistics for students with low socio-economic status.

Table 4.4

Comparison of Low Socio-Economic Students

	<i>M</i>	<i>SD</i>	<i>n</i>	<i>t</i>	<i>df</i>	<i>Sig.(2-tailed)</i>
Control	831.14	24.34	73		189	
Laughter	824.02	27.95	77	-1.643	189	.102

Note. *M*=Mean. *SD*=Standard Deviation. *n*=sample size. *df*=Degrees of freedom

Summary of Findings

Chapter four presents the findings of the data collected in this study to determine if laughter yoga had a statistically significant effect on the math Mock CRCT scores of second grade students. SPSS 17.0 for Windows was used to analyze all the data within this study. Students' raw math Mock CRCT scores were added along with the demographic data of gender, lunch status, and race. Math Mock CRCT test scores from Academic Year 2011-2012 were compared to those of Academic Year 2012-2013. An independent samples *t*-test was used to determine that laughter yoga did not produce statistically significant findings. Research question two dealt with minority status of the participants. The independent

samples *t*-test revealed that race was not statistically significantly affected when participants were exposed to laughter yoga. Socio-economic status was then tested to see if laughter yoga significantly affected the participants' math Mock CRCT scores. The independent samples *t*-test revealed that there was no statistically significant difference between the control group of low socio-economic students and the laughter yoga group of low socio-economic students. Chapter five includes the summary, conclusions, and recommendations relative to the findings.

CHAPTER V
DISCUSSION OF FINDINGS, IMPLICATIONS, AND CONCLUSIONS

I am thankful for laughter, except when milk comes out of my nose.

Woody Allen

Introduction

The purpose of this study was to investigate the effects of laughter yoga on the mathematic achievement of second grade students as measured by the math Mock CRCT. According to Hoffman (2008), laughter can provide positive benefits to children and adults impacted by autism, epilepsy, and even diabetes. Hoffman (2008) conducted research on humor in early childhood education settings and stated there was little research on laughter and the benefits to young children in the academic setting.

Using the research of Bergen (2001), Church (2005), McGhee (1971), and Piaget (2011), Hoffman (2008) described three theories of humor related to children: the psychoanalytic, cognitive, and social interaction theories. This research contains some elements of each of the laughter theories, however the psychoanalytic theory is the one on which this study was based. Using the premise that joking and laughing can lessen the effects of stress, the researcher created laughter sessions for children before instruction and testing.

Laughter has many proven benefits to the body and mind. This study investigated the impact of laughter on learning in a specific subject area, i.e., whether laughter yoga affected the math scores of second-grade children on a criterion-referenced test.

Overview of the Study

Chapter one of this study introduces the research and contains the problem statement, purpose of the study, and rationale. The theoretical framework is established along with the laughter theories most frequently used to study children.

Chapter two contains a thorough review of related literature, which consists of research in the domains of laughter therapy and standardized testing. The domain of laughter therapy begins with a historical overview and contains research pertaining to the development and benefits of laughter therapy. Next, conditions needed for laughter, laughter in schools, and laughter yoga are examined. This domain concludes with literature on anxiety related to math. Under the domain of standardized testing, the history of standardized testing in the United States is examined followed by the standardized testing movement in Georgia.

Chapter three discusses the methodology. Included are the research design and the setting. Next, the participants, along with a detailed description of procedures, are discussed including the laughter yoga sessions. Validity of the study is examined along with a description of how the data are analyzed. The research questions and hypotheses are also reviewed. The chapter ends with a brief summary.

In chapter four, the results of the statistical analyses are presented along with a description of the Mock CRCT and the teachers involved. The structure of the study, in addition to an explanation of descriptive statistics and independent variables, are presented.

This chapter includes a summary, overview of the study, along with a discussion of the findings, implications, and conclusions.

Summary

There is little research on laughter and the benefits to young children in the academic setting. Many times when children do not understand difficult concepts, they experience headaches, stomachaches, or weakness. Laughter may reduce these symptoms, making children better prepared to learn.

Teachers who bring humor into their classroom uplift the spirits of students leaving them more energized and hopeful. Laughter provides neurological benefits such as masking pain, elevating mood, boosting immunity, reducing stress, and exercising one's brain. Laughter increases the secretion of chemicals that make people feel good, stimulates the immune system, oxygenates the blood, and creates positive effects on respiratory and cardiovascular problems. After a good laugh, anxiety and muscle relaxation can show benefits for up to forty-five minutes

Humor can bring people together and provide amusement. It can also help children cope with stress. Because laughter has so many proven benefits to the body and mind, this study investigated the effects of laughter on the criterion referenced math scores of second-grade children.

Restatement of Research Questions and Hypotheses

The underpinnings of this study produced the following research questions and hypotheses:

RQ1: Is there a statistically significant difference in the math Mock CRCT scores of second grade students who participated in laughter yoga sessions as compared to second grade students who did not participate in the sessions?

H1₀: There will be no statistically significant difference in the math Mock CRCT scores of second grade students who participated in laughter yoga sessions as compared to second grade students who did not participate in the sessions.

H1_A: There will be a statistically significant difference in the math Mock CRCT scores of second grade students who participated in laughter yoga sessions as compared to second grade students who did not participate in the sessions.

The relief theory of laughter involves the release of built-up tension and is used largely by filmmakers (D'Alto, 2013; Mitchell, 2005). This theory maintains a good laugh releases built-up tension and nervousness and provides mental relief (Perks, 2012). The relief theory of humor is most associated with the work of the psychoanalyst, Sigmund Freud. Strachy (1960) writes that Sigmund Freud saw humor as a way of releasing suppressed aggression or energy and believed it was linked to the unconscious (Strachy, 1960). The data in this study were analyzed using SPSS 17.0 for Windows. An independent samples *t*-test performed during this study revealed that there was no statistically significant difference between the control group ($M = 840.97$, $SD = 30.6$) and the laughter yoga group

($M = 834.82$, $SD = 31.1$), $t = 1.4$, $p = .169$. The results of the data interpretation indicate that it is appropriate to accept the null hypothesis.

RQ2: Is there a statistically significant difference in the math Mock CRCT scores of second grade males who participated in laughter yoga sessions as compared to second grade students who did not participate in the sessions?

H2₀: There will be no statistically significant difference in the math Mock CRCT scores of second grade males who participated in laughter yoga sessions as compared to second grade males who did not participate in the sessions.

H2_A: There will be a statistically significant difference in the math Mock CRCT scores of second grade males who participated in laughter yoga sessions as compared to second grade males who did not participate in the sessions.

Abbott, Hart, Lybrand, & Nouri, (2009) suggest low income is a better predictor of student achievement as opposed to ethnicity. They tested students in grades three through ten. They found math scores gradually decreased across all grade levels and were lower than reading scores. He also found ethnicity variance was not near that of low-income students.

Along with stress, socioeconomic status and gender may play a part in low math achievement (Robinson & Copur, 2011; Voyer and Voyer, 2014). Voyer & Voyer (2014) found females score higher in most core subjects. Reading showed the most variance; however females scored only slightly higher in math.

The data in this study were analyzed using SPSS 17.0 for Windows. An independent samples *t*-test performed during this study revealed that there was no statistically significant

difference between the control group of males ($M = 841.5$, $SD = 31.1$), and the laughter yoga group of males ($M = 835.39$, $SD = 31.57$), $t = .519$, $p = .604$. The results of the data interpretation indicate that it is appropriate to accept the null hypothesis.

RQ3: Is there a statistically significant difference in the math Mock CRCT scores of second grade, minority students who participated in laughter yoga sessions as compared to second grade, minority students who did not participate in the sessions?

H3₀: There will be no statistically significant difference in the math Mock CRCT scores of second grade, minority students who participated in laughter yoga sessions as compared to second grade, minority students who did not participate in the sessions.

H3_A: There will be a statistically significant difference in the math Mock CRCT scores of second grade, minority students who participated in laughter yoga sessions as compared to second grade, minority students who did not participate in the sessions.

Abbott, Hart, Lybrand, & Nouri, (2009) suggested low income is a better predictor of student achievement when compared with ethnicity. They tested students in grades three through ten. They found math scores gradually decreased across all grade levels and were lower than reading scores. They also found that ethnicity variance was not near that of low-income students.

The data in this study were analyzed using SPSS 17.0 for Windows. An independent samples t -test performed during this study revealed that there was no statistically significant difference between the control group ($M = 841.5$, $SD = 31.17$) and the laughter yoga group ($M = 835.39$, $SD = 31.57$, $t = 2.8$, $p = .006$). The results of the data interpretation indicate that it is appropriate to accept the null hypothesis.

RQ4: Is there a statistically significant difference in the math Mock CRCT scores of second grade, low socio-economic students who participated in laughter yoga sessions as compared to second grade, low socio-economic students who did not participate in the sessions?

H4₀: There will be no statistically significant difference in the math Mock CRCT scores of second grade, low socio-economic students who participated in laughter yoga sessions as compared to second grade, low socio-economic students who did not participate in the sessions.

H4_A: There will be a statistically significant difference in the math Mock CRCT scores of second grade, low socio-economic students who participated in laughter yoga sessions as compared to second grade, low socio-economic students who did not participate in the sessions.

Children of poverty may find it more difficult to laugh. Wilson (2009) wrote the “potential” for laughter is everywhere but it can only be achieved when the conditions are right. For example, people living in poverty, war, famine, and disease do not laugh; the conditions are not met. Wilson (2009) claimed their central nervous systems are wired for laughter but they are unable to laugh because their basic needs have not been met. He generalized this to the five levels of Abraham Maslow’s Hierarchy of Needs. The lowest level describes one’s basic physiological needs such as food, water, sleep, and warmth while the highest level is associated with self-actualization needs.

The data in this study were analyzed using SPSS 17.0 for Windows. An independent samples *t*-test performed during this study revealed that there was no statistically significant difference between the control group ($M = 835.47$,

$SD = 31.56$) and the laughter yoga group ($M = 841.66$, $SD = 31.07$, $t = -1.643$, $p = .102$).

The results of the data interpretation indicate that it is appropriate to accept the null hypothesis.

Discussion of Research Findings

Laughter has been shown to reduce stress but it has not been implemented in the early childhood setting as a relief tactic. Based on the stress-relieving qualities of the relief theory, laughter was utilized to determine whether and to what extent it affected the achievement of second-grade math students. However, this study suggests there is an absence of evidence that laughter yoga can raise the mathematical test scores of second grade students.

Laughter yoga did not statistically significantly affect standardized test scores in this study, but the scores remained constant. Perhaps the effects of laughter cannot be measured in a standardized format. Laughter begins with smiles and the question of whether smiling produces stress-relieving benefits remains. Smiling tends to promote comradeship among students and it raises the question as to what may possibly benefit children.

Many years have passed since Norman Cousins (1979) wrote about the healing effects of laughter, yet the study of laughter occupies a rather modest place in the field of scientific research. It was not until 1995 that laughter yoga emerged through the work of Kataria (2005). The popularity of laughter as therapy has grown remarkably in the last decade and one might expect an abundance of laughter therapies used for alternative or holistic medicine. It must be noted that there are no costs or negative side effects associated with the use of laughter yoga as therapy (Strean, 2009).

Current research indicates using humor is well accepted by the public and is frequently used as a coping mechanism. The practice of using humor and laughter can be traced back to the Holy Bible in Proverbs 17:22, King James Version, “A merry heart doeth good like medicine, but a broken spirit drieth the bones.” However, scientific evidence of laughter’s benefits on health related issues still leaves many questions unanswered. Research on the benefits of laughter is relatively new and most studies produce positive results (Strean, 2009). There is almost no evidence showing negative side effects or undesirable ramifications while using laughter as an intervention. Perhaps the appropriate logic of using laughter as an intervention should be “innocent until proven guilty” (Strean, 2009).

It may be that children’s math scores were not positively impacted because they already laugh so much. Many laughter studies previously published measure the academic effects of laughter presented throughout the entire lesson as opposed to only initial laughter before instruction; these studies include older students (Javidi et al., 1998; Lei, et al., 2010).

Descriptive Statistics

Descriptive and inferential statistics were used to test the hypothesis and draw inferences. Math scores of the experimental group were compared to the math scores of the control group on the Mock CRCT. Raw scores were entered into SPSS 17.0 for Windows to analyze. An independent samples *t*-test was conducted. The researcher controlled for factors such as socio-economic status, gender, and race to see if a relationship existed

between laughter and the math achievement of second-grade students. Results of the descriptive statistics are shown in Table 5.1

Table 5.1

Descriptive Statistics t test

	<i>M</i>	<i>SD</i>	<i>n</i>	<i>t</i>	<i>df</i>	<i>Sig.</i>
Control	840.1	30.6	98		197	
Laughter	834.8	31.07	100	-1.46	197	.146

Note. *M*=Mean. *SD*=Standard Deviation. *n*=sample size. *df*=Degrees of freedom

Humor has shown to provide both psychological and physiological advantages to the human body. Garner (2006) studied students at the collegiate level to determine if humor enhanced learning and enjoyment in a statistics class. The humor group recalled and retained more of the information presented. Students reported that the use of humor provided them a respite from the stressful atmosphere, provided them a cognitive break, and made the subject more interesting. Matthews (2011) sees humor as an instructional tool that should be utilized by teachers, especially in the era of fast-paced video games, the Internet, and television shows.

Some health professionals believe laughter can relieve suffering but cannot cure disease. Bennett et al. (2014) claim laughter is an underutilized therapy. After all, is it not the health professional's job to reduce symptoms and pain? The authors further add that laughter should become a part of the healthcare professional's training at the undergraduate

and graduate levels. Deep breathing, prolonged simulated laughter, and natural laughter has been proven to benefit the body. This is an area that could use additional research in order to reduce the suffering of chronic diseases and to improve the life quality of physical and mental dilemmas, possibly even cause the patient to ingest less medication.

This study contained several factors that could have affected the outcome. A larger sample size would have strengthened the study, as approximately one hundred participants may not be a large enough sample to produce positive results. The laughter sessions may not have been conducted for a long enough length of time.

Comparative research design was used for convenience and all second grade students in one school participated in the study. Another factor to consider in this study is a year-end assessment was used. Perhaps daily grades, quarter averages, or weekly class performance should be studied as the dependent variable. Perhaps the effects of laughter are difficult to measure in second grade, as children in this age group do not typically experience a substantial number of daily stressors in their lives. The fear of math may not be significantly dominant at this age therefore future research should include participants in upper elementary school as peer pressure and self-awareness become more evident. As children mature, they experience more self doubts and could possibly benefit from the calming effects of laughter. Humor can bring people together and provide amusement (Banas, Dunbar, Rodriguez, & Liu, 2011).

As previously stated, there is not an abundance of research on laughter in the early grades. Even though this study failed to indicate that laughter positively affected standardized test scores, it should be noted the effect of attendance was not examined and

could be included in research similar to this. The results of the CRCT were a crucial part of whether each child passed to the next grade and was essential to the success of teacher evaluations. A lot was at stake during testing week. Testing week is no laughing matter in today's schools.

Implications for Future Study

Current literature shows a growing number of laughter studies demonstrating numerous benefits and positive outcomes, however many of these studies are non-evidenced based opinion. Future prudent, descriptive studies are needed to more fully examine the physiological benefits (Strean, 2009). Many of the arguments against using laughter as an intervention are simply a cry for more evidence. Arguments in favor of laughter interventions are grounded in the positive results in existing studies of laughter. Numerous scholars and practitioners recognize the need for further study with more replication of results. The call for more research on the benefits of laughter as an intervention seems warranted.

Future studies of humor at the elementary level are necessary. Much of the research on humor in schools has been done at the collegiate level (Javidi, Downs, and Nussbaum, 1988). Javidi et al. (1988) found teachers with more experience tended to use humor in the classroom and intertwine it with the course content to enhance clarification. This made the lecture more pleasurable for the students.

Lei, Cohen, and Russler (2010) state the most effective college instructors incorporate humor into their classrooms. Some college professors believe one must be serious and solemn in the classroom. However, Lei et al. (2010) believe humor is an

appreciated teaching tool if it is used appropriately, constructively, and in moderation. Like many others, they claim humor alleviates stress, tension, and depression and can elevate self-esteem. Humor can increase the motivation, attention, and comprehension of students (Lei, et al., 2010).

Laughter studies have produced positive benefits at the collegiate level, so why not implement and study it at the primary level? Lei, Cohen, and Russler (2010) suggest teachers at the lower grades may be more content-oriented and less concerned with the manner in which they present material (Javidi et al. 1988). Perhaps this concept needs to be revisited so primary learning environments become more pleasurable for students and teachers. Perhaps the focus of the elusive “test day drama” needs to be removed from the hierarchical focus of each elementary teacher’s classroom and warm, nurturing tones need to return from the past.

It is possible the laughter yoga sessions in this study were not long enough to produce positive results. Perhaps future researchers should incorporate longer sessions of laughter yoga to determine if students’ achievement is affected. Yet another suggestion for future study is to include laughter sporadically throughout the lesson as opposed to the beginning.

Conclusions

It has been many years since Norman Cousins wrote his book on the potential benefits of laughter and humor. Yet, there is still not an abundance of research on laughter. When Dr. Madan Kataria penned a book on laughter yoga in 2005, it sparked a small following and laughter studies began to slowly infiltrate the world of scientific research.

The popularity of laughter programs has gained intensity over the last ten years and researchers are beginning to discover the benefits associated with simulated and spontaneous laughter. However, not everyone yet buys into the concept. Other than medical clowning, health professionals have had a difficult time grasping laughter as a therapy (Strean, 2009).

Teaching is a stressful profession. It is common for many novice teachers to leave the profession. In today's classroom, the emphasis on testing has become a constant reminder for teachers to make sure all their students pass the test or they and the students will be labeled as failures. Today's teachers deal with issues such as apathy, unruliness, violence, and drugs. Teachers reported that they use humor to relieve tension and provide relief and that the use of humor helped to build trust and develop friendships.

Research shows tension relief is an important tool to utilize in schools to create a cohesive atmosphere. Morreall (1981) reported that the average five year-old laughs more than 400 times per day while the average adult laughs fewer than 15. Laughter comes naturally to children, thus possibly producing fewer physical and psychological benefits as opposed to adults.

Children experience stressors in their lives such as divorce, economic problems, abuse, the threat of war, etc., and need to laugh to lessen the severity and in essence, to rise above the inescapable (Sluder, 2016). Schools are places where human beings live, work, and play. Adults and children in schools laugh, cry, get angry, and show disappointment because they are human. Expressions of emotion belong in schools just as much as they do on the outside. Teachers should recognize the importance of laughter and value it in order to make teaching and learning fun and above all, human (Rogers, 1984).

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APPENDICES

Appendix A: Board Letter

November 1, 2013

Dear Taylor County Board of Education Members,

I am interested in raising math scores of the students at Taylor County Primary School. Children tend to experience math anxiety when learning difficult concepts and I would like to study if laughter can provide a stress-relief to children thereby allowing them to become calmer during a math lesson. This letter serves as a request to be allowed to conduct that research.

Children will not be harmed in any way and complete anonymity will be maintained by reporting group results only. Confidentiality will be maintained by coding all data with identification numbers. The children will be exposed to no potential risks and strict adherence to the (Instructional Review Board) IRB process will be accomplished. Parental permission will be obtained from each second grade student before laughter sessions begin.

If you have any questions, please feel free to contact me through email, dnagy@taylor.k12.ga.us or by phone 706-249-2181. Thank you for your time and consideration.

Sincerely,

Debi Nagy

Teaching Children Performance Strategies

Educating Tomorrow's Leaders Today

Appendix B Letter to Superintendent

August 27, 2011

Mr. Wayne Smith Superintendent
Mulberry St.
Butler, Georgia 31006

Dear Mr. Smith,

As you know, I am currently enrolled in a doctoral program at Columbus State University. I am respectfully requesting permission to conduct research within the Taylor County School System.

The dissertation I am writing is entitled *Laughter and Second grade math achievement*. The study will be quantitative in nature and will examine the effect of laughter on achievement. Student and teacher participation will be purely voluntary and all participants will receive complete confidentiality throughout the entire process. Each parent will be given a *Consent to Participate Form* and students will be expected to return it prior to admission to the study.

I appreciate your consideration and will be glad to answer any questions you may have.

Sincerely,

Deborah Lezanic Nagy

Appendix C Letter to Superintendent

March 4, 2014

Dear Dr. Gibson,

I am interested in raising math scores of the students at Taylor County Primary School. Children tend to experience math anxiety when learning difficult concepts and I would like to study if laughter can provide a stress-relief to children thereby allowing them to become calmer during a math lesson. This letter serves as a request to be allowed to conduct that research.

The title of my research proposal is The Effects of Laughter on Second Grade Math Achievement. Children will not be harmed in any way and complete anonymity will be maintained by reporting group results only. Confidentiality will be maintained by coding all data with identification numbers. The children will be exposed to no potential risks and strict adherence to the (Instructional Review Board) IRB process will be accomplished.

If you have any questions, please feel free to contact me through email, dnagy@taylor.k12.ga.us or by phone 706-249-2181. Thank you for your time and consideration.

Sincerely,

Debi Nagy

Appendix D BOE Minutes

Meeting Home Page 2/9/15 10:12 AM

BOARD GOVERNANCE SYSTEM

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3/10/2014 - 7:00 PM - Regular Board Meeting
Print Options

Regular Board Meeting 3/10/2014 - 7:00 PM
Board of Education Board Room Central Office
Butler, Ga 31006

AGENDA

MINUTES

Mr. Joseph W. Patterson, Chairman - District 5
 Mr. John Jamell, Vice-Chairman - District 3
 Mrs. Mary Berry, Board Member - District 2
 Mr. Rufus Green II, Board Member - District 3
 Mr. Ronald S. Harris, Board Member - District 4
 Dr. Gary S. Gibson, Superintendent

Meeting Agenda

1. Call to Order
2. Pledge of Allegiance
3. National Anthem
4. Invocation - Clint Parker
5. Agenda
6. Minutes Approved
7. Recognition
 - a. Student
 - b. Faculty
 - c. Volunteer
8. Staff Report - Superintendent
 - a. Superintendent
 - I. Board Member Appreciation
 - II. Board Member Walk/Talk
 - III. State of the District
 - IV. Legal Conference
 - V. Snow Days - update State Board Meeting
 - VI. Update on Ongoing Audits
 - VII. Standards Based Classrooms-Submission of Standards
 - VIII. Research - Debi Nagy
 - b. Principals
 - I. Primary School - Debi Nagy
 - II. Upper Elementary School - Lisa Reddick
 - III. Middle School - Freddie Harmon
 - IV. High School - Clarence Mathis
 - c. Curriculum
 - I. CCRT
 - II. SACS Calendar 2015
 - III. AP Math Training
 - d. Assistant Principals
9. Action Items
 - a. Purchases
 - b. District Crest

<https://board.eboardolutions.com/Meetings/ViewMeetingOrder.aspx?4151&MD=35533>
Page 1 of 2

Appendix E: Parent Letter

January 4, 2014

Dear Parents/Guardians,

I am writing to ask your permission for your child to participate in a research project on The Effects of Laughter on Second Grade Math Achievement. This project will be conducted at Taylor County Primary School over the next several months. I am interested in studying if the calming effects of laughter can reduce stress thus allowing children to more easily grasp difficult math concepts.

The project in which your child has been invited to participate is expected to be an enjoyable experience and will require five minutes per day of time out of class. However, the decision about participation is yours.

All children's performances are considered confidential and individual children's results will not be shared. However, information based on the results of the group of participants will be provided. Only children in grade two who have parental permission, and who themselves agree to participate, will be involved in the study. Also, children or parents may withdraw their permission at any time during the study without penalty by indicating this decision to the researcher. There are no known or anticipated risks to participation in this study.

I would like to assure you that this study has been reviewed and approved by the Taylor County Board of Education. In addition, it has the support of the teachers at your child's school. However, the final decision about the participation is yours. Should you have any concerns or comments resulting from your child's participation in this study, please contact Debi Nagy at 478-862-4855 or dnagy@taylor.k12.ga.us. Thank you in advance for your interest and support of this project.

Sincerely,

Debi Nagy

Appendix F: Consent Form

Consent Form

I have read the information letter concerning the research project concerning laughter conducted at Taylor County Primary School. I have had the opportunity to ask questions and receive any additional details I wanted about the study.

I acknowledge that all information gathered on this project will be used for research purposes only and will be considered confidential. I am aware that permission may be withdrawn at any time without penalty by advising the researchers.

I realize that this project has been reviewed by and approved by the Taylor County Board of Education, and that I may contact this office if I have any comments or concerns about my son or daughter's involvement in the study.

If I have any questions about the study I can feel free to call the researcher Debi Nagy at 478-862-4855 or dnagy@taylor.k12.ga.us

Yes – I would like my child to participate in this study

No – I would not like my child to participate in this study.

Child's Name (please print)

Parent or Guardian Signature _____ Date _____

Researcher's Signature _____ Date _____