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Teaching Relaxation Techniques to Improve Achievement and Alleviate the Anxiety of
Students With Learning Disabilities in an Independent School

by
Melissa G. Dolton

An Applied Dissertation Submitted to the
Abraham S. Fischler School of Education
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

Nova Southeastern University
2015

Approval Page

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Statement of Original Work

I declare the following:

I have read the Code of Student Conduct and Academic Responsibility as described in the *Student Handbook* of Nova Southeastern University. This applied dissertation represents my original work, except where I have acknowledged the ideas, words, or material of other authors.

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Melissa G. Dolton

Name

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Abstract

Teaching Relaxation Techniques to Improve Achievement and Alleviate the Anxiety of Students With Learning Disabilities in an Independent School. Melissa G. Dolton, 2015: Applied Dissertation, Nova Southeastern University, Abraham S. Fischler School of Education. ERIC Descriptors: Progress Monitoring, Self Efficacy, Learning Disabilities, Test Anxiety, Relaxation Training

Many students have to perform well on achievement tests in order to pass grade levels and matriculate into higher levels of education. Previous research suggests that the increased pressure on student performance on achievement tests could have serious implications on students' anxiety levels and self-efficacy. Students with learning disabilities may have difficulty performing well on tests, but they still have to take achievement tests. Relaxation techniques could have a positive effect on student achievement and lower test anxiety in students with learning disabilities.

Study participants included second- through fifth-grade students with learning disabilities and their teachers in a private school. Students in the experimental group learned relaxation techniques, and students in the control group listened to a book on tape. Both groups took achievement tests to determine if there were changes in the levels of test anxiety and achievement before and after the intervention. Students in the experimental and control groups gave their perceptions of what they learned after the intervention phase of the study. In addition, teachers completed a survey to determine whether they observed students in the control and experimental groups using the relaxation techniques in testing situations.

Results of the study suggested there were no significant differences between students' levels of test anxiety and achievement. However, the researcher provided several recommendations for future research studies in this subject area.

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Chapter 1: Introduction

Introduction

Several factors have created an emphasis on student performance on standardized testing in primary, elementary, and secondary educational settings. In the public school system in the United States, the No Child Left Behind Act of 2001 was the largest involvement of the federal government in school reform in the history of the United States. That legislation dictated the degree of sufficiency that students must show in the academic areas of math, reading, and science on an annual basis (U.S. Department of Education, 2005). The same law (U.S. Department of Education, 2009) does not bind many administrators of independent schools.

However, these administrators should consider many factors, such as accountability and the emphasis of standardized testing results. Administrators and educators of schools experience pressure from parents (Abrams, Pedulla, & Madaus, 2003). Parents want their children to attend high schools that foster the ability for students to be able to attend reputable universities. In an era in which job loss is a distinct possibility and the job market is competitive, students must evolve into adults who are marketable and have the ability to be employed (Brown, 2012; Hill & Wigfield, 1984).

In order to monitor progress, students must complete standardized testing or other normative measurements. This testing serves the purpose of determining how much students are learning and whether the educational system is providing the services students need to be successful learners. The results of the testing also determine if a child passes to the next grade level or is eligible to receive a high school diploma (U.S. Department of Education, 2005). Experts call these testing measurements high-stakes testing because students' successes in school depend heavily on whether or not they have

performed well on the tests. School administrators use the results of the tests to make important choices about the students' fates in their educational careers (Cankoy & Mehmet, 2005). In addition, they are compelled to ensure the success of the students by investigating and implementing screening and intervention programs in schools (Weems et al., 2010).

The overemphasis on testing results may have negative effects on children's school performance and can affect whether they are retained a grade level, earn a regular or special diploma, or graduate from high school (Carter et al., 2005). Knowledge of these effects may increase anxiety in children, especially in children diagnosed with learning disabilities. Students with learning disabilities are still required to participate in standardized testing. These students have to answer the same questions under the same testing conditions, and test administrators score their tests in the same way as their typically developing peers. It has been hypothesized that an inadvertent result of high-stakes testing has been an increase in anxiety, particularly severe test anxiety (Carter et al., 2005; Lowe & Lee, 2008; Sena, Lowe, & Lee, 2007; Supon, 2004).

Lowe and Lee (2008) found that the results of test anxiety may include poor academic performance, grade failure, and dropping out of school. In addition, these students with test anxiety may experience feelings of suicide, failure, anxiety, and depression. Furthermore, Lufi, Okasha, and Cohen (2004) found that, by the end of elementary school, children who were test anxious were 2 years behind in basic reading and arithmetic skills. When tested under time constraints, children with test anxiety completed tests too quickly, which, in turn, resulted in low performance in standard testing situations. It has also been found that test anxiety could be correlated with poor academic performance overall (Chappell et al., 2005; Lufi et al., 2004).

In addition to poor academic performance, individuals with learning disabilities may have fragile egos, suffer from depression, and experience higher anxiety levels. They may alienate themselves from others and be rejected by peers due to poor social and interpersonal skills (Lufi et al., 2004). Students with high test anxiety tend to preoccupy themselves in catastrophizing, which may be viewed as counterproductive (Putwain, Connors, & Symes, 2010). Additionally, students with high test anxiety may disassociate themselves from academic situations in which they have to perform and do not do well on academic tasks (Lang & Lang, 2010). Additionally, Huwe, Henning, and Netter (1998) found that test participants with high test anxiety described more feelings of uneasiness and worry, took longer to finish coursework, and had lower grades than test participants with lower anxiety. Hembree (1988) developed a meta-analysis that identified several studies suggesting that test anxiety has a significant negative impact on performance.

Thirty percent of children with and without learning disabilities in the elementary and secondary levels experience test anxiety (Lowe & Lee, 2008; Lufi et al., 2004). This is an approximation because researchers have not conducted extensive research studies to determine a more accurate figure. Some early studies found that the percentage of students with test anxiety was around 10%, whereas studies conducted later found that rate of prevalence was approximately 33% (Sena et al., 2007). It is unknown what percentage of these students are identified as having both test anxiety and co-occurring learning disabilities.

Background and Justification

Researchers should focus on establishing the best strategies for reducing test anxiety in children with learning disabilities, which may include relaxation techniques.

Because previous research has implied that test anxiety starts in elementary school, students should learn research-based, compensatory relaxation techniques in the early grades. All of these techniques may help students to become successful in school and in life. Additionally, the effects of these techniques may help reduce test anxiety and allow students with learning disabilities to perform better on standardized tests. These strategies may be included in the daily instruction with minimal changes to the existing curriculum (Lufi et al., 2004; Supon, 2004).

Deficiencies in the Evidence

Although the subject of test anxiety with individuals without learning disabilities is popular among researchers and widespread attention has been given toward learning disabilities, there has been little focus on the relationship between learning disabilities and test anxiety in elementary and secondary school settings (Beauchemin, Hutchins, & Patterson, 2008; Lufi et al., 2004; Peleg, 2009; Sena et al., 2007). The studies conducted have indicated that learning disabilities can have a profound effect on the results of the testing of students with learning disabilities (Carter et al., 2005; Lufi et al., 2004; Sena et al., 2007). Therefore, researchers should conduct additional studies to determine the differences in the level of test anxiety related to specific learning disabilities (e.g., reading or math disability).

Furthermore, although test anxiety has been researched for many years, it appears that the amount of scientific publications on test-anxiety research has waned of late (Stöber & Pekrun, 2004; Von Der Embse, Barterian, & Segool, 2013). Gregor (2005) surmised that research studies have focused on the adult and college student population, and there has been limited research done on test anxiety in a typical elementary school setting. A research study conducted by Ergene (2003) indicated that there is a severe

deficiency in research on test-anxiety reduction programs for elementary, middle, and high school students. Semple, Reid, and Miller (2005) reported that there is very little research on the long-term effectiveness of psychosocial interventions for anxious children. The authors also found that there is an even smaller amount of data about the clinical efficacy of treatments used in real-world situations.

Kruger, Wandle, and Struzziero (2007) found little research on how school officials cope with the implications of high-stakes testing, such as increased stress on students. Additionally, Beauchemin et al. (2008) found no other research studies that used relaxation training as a way to improve academic functioning. Hembree (1988) found that there are many studies on measuring test anxiety and effective interventions for students at the university level; however, because test anxiety starts to affect student performance in fourth grade, it is important to conduct research that includes finding interventions that would be effective with elementary, middle, and high school students. This information could be helpful for educators, psychologists, and counselors in implementing successful programs that help decrease test anxiety in younger students.

Audience

Many school-aged children are affected by test anxiety, especially students with learning disabilities. Anxiety is usually defined as a multifaceted condition that is composed of emotional, cognitive, behavioral, or bodily reactions (Sarason, 1984). Anxiety includes two types: trait and state. The definition of trait anxiety is an individual recognizing numerous situations as unsafe and ominous. The definition of state anxiety is an individual perceiving a particular situation to be threatening. Test anxiety is one form of state anxiety. The cause of anxiety is the concern of the consequences that may occur due to the poor performance on a test. As a result, the individual has a physiological

reaction due to changes in the central nervous system (Lufi et al., 2004). Symptoms may include rapid heart rate, clammy hands, dizziness, sweating, upset stomach, rapid breathing, and poor concentration. Behaviorally, the individual may withdraw from social situations, have emotional outbursts, exhibit overactive behaviors, appear exhausted, and avoid school (Cizek & Burg, 2006). The researcher evaluated the student participants in this study for their test anxiety.

The participants in the study conducted by Cizek and Burg (2006) included 22 students in Grades 2 through 5 with a learning-disability diagnosis. The researchers chose these grade levels based on the literature review. Through an exhaustive meta-analysis of research studies on test anxiety, Hembree (1988) found that the level of test anxiety in students increased in Grades 3 through 5. Disabilities include specific learning disability, autism spectrum disorder, hearing impairment, speech and language impairment, orthopedic impairment, multiple disabilities, attention deficit hyperactivity disorder, and other health impairments. Because these students will have to complete tests throughout their formal education and learn how to cope with test anxiety, they may benefit from the relaxation techniques that they learned during the current research study. Additionally, the teachers who were part of the current study benefited from learning how to implement the intervention so they will be able to assist other students with test anxiety in the future.

Study Setting

The setting of the research study was an independent school located in the southeastern United States. Based on the 2014-2015 enrollment, approximately 503 students attended the school, and 81 teachers were employed at the school. One of the school divisions was a clinical program for students with learning disabilities. The goals of the clinical program are to accommodate the learning styles and provide appropriate

instruction for each participant within the context of the school's philosophy and atmosphere. Each classroom in kindergarten through Grade 8 has approximately 12 students. For the 2014-2015 school year, there were 61 students enrolled in the clinical program. Two highly trained teachers within a self-contained classroom teach the students. Furthermore, many of these teachers have advanced degrees in special education.

Instruction is individualized and designed to meet the needs of the students with specific learning disabilities. The teachers within the clinical program follow the mainstream curriculum while providing individualized instruction with clinical support. Instruction is diagnostic and prescriptive in all classes. The staff members formally evaluate each student twice in a school year. In the fall, student achievements over the summer are considered, and the staff members create each student's individualized education program. In addition, the staff members document each student's memory, processing, attention, achievement, and needs in specific academic areas, after which they plan and implement individualized instruction. In the spring, each student participates in a reevaluation to document progress and plan for the coming summer and academic year.

Every 3 months, the teachers and the therapists in the clinical program write an individualized, comprehensive report called the developmental learning summary for each student. It includes a narrative on the student's performance in every academic and therapy area. It is similar to an individualized educational plan. The areas on the developmental learning summary also include academic goals and social-emotional goals for each student. The older students receive letter grades based on their performance in the various subject areas. Instruction within the clinical program is highly individualized,

and each student progresses at his or her own level of readiness. Therefore, grades indicated are not necessarily reflective of mastery of grade-level work. Additionally, observations made by different teachers and therapists may vary.

Student performance can be different due to the number of students in a group, type, and modality of instruction, as well as the individual variability of student performance from day to day. The teachers of special classes send home progress reports as well. Students participate in the mainstream several hours a day. They attend classes, such as homeroom, electives, social studies, science, lunch, and physical education. They also participate in after-school activities with their mainstream peers, such as playground, study hall, sports, and clubs. Furthermore, all of the students attend off-campus activities, such as field trips.

School administrators have taken measures to ensure that the students are able to be a part of the inclusion setting as much as possible, thus creating a least restrictive environment. The researcher is a special educator who has worked at the site for 16 years. She received training in various strategies that are effective in assisting students with learning disabilities. Furthermore, she has worked directly with the school administration to develop and enhance the program's curriculum and implement research-based strategies that meet the needs of students with learning disabilities.

Problem Statement and Study Purpose

The problem addressed by the current study was that students with learning disabilities may have test anxiety that negatively affects their achievement scores. The purpose of the study was to determine if teaching relaxation techniques to students with learning disabilities could alleviate test anxiety in the students and improve their achievement scores.

Definition of Terms

For the purpose of the applied dissertation, the following terms are defined.

Anxiety and anxiousness. The American Psychiatric Association (2013) defined anxiety as the expectation that something bad may happen in the future or worry about negative events that happened in the past. This expectation includes feelings of anguish, apprehension, or somatic indicators of tension. One may feel anxiety in many different situations. A person with anxiety may feel fearful and apprehensive about events that are not predictable and may anticipate a negative outcome. Anxiousness is a part of negative affectivity (American Psychiatric Association, 2013).

Attention deficit hyperactivity disorder. Individuals who have been diagnosed with this disorder have a neurodevelopmental disorder in which their capability to regulate impulses and motor activity is considerably less than typically functioning individuals. Furthermore, the individual's condition may impede him or her from performing well academically or in social situations. There are three subsets of the disorder: inattentive, hyperactive-impulsive, and combined (American Psychiatric Association, 2013).

Autism spectrum disorders (ASD). Students diagnosed with ASD participated in the study. A child diagnosed with ASD may exhibit symptoms that include the inability to interact appropriately with peers or develop, maintain, and understand relationships, absence of language or delays in language development, and repetitive behavior or focus in one area that is unusual in its intensity. An individual with ASD usually exhibits these symptoms before the age of 3 years old.

According to the American Psychiatric Association (2013), there may be slight differences and degrees of severity among each of the individuals with this diagnosis.

Clinicians who give a diagnosis of ASD provide specifiers to provide a better clinical description of the individual with ASD. These specifiers may include ASD with or without a language impairment, ASD associated with medical, genetic, or acquired-environmental conditions, and ASD with or without an intellectual impairment. For example, a child who with the diagnosis of Asperger's syndrome, according to previous versions of the *Diagnostic and Statistical Manual of Mental Disorders*, will now receive a diagnosis of ASD without language or intellectual impairment (American Psychiatric Association, 2013).

The U.S. Department of Education (2004a) defined ASD as a developmental disability that prevents students from being able to verbally communicate, understand nonverbal cues, and interact socially with others. The students exhibit symptoms of ASD before the age of 3 years old and can negatively affect their educational achievement. Individuals with autism may engage in repetitive activities, be opposed to changes in their environment or daily procedures, and exhibit unusual responses to sensory experiences.

Cognitive test anxiety. Although general anxiety and test anxiety seem to correlate, there is a distinction between the two constructs. An individual may not experience any anxiety except in testing situations (Zeidner & Matthews, 2010).

Learning disability. The U.S. Department of Education (2004e) defined learning disability as follows:

A disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. (para. 1)

These disorders include perceptual disabilities, brain injury, minimal brain

dysfunction, dyslexia, and developmental aphasia. According to the American Psychiatric Association (2013), between 2% and 10% of the population may be affected by learning disabilities. Approximately 40% of students with learning disorders drop out of school prior to high school graduation (American Psychiatric Association, 2013).

Multiple disabilities. A child with multiple disabilities may have more than one disability in which all of their needs have to be addressed (U.S. Department of Education, 2004b).

Negative affectivity. This term refers to the frequent and intense experiences of high levels of a wide range of negative emotions (e.g., anxiety, depression, guilt or shame, worry, anger), and their behavioral (e.g., self-harm) and interpersonal (e.g., dependency) manifestations. Negative affectivity is one of the five pathological personality trait domains defined by the American Psychiatric Association (2013).

Orthopedic impairments. Students with orthopedic impairments have a significant impairment that negatively affects their performance in an educational setting. These impairments may include, but are not limited to, bone tuberculosis, cerebral palsy, amputations, burns, and fractures (U.S. Department of Education, 2004d).

Other health impairments. Individuals with other health impairments may have limited strength, energy, and attentiveness or an amplified state of attentiveness due to environmental stimuli that cause prolonged or severe health problems. These health problems may include asthma, attention deficit disorder or attention deficit hyperactivity disorder, diabetes, epilepsy, a heart condition, hemophilia, lead poisoning, leukemia, nephritis, rheumatic fever, sickle cell anemia, and Tourette's syndrome (U.S. Department of Education, 2004c).

Perceptual-motor disabilities. A student diagnosed with a perceptual-motor

disability may have trouble processing visual, auditory, or tactile information but has normal hearing, vision, and feeling. A child may not be able to see the directional differences of the letters /b/ or /d/ or may take a long time to analyze a word to be able to read it (Pisarchick, 2007).

Speech and language impairment. Children with speech and language impairments possess communication disorders. These disorders may include stuttering, compromised articulation, voice impairment, or a language impairment. These disorders prevent them from performing successfully in an academic setting (U.S. Department of Education, 2004f).

Chapter 2: Literature Review

Educational Theory and Framework

The purpose of this chapter was to review educational theories and research studies to help support the hypothesis of this study: If students learn relaxation techniques, then their anxiety will decrease and achievement will increase. Educational theorists have provided a framework to identify the strategies and interventions used in educational settings (Ormrod, 2008). Since the early 20th century, researchers have performed numerous studies that focused on test anxiety. Because of these studies, researchers proposed several theories to help explain the origin of test anxiety in test-anxious individuals (Naveh-Benjamin, Lavi, McKeachie, & Lin, 1997).

The earliest study was the Yerkes-Dodson Law developed by Robert Yerkes and John Dodson in 1908. The law hypothesized that performance will increase with mental and physiological stimulation but only to a certain point. If an individual perceives tasks to be too difficult, the stimulation may be too intense and performance may decrease. The negative effects may affect an individual's level of attention, memory, and problem solving. In turn, these negative effects may have an impact on one's performance on an assessment.

Albert Bandura, a well-known theorist, developed the social-cognitive theory from numerous research studies he conducted. From the social-cognitive theory, Bandura (1977) developed the theory of self-efficacy. Theory development based on research studies has played an integral part in identifying appropriate ways to help all types of learners perform well in educational settings. The self-efficacy theory could be appropriate in determining what influences student behavior in testing situations (Multon, Brown, & Lent, 1991). If students have low self-efficacy for performance, this could

cause poor performance in testing situations. Several studies have suggested that relaxation techniques, combined with other techniques, could help students decrease test anxiety (Breso, Schaufeli, & Salanova, 2011; Damer & Melendres, 2011; Dendato & Diener, 1986; Ergene, 2003; Kitsantas, Winsler, & Huie, 2008; Salend, 2011; Sansgiry & Sail, 2011; Sena et al., 2007; Weems et al., 2009). If students have strategies such as relaxation techniques, they may worry less and have increased self-efficacy, thus allowing them to perform better on assessments (Lal Zinta, 2008).

Cognitivism

Cognitivism includes all of the theoretical approaches that study the human mind and an individual's thought processes. Educational psychologists developed this theoretical approach because they wanted to have a better understanding of more complex human behaviors (Tudela, 2004). Cognitive learning includes higher level thinking (e.g., understanding, knowing, and anticipating). According to cognitivism, even though the learning situation may be uncomplicated, individuals seem to create cognitive maps in their minds. Cognitive maps are illustrations of connections made from within (Coon & Mitterer, 2008). Over several years, many researchers have developed cognitivist-based theories to help explain human learning and behavior.

Social-Cognitive Theory

The social-cognitive theory, derived from behaviorism, is now composed of several ideas that cognitivist theorists embrace (Ormrod, 2008). The social-cognitive theorists emphasize the impact of investigating the activities, insights, and emotional responses of others. Social-cognitive theorists have postulated that people's thoughts and feelings have an influence on their behaviors. One important component of the social-cognitive theory is observational learning. Children obtain an extensive assortment of

difficult skills, such as language and social interaction, through modeling. Furthermore, children attain these skills without reinforcement. Educators observe learning and behaviors numerous times during a school day. For instance, some educators will reinforce a student who is behaving properly just so other children are inspired to imitate the appropriate behavior (Thompson, 2007).

Self-Efficacy

Self-efficacy is one's belief in being able to perform behaviors well enough to generate a preferred result (Ormrod, 2008; Sapp, 1999). Regarding self-efficacy, people are not concerned with the skills they possess. Rather, they are concerned with their perception of what they can achieve with the skills in their possession. The social-cognitive theory provides the reasoning for the hypothesis that self-efficacy affects how well students perform academically by increasing their feelings of success and the amount of stamina they exhibit to acquire difficult academic tasks.

Social-cognitive theorists postulate that self-efficacy affects student achievement (Sapp, 1999). Studies have found that students with high self-efficacy will use their knowledge and skills more effectively (Breso et al., 2011). In addition, students with high self-efficacy appear to regulate themselves more efficiently, are willing to confront difficult tasks, utilize more effort, persevere for a longer period of time despite hindrances, set difficult aims, experience less anxiety, apply more effective procedures and approaches, perform better academically, and process information more efficiently (Lodewyk & Winne, 2005; Usher & Pajares, 2008).

In contrast, students who have low self-efficacy will avoid tasks they perceive to be difficult compared to their peers with high self-efficacy who will choose to attempt more skills that are difficult (Schunk, 1984). An individual's self-efficacy can vary

throughout his or her lifetime (Sapp, 1999). The definition of academic self-efficacy is a person's beliefs that he or she can perform given academic tasks at designated levels (Ferla, Valcke, & Yonghong, 2009). Therefore, one may hypothesize that students with higher academic self-efficacy may perform better on achievement tests than those with low self-efficacy because a stronger sense of efficacy increases achievement (Mills, Pajares, & Herron, 2006).

Self-efficacy identification. Through his research studies, Bandura (1977) identified four ways that individuals may determine their level of efficacy. First, the student may evaluate himself or herself as to whether he or she can successfully accomplish a task. As individuals experience success, their level of self-efficacy should increase. In contrast, if they experience several failures, then they should have lower self-efficacy. If individuals possess high self-efficacy and they experience a failure occasionally, it should not affect their self-efficacy. Second, students determine their self-efficacy by modeling the behavior of others. They are able to gauge whether they are able to accomplish a task by observing their peers.

Third, students often receive information through recommendations or encouragement from educators, parents, or other adults. Initial positive criticisms can increase students' self-efficacy. However, if they perform poorly, then they could develop low self-efficacy despite initial positive feedback from others. Finally, students may acquire personal efficacy information through their physiological symptoms, such as quivering or perspiring. If individuals experience these symptoms prior to taking a test, they may feel they are not capable of performing well on tests (Sapp, 1999; Schunk, 1984; Usher & Pajares, 2008).

Self-efficacy for performance. Self-efficacy for performance pertains to one's

anticipation for success or attaining a preferred result on an assignment (Lodewyk & Winne, 2005). A study conducted by Pintrich and DeGroot (1990) revealed that self-efficacy might be one of the best predictors of performance. Additionally, when several individuals have equal ability, those who believe they can do a task are more likely to accomplish it than those who do not believe they are capable of success (Ormrod, 2008). Students are more likely to avoid performing tasks due to fragile or low efficacy, which often exhibits itself through procrastination (Cassady, 2004). In academic achievement or evaluation situations, lower levels of self-efficacy are associated with higher test anxiety and greater decrease in task performance (Bandalos, Yates, & Thorndike-Christ, 1995).

Self-efficacy for performance versus self-efficacy for learning. Self-efficacy for performance and self-efficacy for learning are not the same concepts. Students can perform successfully without fully understanding the information or a skill, and they can learn information without being able to carry out methods that demonstrate proficiency. Self-efficacy for learning may include self-regulatory methods and perceived methods to achieve specific tasks. In contrast, self-efficacy for performance includes how students perceive their skills or how they compare to peers. As a result, self-efficacy for learning is different from self-efficacy for performance (Lodewyk & Winne, 2005; Ormrod, 2008).

How does self-efficacy affect student performance in testing situations? If students have a poor outlook on what they are capable of achieving, these negative feelings can create additional negative feelings about what they are capable of accomplishing. This, in turn, may increase the chance that students will not perform well (Breso et al., 2011). According to Sapp (1999), one way that self-efficacy affects student performance is in testing situations. Test-anxious individuals usually experience low

levels of self-efficacy. They may feel helpless and incapable of achieving positive testing results. As a result, people with test anxiety may believe that it is pointless to try to succeed on any test. When students experience difficulty completing a problem during a test and suffer from test anxiety, they rapidly quit if initial attempts to overcome these obstacles are ineffective.

Students who have low self-efficacy related to testing may be less motivated to work hard on tests, choose not to complete more difficult problems, and lack determination when they perceive the test has become too difficult. If the students lack interest in the test, they may be likely to put forth only marginal effort in the completion of the test. Students with high levels of test anxiety and low self-efficacy will continue to exhibit avoidance behaviors if they feel threatened by the testing events. The student considers taking a test as a stressful event because of the harm that the test holds for the student. This damage may affect grades, self-esteem, or social status (Cassady, 2004). In addition, students with low self-efficacy may feel exceedingly anxious about completing a test (Feldman, Kim, & Elliot, 2011).

Research studies have suggested that students with high self-efficacy had a reduction in test anxiety, and students with low self-efficacy had an increase in test anxiety. Therefore, when the students have to complete a high-stakes test, they may have difficulty performing well because they may feel as though their efforts were in vain. This, in turn, could have a serious effect on the results of the test (Sapp, 1999). Consequently, the student's score on the test might not correctly reveal the student's accurate ability in a particular skill area (Feldman et al., 2011).

As suggested by Yerkes and Dodson (1908), some anxiety may help to improve performance. For example, it may help athletes by helping improve performance in

competitive situations. However, debilitating anxiety, such as test anxiety, may prevent an individual from performing well on an examination (Zeidner & Matthews, 2010).

Hancock (2001) found that the students involved in the study did poorly under situations of high evaluation threat. When students felt as though they needed to compete with each other and teachers exhibited an emphasis on testing, student response to these stressors negatively influenced their performance on examinations. Furthermore, students with high levels of test anxiety were less motivated in classrooms they perceived as highly evaluative compared to students with low levels of test anxiety, and all students in less highly evaluated classrooms performed better. Students, despite their level of test anxiety, were motivated to learn in classroom settings that were less evaluative.

Lal Zinta (2008) conducted a study with a quasi-experimental design that explored reducing test anxiety in students by increasing their self-efficacy. The author used the Test Anxiety Inventory to identify the students' levels of test anxiety and the General Self-Efficacy Inventory to assess levels of students' efficacy. Study participants received guided mastery that previous studies had shown successful in decreasing levels of test anxiety and increasing self-efficacy in individuals. The author based the guided mastery treatment on the social-cognitive and self-efficacy theories. During the guided mastery treatment, students solved anagrams. If the students exhibited difficulty solving the anagrams, they received advice, reassurance, and encouragement in an effort to decrease their test anxiety and increase their self-efficacy. However, the results of the study suggested that the guided mastery did not reduce test anxiety among the treated students.

Peleg (2009) conducted a study in which the researcher compared test anxiety, self-esteem levels, and academic achievement between Christian Arab adolescents with

learning disabilities in a special education program and peers without learning disabilities who attended a mainstream setting. The study participants completed two questionnaires. The Test Anxiety Questionnaire was used to measure the students' levels of test anxiety, and the Self-Esteem Inventory was used to measure the students' levels of self-esteem. Academic achievement was determined by analyzing the students' academic scores, which were provided by the school's registrar.

The students completed the questionnaires prior to taking final examinations during the first semester of the school year. Students in the top 25% of test-anxiety scores had high levels of test anxiety, and students in the bottom 25% of test-anxiety scores had low levels of test anxiety. The results of the research study implied that students with higher levels of self-esteem had less test anxiety. Furthermore, students with high levels of test anxiety experienced lower academic achievement regardless if they had learning disabilities or not. In addition, the results suggested that students with learning disabilities had higher levels of test anxiety and lower achievement scores because of their lack of skills.

How is self-efficacy important in affecting testing outcomes? Based on Bandura's social-cognitive theory, test-anxious individuals can decrease their level of test anxiety by using effective test-taking skills and attitudes. Some of these skills include self-regulatory skills and self-beliefs of efficacy. This will allow test-anxious individuals to have control over their motivations. Bandura (1986, 1988) and Zeidner (1998) hypothesized that individuals with high levels of test anxiety should not use specific remedies; instead, they should use tools that enable them to manage any future stressful testing situations.

Consequences of poor performance in testing situations. The consequences of

poor performance on standardized tests may include an increase in recommendations for special education services and decreased expectations of learning. Often, school officials will rewrite curriculum to focus on teaching material that is included on standardized tests and the format of the test. Another consequence is that the student may be limited to working only in areas in which weaknesses were determined by testing results (Carter et al., 2005). Additionally, the failed experiences may prevent the student from making any effort in the future in testing situations in order to avoid experiencing failure again. The student may feel that future tests are threatening rather than just challenging and that the anxiety was incapacitating (Cassady, 2004).

Test-Anxiety Intervention Categories

In addition to analyzing educational theory, this chapter includes an exhaustive analysis of research studies suggesting that using a multitude of techniques will help decrease test anxiety and increase student achievement. Cizek and Burg (2006) found that intervention for test anxiety falls within one of the following categories: behavioral, cognitive, cognitive-behavioral, study skills, and test-taking skills. Research studies that focused on behavioral interventions, such as relaxation techniques and systematic desensitization, have suggested that they resulted in a decrease in test anxiety. Cognitive interventions that focused on worry were not as effective in reducing test anxiety.

Cognitive-behavioral interventions, such as anxiety-management training and cognitive inoculation, address both worry and emotionality. Teaching study skills (e.g., time management and continual review) to individuals who lack knowledge and skills, although effective with other interventions that address emotionality, is not efficacious by itself in lessening test anxiety (Ergene, 2003). Test-taking skills, such as time management and educated guessing, seem to decrease test anxiety for students who lack

test-taking skills (Dendato & Diener, 1986).

Causal Test-Anxiety Theories and Cognitive-Interference Model

Researchers have created theories suggesting that there is a causal link between test anxiety and test performance, as previously noted. Low self-efficacy may cause individuals to have intrusive thoughts, such as insufficiency, helplessness, and fear over the loss of position. This consumes the student with test anxiety to the degree that there is a decrease in performance. Worry, a component of the cognitive-interference component of test anxiety, is most often connected to test performance (Bandalos et al., 1995).

Lang and Lang (2010) found that, based on the causal test-anxiety theories, the priming procedure that was used in their study enhanced the performance of people with high levels of test anxiety. Therefore, they were able to show their true ability on the examination. The researchers found that people with high levels of test anxiety received test scores that did not reveal their true potential. This was unfair to an individual because his or her educational or career track was contingent on his or her performance on a high-stakes test. The researchers did not find that worry-related thoughts prevented the cognitive capacity of cognitively test-anxious persons. The results of their study indicated that competence priming improves the validity of test scores for people with high levels of cognitive test anxiety.

Irwin G. Sarason is one researcher who studied the connection between test anxiety and test performance. Through his research, he developed the cognitive-interference model (Sarason, 1984). One component of this theory is the causal test-anxiety theory. He hypothesized that individuals with test anxiety had trouble performing in testing situations because they were using a substantial amount of their cognitive-processing capacity worrying about how competent they were in completing the test.

Additionally, they experienced feelings of insecurity and self-doubt (Lang & Lang, 2010; Sarason, 1980; Sarason, Sarason, & Pierce, 1990; Wine, 1971). Liebert and Morris (1967) and Spielberger, Gonzalez, Taylor, Algaze, and Anton (1978) found four emotional-anxiety components linked to test anxiety that included worry, test-irrelevant thinking, tension, and bodily reactions. The cognitive components are worry and test-irrelevant thinking, and the two physiological-affective components are tension and bodily reactions.

Worry. Worry may be defined as one's specific thoughts of failure regarding the evaluation while he or she is taking a test, as well as the apprehension over the possible consequences of failure during examinations and tests (Conley & Lehman, 2012; Putwain et al., 2010; Zeidner & Matthews, 2010). Worry can reduce working-memory capacity and efficiency (Eysenck, Santos, Derekeshan, & Calvo, 2007; Owens, Stevenson, Norgate, & Hadwin, 2008).

Galassi, Frierson, and Sharer (1981) found that their participants with high levels of test anxiety felt as though they wanted to escape from the testing situation as they were taking the test. Some of the participants' other recurring thoughts were that the test was too hard, that there was not enough time to finish the test, and that they were likely to receive a poor grade on the test. As a result, their cognitive-processing capacity was not accessible to them to be able to focus successfully on completing the test. If the individuals suffering from test anxiety were able to feel competent as they took a test, their worry-related thoughts would decrease (Carver, 1996; Lang & Lang, 2010). The test-anxious individuals completed tests because they were able to focus on completing their tests as opposed to having worry-related thoughts (Lang & Lang, 2010).

Keogh, Bond, French, Richards, and Davis (2004) found that worry affected

examination performance. However, one could not presume that worry did not cause the poor performance on a test because it was possible that the test participants knew that they would not do well on the test and, therefore, worried about it. The researchers of the study suggested that interventions that focus on the worry aspect may have helped improve test performance. Hadwin, Brogan, and Stevenson (2005) conducted a study to determine how students' working memory was affected by test anxiety. Students were given tasks to do and then asked to complete them in a certain time period. Study participants with high state anxiety took more time to finish the backward digit span task and had to put forth more mental effort in forward digit span. The findings suggested that when students were concerned about being evaluated, this concern led to poor performance, especially in situations in which there was pressure to perform.

Test-irrelevant thinking. Test-irrelevant thinking represents disrupting ideas that are not necessarily associated with the test (Putwain et al., 2010; Zeidner & Matthews, 2010). Worry and test-irrelevant thinking pertain to the cognitive aspect of test anxiety (Zeidner & Matthews, 2010). Examples of test-irrelevant thinking are daydreaming and thoughts about going on vacation (Putwain & Symes, 2012).

Tension and bodily reactions. Tension refers to negative feelings such as nervousness and jitteriness (Zeidner & Matthews, 2010). The bodily reactions that an individual with high levels of test anxiety may exhibit include physical symptoms, such as headaches, trouble breathing, a racing heart, or an upset stomach (Sarason, 1984; Zeidner & Matthews, 2010). A study conducted by Putwain et al. (2010) found that both worry and bodily symptoms had a significant inverse relationship with high-stakes testing. Bodily reactions and tension relate to the affective aspect of test anxiety (Zeidner & Matthews, 2010).

Cognitive-Behavioral Therapy and Stress-Management Intervention

Cognitive-behavioral therapy and stress-management intervention are methods that can be used to help individuals with high levels of test anxiety. The development of cognitive-behavioral therapy was influenced by Albert Bandura (Meichenbaum, 1993). Cognitive-behavioral therapy is connected to both the worry and emotionality factors of test anxiety because it focuses on altering the irrational thoughts, cognitions, and emotional processes of individuals with high levels of anxiety. It may be used to help change the negative perception of the testing situation for highly anxious individuals so that it is less threatening for them.

Research has suggested that cognitive-behavioral therapy combines emotionally and cognitively oriented approaches, which helps to alleviate clients' test anxiety and enhance test performance. Anxiety-reduction training and helping individuals to modify their existing misconceptions with regard to test taking can be used to reduce test anxiety (Zeidner, 1998). The results of a research study conducted by Keogh, Bond, and Flaxman (2006) suggested that cognitive-behavioral therapy helped to improve students' scores on educational achievement tests. Students in the experimental group improved their scores by a letter grade compared to those students in the control group.

Furthermore, Wood (2006) tested the correlation between reducing anxiety and improvement in social functioning. The results of the study suggested that parents perceived that their children's school performance improved upon the implementation of cognitive-behavioral therapy. Chinaveh, Ishak, and Salleh (2010) found that stress-management intervention appeared to affect the academic performance and mental health of college-aged students. Students in the experimental group earned higher grades, and a positive effect was seen on the students' mental health scores after the stress-management

intervention was implemented.

Handelzait and Keinan (2010) conducted an experiment in which the participants had a choice in treatments that were easily differentiated. In the study, the researchers used progressive muscle relaxation as one of the treatments and hypothesized that progressive muscle relaxation would help to alleviate the emotional realm of test anxiety and bodily symptoms. The other treatment, changing of internal dialogue, helps individuals to develop an inner voice to help lessen test anxiety. Changing of internal dialogue focused on the cognitive component of test anxiety and helped to decrease worry. The researchers wanted to determine whether the individual's choice of treatment was more effective than the treatment itself. They hypothesized that, if individuals had the autonomy of choosing treatment after they received instruction on the treatments, it would enhance the outcome of the test-anxiety treatment. The results of the study suggested that both treatments were equally effective in treating test anxiety. Additionally, the outcome of the study suggested that the feeling of choice of treatment had a greater effect on treatment outcome than the treatment itself.

Behavioral Interventions

There are several behavioral interventions that may be used to help decrease high levels of test anxiety. In the approach called relaxation-skills training, individuals are taught an assortment of behavioral techniques, such as relaxation without tension, cognitively cued relaxation, breathing exercises, progressive muscle relaxation, and mental imagery. Researchers found that providing relaxation-skills training for students helped to improve their self-efficacy in testing situations (Zeidner, 1998). Some of the research-based treatments that have appeared to be effective in the alleviation of test anxiety included progressive muscle relaxation, guided imagery, and self-instruction

training (Lufi et al., 2004). Bresó et al. (2011) and Weems et al. (2010) suggested that intervention programs could be used to help reduce anxiety, stress, and fatigue, which, in turn, could help to increase students' self-efficacy.

Commonly used relaxation techniques. Two commonly used relaxation techniques include mental imagery and progressive muscle relaxation. The definition of mental imagery involves the human's ability to visualize images in one's mind. A mental-imagery activity could be having students listen to visualization stories via the classroom's radio system. These stories can guide students through a story that the students find relaxing, that uses an activity using progressive muscle relaxation, or that takes them to their own visual place of relaxation (Lytle & Todd, 2009). Progressive muscle relaxation is a technique developed by Jacobson (1938) to treat anxiety disorders.

Jacobson (1938) hypothesized that progressive muscle relaxation discouraged people from producing thoughts and emotions that created neuromuscular hypertension on the body. During an activity using progressive muscle relaxation, the instructor leads an individual through a series of flexing and releasing of muscle groups throughout the entire body. Paul, Elam, and Velhurst (2007) found that implementing deep-breathing meditation in a school's curriculum was an effective way to decrease test anxiety, self-doubt, and loss of concentration in medical students. The research findings suggested that students should have sufficient time to use the techniques that decreased stress created by academics.

Rausch, Gramling, and Auerbach (2006) led a study to compare meditation and progressive muscle relaxation as ways to manage anxiety. Students in the study participated in 20 minutes of meditation, progressive muscle relaxation, or a control condition. The findings of the study determined that progressive muscle relaxation helped

to reduce somatic anxiety. Meditation and progressive muscle relaxation helped to reduce general state anxiety. However, meditation seemed to be the most effective in reducing general state anxiety in highly anxious individuals.

Egbochuku and Obodo (2005) conducted a study that used systematic desensitization, which is a behavior-modification therapy that teaches classical conditioning techniques to help a person relax who has anxiety toward a specific stimulus. The researchers wanted to diminish a habit or help distract the individual from his or her anxiety by teaching them relaxation techniques while being exposed to the component causing stress for the individual. The results of this study suggested that this type of therapy was effective. Additionally, the results suggested that obtaining a baseline to determine the student's level of anxiety before teaching the intervention would be helpful to determine the effectiveness of the treatment. Finally, the authors also found that both genders are susceptible to test anxiety.

Larson, El Ramahi, Conn, Estes, and Ghibellini (2010) looked at test anxiety in third-grade students, as well as the effects of relaxation techniques as ways to treat test anxiety. The Westside Test Anxiety scale measured levels of test anxiety in the students. Individuals in the experimental group participated in relaxation techniques during the school day, 2 days a week, over a 5-week period. The participants learned both deep-breathing meditation and progressive muscle relaxation. The results of the study showed a substantial decline in test-anxiety scores based on the posttest scores of the assessment. Despite the decrease in test-anxiety scores, there was no significant difference in the postintervention anxiety scores of individuals between the control and experimental groups. The researchers hypothesized that this may have been due to the students in the experimental group sharing techniques with the students in the control group. The

researchers concluded that using a cluster-sampling procedure might avoid this threat to validity in future research studies.

Learning-Deficit Model

The learning-deficit model suggests that students who have ineffective study habits while preparing for a test may cause them to become anxious, thus affecting their performance on a test (Tobias, 1985). Students with high levels of test anxiety may use ineffective study strategies, such as procrastination and repetitive memorization strategies (Cassady & Johnson, 2002).

Test-preparation skills and study skills. Beidel, Turner, and Taylor-Ferreira (1999) implemented a program in which researchers taught test-taking skills to elementary and middle school students in Grades 4 through 7. The students' levels of test anxiety decreased significantly after the intervention. In addition, the students' significant increases in academic scores suggested that the intervention was successful in increasing academic achievement.

Holzer, Madaus, Bray, and Kehle (2009) analyzed the effectiveness of teaching test-taking strategies to college students with learning disabilities to help alleviate test anxiety and increase achievement. The researchers hypothesized that decreasing test anxiety without teaching test-taking skills would not have an effect on student performance. In order to determine if the participants were appropriate, the participants took the Test Anxiety Inventory to identify their level of test anxiety. They also took a pretest to determine their knowledge of the test-taking strategy called PIRATE, which is a test-taking strategy mnemonic that stands for the following: P = prepare to succeed; I = inspect instructions; R = read, remember, and reduce; A = answer or abandon; T = turn back; and E = estimate.

In order to be able to participate in the study, the students had to meet particular benchmarks. First, they had to score above the mean on the Test Anxiety Inventory, indicating that they had high levels of test anxiety. Next, the participants could participate in the study if they could prove they did not have prior knowledge of the PIRATE strategy. Furthermore, participants had to score 80% or less on an assessment that included practice questions from the Graduate Record Examination. Finally, the participants received extra time on tests as an accommodation at their educational institution. The students participated in an intervention program composed of three to four sessions that each lasted 1 hour. Participants learned the PIRATE test-taking strategy during these sessions.

Results of the research showed that, during intervention implementation, the frequency of PIRATE usage increased but decreased slightly after the intervention ceased. Upon the completion of the intervention program, students reported that they experienced less test anxiety. Additionally, students' test scores increased for most of the participants. Furthermore, the participants completed a customer satisfaction survey. Most of the student responses reflected either agreement or neutrality. Interestingly, the student who reported the least amount of satisfaction performed the best on the PIRATE prompts. Moreover, two of the four students whose test anxiety decreased used less extra time on tests. The findings suggested that their test anxiety decreased because they had the ability to control their use of time.

Some research studies have indicated that study-skills training in isolation did not have an effect on a participant's test-anxiety self-report or academic performance (Dendato & Diener, 1986; Harris & Johnson, 1983; Naveh-Benjamin, McKeachie, Lin, & Holinger, 1981). Neuderth, Jabs, and Schmidtke (2009) conducted a study in which they

implemented a program for first-semester students at a university. The premise of the program was to help prevent the manifestation of test anxiety in these students.

Based on their review of the literature, Neuderth et al. (2009) identified five areas of concern that, if not addressed, could lead to test anxiety: time-management skills, learning approaches, causes for test anxiety, ways to cope with test anxiety, and test-taking preparation. Participants received therapeutic treatment in individualized therapeutic or small-group settings. They participated in peer coaching in small-group settings. The peer coaches were third- and fourth-year students who were knowledgeable in the area of testing situations. The students evaluated the program after its conclusion. Based on the results of the program evaluation, the students believed that it was an effective approach and that the program should continue.

Carter et al. (2005) conducted a study to explore whether strategy instruction would be beneficial in preparing students with learning disabilities for high-stakes testing and, consequently, decrease their level of test anxiety. Students learned test-taking strategies in a series of six lessons over six 90-minute class sessions. Students learned several methods to help them while answering multiple-choice questions on math and language arts high-stakes tests. The researchers used the Test Anxiety Inventory to determine an individual's level of test anxiety and efficiency of the treatments used to help treat students with high levels of test anxiety. They also used the Simulated Tennessee Competency Achievement Program in mathematics to determine whether student performance increased after the researchers taught the test-taking strategy instruction. To determine the program's effectiveness, the students took both assessments before and after they learned test-taking instruction. There was a slight improvement in student performance on the competency exam and a decrease in the level of test anxiety.

Carter et al. (2005) suggested that, although this approach could be helpful for students with learning disabilities, students should combine strategy and content instruction to create an all-inclusive program. Other researchers, such as Kitsantas et al. (2008), concluded that students should be taught preparation methods for high levels of test anxiety early in their school careers. Additionally, researchers recommended that students should learn strategies that were specific to the types of questions they encountered. Furthermore, because students were aware that passing a grade level or graduating school was contingent on their performance on these tests, it was beneficial to provide these students with appropriate instruction that would help develop academic skills. As a result, students' self-efficacy increased because they felt confident in their ability to do well because they had the skill set to do so.

Leisure time and physical activity. Haugland, Wold, and Torsheim (2003) found that students who participated in leisure time and physical activity reported fewer health complaints due to school-related stress. Subramanya and Telles (2009) conducted a study to determine if two yoga-based relaxation techniques improved memory scores and alleviated state anxiety. The techniques used for relaxation included cyclic meditation and supine rest. The researchers assessed the study participants' levels of state anxiety before and after they introduced the intervention.

Subramanya and Telles (2009) used the State Trait Anxiety Inventory to determine the level of state anxiety. They also used the Wechsler Memory scale to measure memory scores before and after the implementation of the intervention. The results of the study suggested that, although state anxiety decreased and memory scores increased after the implementation of both techniques, there was more improvement after cyclic meditation than supine rest. There was a significant decrease in state anxiety after

cyclic meditation than supine rest. In addition, working memory improved after the study participants practiced cyclic meditation. The researchers suggested that movement conducted during cyclic meditation helps to facilitate performance and memory tasks.

Doan, Plante, Digregorio, and Manuel (1995) compared three conditions: aerobic exercise, relaxation training, or the control. During the aerobic exercise, test participants in this experimental group pedaled an exercise bicycle for 15 minutes. In the relaxation training exercise, test participants listened to a relaxation training tape while blindfolded for 15 minutes. The tape included subliminal messages about test taking and breathing exercises. Furthermore, they practiced breathing exercises that were on the tape. Test participants in the control group read magazines for 15 minutes. Participants read magazines that did not elicit any physiological or psychological changes in them. Each test participant completed three evaluation scales prior to and after they participated in the treatment activities to determine which therapy appeared to be the most effective.

The first scale, the Fear of Negative Evaluation, measured test participants' levels of social anxiety. Additionally, the researchers used the Test Anxiety Children's scale to measure the participants' levels of test anxiety. The researchers altered the scale so it was appropriate to use with college students. They also used the Multiple Affect Adjective Checklist to measure state anxiety. Results of the study indicated that the participants in the control group reported high anxiety, whereas participants in both experimental groups reported less anxiety.

In addition, results suggested that individuals with more social anxiety were more likely to experience test-taking anxiety. Furthermore, results suggested that the relaxation techniques and aerobic exercise minimized general anxiety and assisted college students in confronting situations that may cause test anxiety. Test participants' anxiety seemed to

lessen instantly after participating in the therapy activities. Prupas and Reid (2001) found that physical activity in moderation, such as jogging, helped to decrease stereotypical behaviors (e.g., hand flapping) in students with ASD. The decrease in stereotypical behaviors allowed the students to focus on the task that was required of them at that time.

Combination of interventions to help decrease test anxiety. Throughout this literature review, the findings of many research studies have led to the conclusion that the most effective way to decrease test anxiety and enhance performance on high-stakes tests was by using an intervention program that combined several strategies. Researchers conducted numerous studies that suggested a combination of test taking and relaxation techniques could be effective in decreasing anxiety and improving performance on tests (Breso et al., 2011; Damer & Melendres, 2011; Dendato & Diener, 1986; Ergene, 2003; Kitsantas et al., 2008; Salend, 2011; Sansgiry & Sail, 2006; Sena et al., 2007; Weems et al., 2009).

Dendato and Diener (1986) conducted a study in which students with test anxiety received either relaxation-cognitive therapy, study-skills therapy, study-skills training, a combination of relaxation-cognitive therapy and study-skills training, or no intervention. The researchers used the Test Anxiety Inventory to determine the level of test anxiety in students before and after the intervention. One of the groups received the deep-muscle relaxation technique as a method for relaxation. Cognitive therapy included rational-emotive psychotherapy. This type of psychotherapy included group discussions in which participants practiced identifying whether their beliefs about exams, goals, and other experiences were rational or irrational.

Study-skills training included teaching skills such as time management, note taking, studying for tests, SQ3R method, test-taking strategies, and goal setting. The

SQ3R method was a reading strategy that a student could use to help him or her comprehend a reading passage. The SQR3 acronym stood for survey, question, read, recite, and review. The results of the posttest of the Test Anxiety Inventory suggested that relaxation-cognitive therapy was efficient in lessening anxiety but not improving academic performance. Results suggested that the study-skills strategies were effective in decreasing anxiety and improving performance. The results also suggested that study-skills training in isolation was ineffective in reducing test anxiety or improving academic performance.

Many research studies have suggested that teaching study skills, using test-taking strategies, and implementing physical activity into the school day is an effective way of reducing test anxiety. Ergene (2003) suggested that the most effective treatments in reducing test anxiety were those that combined both behavioral and cognitive approaches. A study conducted by Weems et al. (2009) included the implementation of an intervention to assist ethnic minority youth who experienced Hurricane Katrina in New Orleans in August of 2005. Several of these students experienced anxiety in the form of test anxiety and posttraumatic stress disorder. Researchers used increasing self-efficacy, clearly defining anxiety, test-taking skills instruction, and relaxation techniques (e.g., progressive muscle relaxation and deep-breathing training) as interventions.

Because posttraumatic stress disorder and test anxiety were associated at the core level of anxious arousal, the researchers thought that these techniques would be beneficial in controlling the anxious emotions of the students. The training sessions took place during the students' school day. The Test Anxiety Children's scale measured the students' levels of test anxiety before and after the implementation of the intervention. The Reaction Index for Children measured the symptoms of posttraumatic stress disorder

in the students prior to and at the conclusion of the intervention program sessions. The results of the study suggested that the intervention helped reduce test anxiety and symptoms of posttraumatic stress disorder and improve academic performance. The posttest showed a substantial decline in symptoms of posttraumatic stress disorder after the intervention. These findings suggested that intervention programs such as the one described in the study could be effective in decreasing test anxiety and symptoms of posttraumatic stress disorder.

Damer and Melendres (2011) conducted a study in which they implemented a 4-week intervention. The intervention incorporated programming that included relaxation, breathing techniques, study skills, study habits, and time management. In addition, the participants learned the skills in a group setting so they could provide support to one another and learn skills that helped them manage their test anxiety. Group members took a pretest and posttest of the Test Anxiety Inventory and completed an anonymous evaluation form. The results suggested that the group members benefited from the group intervention because their levels of test anxiety decreased, they acquired new strategies, and they seemed to feel that they could solve problems and manage dilemmas better. A positive outcome of the study was that the group members learned they were not alone in experiencing test anxiety.

Kitsantas et al. (2008) conducted a study to investigate how self-regulation, self-efficacy, task value, and test anxiety affected the academic performance of students in their first and second years of college. Findings in the study suggested that teaching time-management skills might have been a possible objective for increasing academic achievement. Self-efficacy seemed to play an important role during the first semester when students were transitioning into college. It no longer seemed to predict academic

achievement during the students' sophomore year. Test anxiety did not appear to affect the academic performance of the students. Additionally, students may have experienced test anxiety in one subject area but not in another. Based on the results, the researchers proposed that college instructors and administrators should provide workshops that help to develop time-management skills, act as peer role models to help students improve their self-efficacy, and encourage students to complete their course work. Findings also suggested that students should learn time-management skills as early as middle school to transition smoothly into postsecondary education.

Gregor (2005) conducted a study investigating the effectiveness of relaxation techniques, cognitive-behavioral therapy, or the use of both techniques simultaneously to alleviate test anxiety. Researchers used several pretest and posttest measures to assess test anxiety. They also used the Friedben Test Anxiety scale that measures one's level of test anxiety. Teachers completed the revised version of Connor's rating scales to evaluate student behavior before and after the intervention while taking a high-stakes test. The researchers also used the General Certificate of Secondary Examinations to determine student academic performance before and after the intervention. The intervention program consisted of five 45-minute sessions.

Experimental groups received instruction on relaxation techniques, cognitive-behavioral therapy, or both techniques. The results of the study concluded that teachers observed a decrease in anxiety of those students who participated in the relaxation techniques and cognitive-behavioral therapy intervention. On the contrary, the students' responses on the anxiety scale indicated there was not a major difference in levels of anxiety before and after the implementation of the intervention. The math scores of the students who participated in the mixed-methods intervention improved, whereas the other

groups did not do as well as expected. Therefore, the results suggested that the combination of methods might be effective in increasing performance on tests and managing one's anxiety while taking an exam.

Breso et al. (2011) used the social-cognitive theory as the theoretical framework in their study. The objective of this study was to determine whether a cognitive-behavioral intervention program was effective in decreasing the level of test anxiety and burnout in students by increasing their self-efficacy. Students voluntarily attended a workshop in which they determined their levels of anxiety. Next, the researchers asked the students if they were interested in an intervention program. The students participated in four one-on-one sessions in which they learned how to control anxiety by identifying anxious thoughts, seeking realistic and useful alternatives, and taking action to test these alternatives. One assessment measured academic burnout, and another instrument measured student performance on exams.

After the experimental-group members learned the intervention, the results of the assessment indicated that test anxiety and burnout decreased, but there was not a noticeable change with the stressed and nonstressed members of the control group. Sansgiry and Sail (2006) found that students with better time-management and test-preparation skills had less test anxiety and better academic performance. The results suggested that students had less test anxiety when they implemented multiple coping strategies such as exercise, relaxation, nutrition, and time-management skills.

Gender differences and test anxiety. Many study results suggested that females experienced greater test anxiety than males. Sarason, Davidson, Lighthall, Waite, and Ruebush (1960) concluded that females had higher anxiety scores than males based on their survey responses. Hembree (1988) conducted a meta-analysis of studies that

included students in Grades 1 through 12 and college. Hembree's analysis found that females scored higher on test anxiety than males. Lowe and Lee (2008) measured the level of test anxiety in elementary school children. The researchers found that the results varied among males and females depending on the type of scale. Males and females did not differ on the scale that measured how test anxiety could improve test performance. Females scored higher overall, specifically on the self-report measures. Because many studies (Carter, Williams, & Silverman, 2008; Hembree, 1988; Sarason et al., 1960) have found that females had significantly higher anxiety scores than males, Zeidner (1998) concluded that females might be more willing to share their feelings because they have been more conditioned to do so than males.

Time for implementing relaxation-techniques training. Zaichkowsky and Zaichkowsky (1984) conducted a similar study to this dissertation in which they implemented a school-based relaxation training program for 6 weeks. The authors concluded that fourth-grade children could learn relaxation techniques in this time frame. Furthermore, Beauchemin et al. (2008) led a study in which a relaxation-technique program was implemented in a school setting for 5 weeks. At the conclusion of the study, findings suggested that the levels of trait and state anxiety decreased in the participants.

Moreover, Lohaus and Klein-Hessling (2003) conducted a study in which they studied the effects of extended and intensified relaxation-technique training for elementary-aged students with test anxiety. The sessions were presented in weekly intervals. The results of the study showed that the students benefited from five sessions of training compared to 10 sessions of training. The five sessions seemed to be an adequate amount of time to help students learn how to relax. These findings proposed that children can learn relaxation techniques in a shorter period of time, and there was no benefit if the

training was extended or intensified.

Research Questions

The following research questions were established to guide the applied dissertation:

1. Will learning relaxation techniques lower test anxiety, as measured by the Children's Test Anxiety scale (CTAS)?
2. Will learning relaxation techniques affect scores, as measured by the fourth edition of the Wide-Range Achievement Test (WRAT-4)?
3. What will be the students' perceptions of what they learned, as measured by a survey?
4. Will the students use what they learned, as measured by teacher observations?

Further Explanation

The literature review revealed that students benefit from being taught multiple modalities with regard to relieving test anxiety and improving student achievement. The students had already received time-management skills and test-taking strategies. Furthermore, they were provided time for exercise. Therefore, relaxation techniques in this study constituted a multimodal approach to alleviating test anxiety.

Chapter 3: Methodology

Participants

Participants consisted of 22 elementary school-aged children and 10 teachers ($N = 32$). The students were in Grades 2, 3, 4, and 5 in two multiage classrooms in the independent school at which the researcher is employed. The first classroom was composed of students in Grades 2 and 3. The second classroom was made up of students in Grades 4 and 5. Both male and female students participated in the study. Seventy-seven percent of the participants were male ($n = 17$) and 23% ($n = 5$) of the participants were female (see Appendix A). Males are identified with a specific learning disability more frequently than females. Therefore, it was a reasonably accurate representation of gender (Akinbami, Liu, Pastor, & Reuben, 2011; Giarelli et al., 2010; Wheldall & Limbrick, 2010). The age range for student participants was from 7 to 12, with a mean age of 9.18 ($SD = 1.22$). Ethnic groups that were represented included Caucasian and Hispanic; however, the exact numbers could not be determined due to privacy issues.

The students were all identified as having a learning disability based on the results of psychoeducational testing completed by a licensed psychologist. Twenty-three percent of the participants had anxiety and anxiousness ($n = 5$), 5% had an orthopedic impairment ($n = 1$), 5% had other health impairments ($n = 1$), 27% had perceptual-motor disabilities ($n = 6$), 5% had a speech and language impairment ($n = 1$), 36% had ASD ($n = 8$), and 32% ($n = 7$) had attention deficit hyperactivity disorder. Eight students had multiple disabilities. Children were randomly assigned to the experimental and control groups. There were 13 students in the experimental group and nine students in the control group. The sampling method that was used was a sampling of convenience because the participants were easily accessible to the researcher and willing to be part of the study.

Four teachers helped to administer the intervention, pretest and posttest of the CTAS, pretest and posttest of the WRAT-4, and student surveys. To prevent bias, two teachers who were not part of implementing the intervention completed the teacher surveys. The teachers who completed the survey questions were familiar with the students' behaviors in testing situations.

Instruments

In order to address the four research questions, the following instruments were used.

Research Question 1. Will learning relaxation techniques lower test anxiety, as measured by the CTAS? The CTAS is a 30-item instrument with a Likert-type scale that was developed by Douglas Wren and Jeri Benson. The test is a quantitative assessment that is used to measure levels of test anxiety in elementary school students. Wren and Benson (2004) developed this test based on a three-factor model of test anxiety. It includes a cognitive element (i.e., worrisome thoughts), a behavioral element (i.e., off-task behaviors), and an affective-physiological component (i.e., autonomic reactions). The CTAS was written at a third-grade level. The questions ask students how they feel, act, or think while taking a test.

An example of a question on the measure that would indicate whether a student was experiencing worrisome thoughts would include the following: When I take tests, I worry about failing. An example of a question that would measure a student's off-task behavior would be the following: When I take tests, I play with my pencil. A question on the CTAS that asks about a student's autonomic reactions and specific somatic indications of anxiety during a test would be the following: When I take tests, my heart beats fast (Putwain & Best, 2011; Wren & Benson, 2004).

The internal-consistency reliability was 0.92 for the overall scale, 0.76 for the nine-item off-task behavior subscale, 0.82 for the nine-item autonomic reactions subscale, and 0.89 for the the 13-item thoughts subscale. The development and validation samples ranged from 0.37 to 0.76 (Wren & Benson, 2004). Permission was granted for use by one of the authors, Douglas Wren. The researcher inquired about how to obtain a copy of the CTAS, and the author sent a copy of the test document. Dr. Wren reported that, when he conducted the research study to ensure validity of the CTAS, he asked the students to raise their hand if they had difficulty reading anything on the survey. He read the items verbatim quietly to the individuals who needed help, but he did not interpret anything they did not understand.

In order to score the CTAS, a student's score is the total of the numbers he or she circled for all 30 items. The mean of the CTAS score is 62, and the standard deviation of the mean is 16.5. One standard deviation above or below the mean would indicate high or low test anxiety, respectively. A score of 79 or greater would be an indication of high test anxiety, and a score of 45 would indicate low test anxiety (D. Wren, personal communication, July 2, 2012).

The instrument used for the intervention for the experimental group was a relaxation-technique compact disc (CD). The CD was called *How I Can Take Tests–For Kids!* by Lohr (2008). The purpose of the CD is to assist elementary school students in learning relaxation techniques. The relaxation techniques on this CD were designed to help the students teach themselves to relax and be able to focus on completing and performing well on tests. When individuals are anxious, they may often use the central, or emotional part, of their brains. The program's creator theorized that the visualization techniques allow the listener to use the frontal lobe of the brain, which is part of the brain

that allows one to think and plan.

The CD includes seven audio tracks. Tracks 1 and 2 include information about the intricacies of the program, such as descriptions of the relaxation, muscle tensing, and mental visualization exercises. The vocabulary and the sentences used in the narration on the CD were simplified to ensure that elementary school children could understand the directions (Lohr, 2008). For the first week of training, the students listened to Tracks 1 and 2, which was 16 minutes and 49 seconds in length. Subsequent tracks (i.e., Tracks 3 through 7) provide relaxation steps and exercises that lead up to taking tests. The students listened to these tracks in all subsequent training sessions that lasted approximately 16 minutes. The students in the control group listened to books on tape. The second and third graders listened to *Junie B. Jones* (Park, 2003), and the fourth and fifth graders listened to a tape entitled *Magic Tree House Series* (Osborne, 2003). These students read these books as part of the literature curriculum at the research site.

Research Question 2. Will learning relaxation techniques affect academic scores, as measured by the WRAT-4? The WRAT-4 is a norm-referenced achievement test. Gary S. Wilkinson and Gary J. Robertson made the third revision to the WRAT-4 in 2006. Its purpose is to measure the fundamental academic skills of spelling, word reading, sentence comprehension, and math computation of 5- through 94-year-olds. Testers can reevaluate individuals with learning or cognitive disabilities with alternate forms to control for practice effects. The test materials include an instructional manual, separate parallel blue and green test forms, a response form, a two-sided word-reading list and spelling list card, a sentence-comprehension test form, a sentence-comprehension card, and a sentence-comprehension sample card.

The reliability coefficients for the four subtests ranged from .87 to .93 by age

group and .83 to .93 by grade level. Concerning validity, there were strong intercorrelations between subscales. Word reading and spelling scored a .79, spelling and math computation scored a .63, and word reading and math computation scored a .59 (Hoff, Swerdlik, Sabers, & Olson, 2010). There are competency-based qualification guidelines in order to purchase the testing materials. The researcher had to complete a qualification form that showed that she had completed a class in test interpretation, psychometrics, measurement theory, educational statistics, or a closely related area, and she had to have a license from an agency that required adequate preparation in the appropriate use of psychological tests.

Research Question 3. What will be the students' perceptions of what they learned, as measured by a survey? Study participants completed a survey after the implementation of the intervention to determine their perceptions of what they learned about relaxation (see Appendices B and C). The survey contained questions based on a 4-point response scale that ranged from 1 (*almost always*) to 4 (*almost never*). The researcher developed the survey questions based on the areas of anxiety targeted by the authors of the CTAS and based on the studies in the literature review. The research studies in the literature review suggested that worrisome thoughts and off-task behaviors caused students to have difficulty performing well on tests (Conley & Lehman, 2012; Putwain et al., 2010; Zeidner & Matthews, 2010). Therefore, items on the survey included worrisome thoughts (e.g., "How worried were you during test taking before the instruction?") and off-task behaviors (e.g., "Were you able to concentrate while taking tests after the instruction?"). Teachers read the survey to students who needed assistance reading the document.

Research Question 4. Will the students use what they learned, as measured by

teacher observations? Teachers of the students who participated in the study completed a survey (see Appendix D) to determine their perceptions of what the students learned and if they had observed the students using the relaxation techniques. These teachers were unaware of which condition the students were assigned. The survey contained questions based on a 4-point response scale that ranged from 1 (*almost always*) to 4 (*almost never*). The researcher developed this survey based on the review of the literature of best practices of school-based on relaxation techniques and feedback from an assessment specialist. The control group in the second and third grades completed a survey in which the participants answered questions related to the activity in which they listened to a book on tape entitled *Junie B. Jones* (Park, 2003). The control group in the fourth and fifth grades completed a survey in which the participants answered questions related to listening to a book on tape entitled *Magic Tree House Series* (Osborne, 2003). These books were chosen because they are part of the literature curriculum at the research site.

Feedback regarding surveys. The researcher contacted Dr. Douglas Wren to receive feedback from him to establish the content validity of the surveys. Dr. Wren is one of the authors of the CTAS and an assessment specialist with the Virginia Beach City Public Schools. He analyzed the surveys and provided feedback concerning the development of the student and teacher survey. Dr. Wren suggested that, in addition to having the students read the survey items aloud, it would be beneficial to determine how well the students understood the anchor choices in the survey. For example, *most of the time* and *some of the time* may mean the same thing to some people. Therefore, there should be enough of a difference in the meaning of the anchor words so individuals completing the survey can easily make a choice. The anchors of the survey were changed to *almost never*, *some of the time*, *most of the time*, and *almost always*. Gable and Wolf

(1993) concluded that having too many anchors might create frustration and confusion, whereas having too few results would make it difficult to discriminate between the choices. Hence, the researcher used four anchors in both surveys.

Furthermore, Dr. Wren suggested using vocabulary on the survey that was appropriate for elementary school students. When the Institutional Review Board gave approval, the researcher arranged a focus-group session to determine whether the wording in the survey was appropriate. The researcher received consent from a teacher and asked her to have a focus group of three children read the survey after receiving written assent from the students and written consent from their parents. The students were able to analyze the items on the survey in a nonthreatening environment. If there was a phrase or a word that the students did not understand or could not pronounce, the teacher was to take notes on these items. The researcher was to omit or replace inappropriate wording with more appropriate phrasing (D. Wren, personal communication, August 1, 2013).

There have been other studies in which researchers reviewed surveys. Wigfield and Eccles (1989) examined the validity of earlier editions of the Test Anxiety Children's scale. They concluded that many of the questions appeared to be too difficult for some children because of the level of vocabulary and the amount of words in a question. Edwards (1957) recommended that statements should be less than 20 words, simple, clear, and direct. However, students might figure out that the research is on test anxiety, which may compromise the validity of the results. Therefore, the researcher reexamined the wording of surveys and other pertinent materials to ensure that students were not privy to the nature of the study (D. Wren, personal communication, August 1, 2013). The focus group did not identify any issues with the wording on the survey.

Procedures

Design. The study utilized a quasi-experimental, pretest-posttest, quantitative methods design. This design was chosen because all of the participants could not be randomly assigned to groups. A random assignment could have interrupted classroom learning within Grades 2 through 5. Therefore, the experimental and control groups were closely matched for age, grade, and learning disability within a classroom. Several quantitative measures were used. Two standardized assessments, the WRAT-4 and CTAS, were used. The blue form of the WRAT-4 was used to determine the students' levels of achievement before the intervention.

All of the participants were given the CTAS pretest prior to the implementation of the intervention to determine their levels of test anxiety. The control group listened to a book on tape entitled *Junie B. Jones* (Park, 2003) if the students were in second or third grade. Students in the fourth or fifth grade listened to a book on tape entitled *Magic Tree House Series* (Osborne, 2003). The students in the experimental group received instruction on relaxation techniques by listening to a CD. Upon the completion of the instruction, the CTAS posttest was distributed to the students in the control and experimental groups. These results were compared to results of the CTAS pretest to determine if there were any changes in the scores.

The green form of the WRAT-4 was used to determine the students' levels of achievement after the intervention. These results were compared to results of the blue form of WRAT-4 to determine if there were any changes in the scores. Closed-ended postintervention surveys were used to determine the perceptions of the students with regard to the intervention. Once the study was completed, the students in the control group were taught the relaxation techniques. After the intervention was implemented, two

teachers were surveyed to ask their opinions of the intervention and their observations of the behaviors of the students to determine if they had used the relaxation techniques. Because the study was a double-blind experiment, the researcher was not privy to whether a student was in the control or experimental group to take precautions against bias. Each student received an identification number, and the classroom teachers assigned and kept track of the student lists with the identification numbers. The participants' scores were entered into Microsoft Excel spreadsheets for future reference. Any data collection would be destroyed after 36 months.

June 2013. The researcher wrote a letter describing the research study to the head of the school in which the study took place. The researcher obtained written approval to conduct the study from the head of the school and the director of the clinical program at the site.

June 2013 to April 2014. The researcher submitted the proposal to the dissertation committee. Once corrections were made, the proposal was sent to the Applied Research Center at Nova Southeastern University.

April 2014 to July 2014. Upon acceptance, the proposal was sent to the Institutional Review Board. Once approval had been granted, the researcher started the research process.

August 2014 to September 2014. The researcher provided four clinical teachers in Grades 2 through 5 with a letter to obtain consent from them to participate in the study. The teachers who participated in the study attended a brief informational meeting about the research study. It took place during school hours at the research site in a classroom. They were trained in setting up the audio recording of the relaxation techniques for the experimental group and the book on tape for the control group. The researcher showed

the teachers a copy of the CTAS and the audio materials that were used in the study. They were given a time frame of how long the study was going to take and how long each component should take to implement.

Furthermore, because the teachers were also participants, they were informed of their rights to participate voluntarily, their rights to withdraw from the study if they chose to do so, and their right to know the purpose of the study. The teachers were asked to assign students to a control or experimental group and provide each student with a number so that he or she was not identified by name. The teachers were instructed to make sure that each group had the same number of students who had the same gender, learning disability, and age, if possible.

In finalizing the student survey, the researcher asked the reading specialist at the research site to lead a focus group of students in a mainstream setting in Grades 2 through 5 to determine if the wording of the survey was appropriate. The students were given written assent forms, and parents gave permission for their child to participate in the focus group and read the survey for the reading specialist. Once the survey was finalized, it was given to the study participants to complete. Next, the researcher obtained written consent from students' parents and written assent from the students. The researcher spoke with the parents to inform them of the study, reviewed the consent form, and presented permission forms to obtain written consent.

October 2014 to November 2014. The researcher met with the students in their classrooms to explain the study, review the assent form with them, and inform them of how long the study was going to take. The letter and consent forms distributed explained the purpose of the study, the quantity of time that was used to collect data, the time required of the students, and the activities that were conducted in the study. Additional

components that were in the letter were how the data and results of the study would be used, the benefits to the individuals by participating in the study, and the steps that would be taken to ensure that the students would remain anonymous. Students were told that the study would help them learn new ways to be better learners and teachers to be better teachers.

Students were also told that they would be assigned a number by their respective teacher, and this number would be used to identify them. They were told that any data that were collected were kept for 36 months. After 36 months, the digital copy of the information would be deleted and any paper copies of the research would be shredded. Also, the students were informed that they could withdraw from the study at any point, that their participation was voluntary, and that they had a right to know the purpose of the study. The projected time period required to collect data was approximately 6 weeks. This time period was based on other studies in which it was found that school-based relaxation-technique training was found to decrease anxiety in students (Larson et al., 2010).

If at any time the students were to become upset or uncomfortable, the teachers or school guidance counselor could provide support to students who were experiencing anxiety. Also, if the anxiety had become a cause for concern, the student's parents or guardians could have been contacted by the school administration and a recommendation could have been made for the parents to seek professional psychological therapy for their child.

Parental permission and student assent were obtained. Then the students answered questions on the CTAS pretest. Teachers were available to read the survey to the students if they were unable to do so independently. It took the students approximately 15 minutes

each time to complete. In addition, they met with a teacher trained in assessment administration who administered the blue form of the WRAT-4 that took approximately 30 minutes to complete. The teachers placed students in the experimental and control groups. Students in the experimental group were administered the intervention in a nondistracting classroom. They listened to the relaxation-technique CD entitled *How I Can Take Tests-For Kids!* (Lohr, 2008) over an amplification system for 16 minutes once per week for 6 weeks. For the first week of training, the students listened to Tracks 1 and 2, which were 16 minutes 49 seconds in length. Subsequent tracks (i.e., Tracks 3 through 7) provided relaxation steps and exercises that led up to taking tests. The students listened to these tracks in all subsequent training sessions that lasted approximately 16 minutes.

The students in the control group listened to the book on tape for 16 minutes once per week for 6 weeks. The second- and third-grade students in the control group listened to a book on tape called *Junie B. Jones* (Park, 2003), and the students in the fourth and fifth grades listened to the *Magic Tree House Series* (Osborne, 2003) for 6 weeks for 16 minutes each time. The students in the control group also listened to the book on tape over an amplification system in a nondistracting classroom. Following the interventions, students in both groups were administered the WRAT-4 green form and the CTAS posttest. As the students were completing the WRAT-4, visual reminders were posted in the room to remind the students in the experimental group to use the relaxation techniques. The visual reminders included key words used in the CD, such as *breathe* and *relax*, to help students generalize the relaxation techniques to different testing situations.

Students completed the postintervention surveys to determine their perceptions of the relaxation-technique instruction or listening to the book on tape. Teachers were able to read the survey to the students if they were unable to do so independently. Finally, the

teachers who were not part of teaching instruction for the control and experimental groups completed surveys to determine whether they observed changes in students' behaviors. In order to protect the well-being of the participants, the researcher and teachers measures were prepared to ensure that the students did not experience any discomfort during the research. However, there were no reports of any of the students experiencing discomfort during the research.

December 2014. Results of the CTAS, WRAT-4, and surveys were analyzed to determine if the relaxation-technique instruction was an effective method to help reduce test anxiety in students with learning disabilities by comparing the pretest and posttest scores of the experimental group to the pretest and posttest scores of the control group.

January 2015. The researcher submitted the final document to the dissertation committee for final approval.

Data analysis. For Research Question 1, the results of the pretest and posttest of the CTAS were analyzed through Statistical Solutions Pro using a one-within, one-between analysis of variance (ANOVA). It was used to determine whether there were significant changes in test scores in comparison to the control group in the level of test anxiety in the participants. Students' scores were analyzed, and their scores determined whether they were considered to have high test anxiety or low test anxiety.

For Research Question 2, the results of the WRAT-4 test were analyzed through Statistical Solutions Pro to compare previous test scores with the test scores after the implementation of the relaxation techniques. The scores determined whether there were significant changes in test scores before and after the intervention was implemented. A one-within, one-between ANOVA was used to compare the scores of students.

For Research Question 3, the results of the students' surveys were analyzed to

determine the students' perceptions of the effectiveness of being taught the relaxation techniques. Each response was assigned a numeric value for each question. The students completed the surveys in a classroom setting, and the scores were integrated into and analyzed through Statistical Solutions Pro. The mean was found, and, if a student's score was one standard deviation above or below the mean, it was determined whether the intervention was effective or ineffective. A one-within, one-between ANOVA was used to compare the scores. Because previous research suggested that males tend to have higher scores on self-reporting surveys on their level of anxiety while taking tests, the directions on the survey mentioned that there were no right or wrong answers on the survey (Hembree, 1988; Lowe & Lee, 2008; Sarason, 1980; Zeidner, 1998).

For Research Question 4, the results of the teachers' surveys were analyzed to determine whether teachers observed students using the relaxation techniques and their perceptions of the effectiveness of the techniques. As with the student surveys, the questions were assigned a numeric value for each question. Once the data were collected, the information was integrated into and analyzed through Statistical Solutions Pro.

Chapter 4: Results

Introduction

The purpose of this study was to determine if relaxation techniques would help alleviate test anxiety and increase achievement in students with learning disabilities. The following research questions were established to guide the applied dissertation:

1. Will learning relaxation techniques lower test anxiety, as measured by the CTAS?
2. Will learning relaxation techniques affect scores, as measured by the WRAT-4?
3. What will be the students' perceptions of what they learned, as measured by a survey?
4. Will the students use what they learned, as measured by teacher observations?

The study used a quasi-experimental, pretest-posttest, quantitative method design. The researcher used four measurements to collect data. The CTAS (Wren & Benson, 2004) measured the level of test anxiety of the test participants. The students completed the CTAS before and after the intervention. Next, a teacher trained in testing administration gave the WRAT-4 (Wilkinson & Robertson, 2006) to the study participants. A teacher trained in testing administration gave the WRAT-4 before and after the intervention.

The WRAT-4 is a measurement tool used to determine the level of student achievement in four academic areas: word reading, sentence comprehension, spelling, and math computation. Third, students completed surveys after the intervention. The researcher wrote a survey for the members in the control group and one for the members in the experimental group. The researcher analyzed the results to determine the students'

perceptions of what they learned. Finally, teachers completed surveys to identify student behavior after the intervention. The researcher analyzed these responses. The researcher used descriptive statistics to define and investigate the main features of the variables. The inferential statistics used was the one-within, one-between ANOVA. The researcher used the results of ANOVA to analyze whether statistically significant differences existed between the experimental and control groups for the pretest and posttest scores of the CTAS and the WRAT-4. The researcher used the survey results to determine the students' perceptions of what they learned.

Results for Research Question 1

Will learning relaxation techniques lower test anxiety, as measured by the CTAS?

The researcher used Statistical Solutions Pro to determine whether learning relaxation techniques decreased test anxiety in students with learning differences. The range of the CTAS pretest scores was from 46 to 84. The range of the CTAS posttest scores was from 38 to 102. Although the CTAS overall scores were lower on the posttest, results of the main within effect of the one-within, one-between ANOVA were not significant, $F(1, 20) = 2.64, p = .120$. Because significant differences were not found, pairwise comparisons were not conducted.

The results of the main effect of group were not significant, $F(1, 20) = 0.04, p = .836$, implying that there were no differences by group. Because significant differences were not found, pairwise comparisons were not conducted. The results for the effect of the interaction were not significant, $F(1, 20) = 0.83, p = .374$, suggesting that there were no differences by group. Because significant differences were not found, pairwise comparisons were not performed. Although not significant, the control group's CTAS scores were lower than the experimental group's scores on the posttest. Table 1 presents

the means and standard deviations for CTAS pretest and posttest scores by group.

Table 1

Means and Standard Deviations for Scores on Anxiety Scale

Group	Pretest		Posttest	
	Mean	SD	Mean	SD
Control	65.11	10.86	56.44	12.38
Experimental	61.15	9.74	58.38	17.89

Results for Research Question 2

Will learning relaxation techniques affect scores, as measured by the WRAT-4? The researcher used Statistical Solutions Pro to analyze the data. The WRAT-4 includes four academic subtests: word reading, sentence comprehension, spelling, and math computation. The participants of the study completed each subtest of the WRAT-4. The researcher used the results to determine if there was a change in academic achievement after the students in the experimental group listened to the relaxation-technique intervention and the students in the control group listened to the book on tape.

The range of scores on the word-reading pretest was from 73 to 110. The range of scores on the word-reading posttest was from 83 to 117. A one-within, one-between ANOVA was conducted to assess if there were statistically significant differences in scores for the word-reading pretest and posttest by group. Prior to the analysis, the assumption of normality was assessed with several Shapiro-Wilk tests (Shapiro & Wilk, 1965). The results of the test were not statistically significant for the word-reading pretest, $p = .254$, but they were statistically significant for the word-reading posttest, $p <$

.001, indicating a violation of the assumption. However, nonnormality has little effect on a Type I error (Tabachnick & Fidell, 2012).

The results of the main within effect of the one-within, one-between ANOVA were not statistically significant, $F(1, 20) = 0.21, p = .655$, suggesting that there were no differences between the word-reading pretest and posttest scores. Because statistically significant differences were not found, pairwise comparisons were not conducted. The results of the main effect of group were not statistically significant, $F(1, 20) = 0.03, p = .865$, suggesting that there were no differences by group. Because statistically significant differences were not found, pairwise comparisons were not conducted. The results for the effect of the interaction were not significant, $F(1, 20) = 0.30, p = .591$, suggesting that there were no differences by group. Because statistically significant differences were not found, pairwise comparisons were not conducted. Table 2 presents the means and standard deviations for the word-reading pretest and posttest by group.

Table 2

Means and Standard Deviations for Word-Reading Scores

Group	Pretest		Posttest	
	Mean	<i>SD</i>	Mean	<i>SD</i>
Control	90.67	11.15	92.89	8.16
Experimental	92.46	10.49	92.46	10.69

The range of scores on the sentence-comprehension pretest was from 55 to 110. The range of scores on the sentence-comprehension posttest was from 73 to 117. A one-within, one-between ANOVA assessed if there were statistically significant differences in

the sentence-comprehension pretest and posttests between groups. Prior to the analysis, the assumption of normality was assessed with several Shapiro-Wilk tests (Shapiro & Wilk, 1965). The results of the test were not statistically significant for the sentence-comprehension pretest, $p = .244$, and not statistically significant for the sentence-comprehension posttest, $p = .337$; therefore, the assumption was met.

Results of the main within effect of the one-within, one-between ANOVA were statistically significant, $F(1, 20) = 10.90, p = .004$, suggesting that there were differences between the sentence-comprehension pretest and sentence-comprehension posttest scores. Pairwise comparisons were conducted to assess the area in which the differences occurred. The sentence-comprehension posttest scores were significantly higher than the sentence-comprehension pretest scores, $F(1, 20) = 10.90, p = .004$.

Results of the main effect of group were not statistically significant, $F(1, 20) = 0.31, p = .585$, suggesting that there were no differences by group. Because statistically significant differences were not found, pairwise comparisons were not conducted. The results for the effect of the interaction were not statistically significant, $F(1, 20) = 0.09, p = .766$, suggesting that there were no differences by group. Because statistically significant differences were not found, pairwise comparisons were not conducted. Table 3 presents the means and standard deviations for the sentence-comprehension pretest and posttest by group.

The range of scores on the spelling pretest was 61 to 117. The range of scores on the spelling posttest was 65 to 115. A one-within, one-between ANOVA assessed if there were statistically significant differences in spelling pretest and posttest scores by group. Prior to the analysis, the assumption of normality was assessed with several Shapiro-Wilk tests (Shapiro & Wilk, 1965). The results of the test were not statistically significant for

the spelling pretest, $p = .913$, and not statistically significant for the spelling posttest, $p = .823$; therefore, the assumption was met.

Table 3

Means and Standard Deviations for Sentence-Comprehension Scores

Group	Pretest		Posttest	
	Mean	<i>SD</i>	Mean	<i>SD</i>
Control	85.78	19.16	91.89	13.04
Experimental	88.62	16.98	96.00	11.32

The results of the main within effect of the one-within, one-between ANOVA were not statistically significant, $F(1, 20) = 0.04$, $p = .852$, suggesting that there were no differences between the spelling pretest and posttest by group. Because statistically significant differences were not found, pairwise comparisons were not conducted. The results of the main effect of group were not significant, $F(1, 20) = 0.00$, $p = .968$, suggesting that there were no differences by group. Because statistically significant differences were not found, pairwise comparisons were not conducted. The results for the effect of the interaction were not significant, $F(1, 20) = 0.59$, $p = .452$, suggesting that there were no differences by group. However, the spelling posttest scores of the control group decreased, whereas the scores of the experimental group on the spelling posttest increased. Because statistically significant differences were not found, pairwise comparisons were not conducted. Table 4 presents the means and standard deviations for the spelling pretest and posttest scores by group.

The range of scores on the math-computation pretest was 71 to 109. The range of

scores on the math-computation posttest was 72 to 120. A one-within, one-between ANOVA was conducted to assess if there were statistically significant differences in the math computation pretest and posttest by group. Prior to the analysis, the assumption of normality was assessed with several Shapiro-Wilk tests (Shapiro & Wilk, 1965). The results of the test were not statistically significant for the math-computation pretest, $p = .317$, and not statistically significant for the math-computation posttest, $p = .168$; therefore, the assumption was met.

Table 4

Means and Standard Deviations for Spelling Scores

Group	Pretest		Posttest	
	Mean	<i>SD</i>	Mean	<i>SD</i>
Control	91.44	9.95	88.78	9.05
Experimental	89.77	14.10	90.85	14.61

The results of the main within effect of the ANOVA were not statistically significant, $F(1, 20) = 0.95$, $p = .342$, suggesting that there were no differences between the math-computation pretest and posttests. Because statistically significant differences were not found, pairwise comparisons were not conducted. The results of the main effect of group were not significant, $F(1, 20) = 0.49$, $p = .492$, suggesting that there were no differences by group. Because statistically significant differences were not found, pairwise comparisons were not conducted. The results for the effect of the interaction were not significant, $F(1, 20) = 0.03$, $p = .864$, suggesting that there were no differences by group. Because statistically significant differences were not found, pairwise

comparisons were not conducted. Table 5 presents the means and standard deviations for math-computation pretest and posttest by group.

Table 5

Means and Standard Deviations for Math-Computation Scores

Group	Pretest		Posttest	
	Mean	<i>SD</i>	Mean	<i>SD</i>
Control	85.22	12.53	86.22	11.52
Experimental	88.54	11.22	90.00	12.92

Results for Research Question 3

What will be the students' perceptions of what they learned, as measured by a survey? The researcher used Statistical Solutions Pro to analyze the data. The students in the experimental and control groups completed surveys with questions on what they learned from the intervention. Frequencies and percentages for the nominal and ordinal variables for the experimental and control groups can be found in Appendix E. For ease of comparison, the percentages for *almost always* and *most of the time*, as well as for *some of the time* and *almost never*, were combined for each question. For the experimental group, most of the students (54%) did not like listening to the CD on relaxation techniques. Less than half of the students (36%) were calm when listening to the CD on relaxation techniques. Only 36% of the students practiced relaxation techniques at home or outside the classroom.

Less than half of the students (45%) were calm while taking tests before they listened to the CD on relaxation techniques. Only 36% of the students reported being

calm while taking tests after listening to the CD on relaxation techniques. More than half of the students (54%) could concentrate while taking tests before listening to the CD on relaxation techniques. A majority of the students (82%) could concentrate while taking tests after listening to the CD on relaxation techniques. Less than half of the students (45%) were confident while taking tests before listening to the CD on relaxation techniques. Only 27% of the students were worried while taking tests before listening to the CD on relaxation techniques. After listening to the CD on relaxation techniques, the percentage remained the same (27%). Less than half of the students (45%) were bothered by others before listening to the CD on relaxation techniques. This percentage declined to 36% of the students being bothered by others after listening to the CD on relaxation techniques.

For the control group, most of the students (55%) did not like the book on tape. Many of the students (63%) were calm while listening to the book on tape. Only 36% of the students listened to books on tape at home or outside the classroom. Many of the students (64%) were calm while taking the test before they listened to the book on tape. Most of the students (82%) were calm after listening to the book on tape. A majority of students (54%) could concentrate while taking tests before listening to the book on tape. Most of the students (63%) could concentrate while taking tests after listening to the book on tape. Most of the students (64%) were confident while taking tests before listening to the listening to the book on tape. Few students (18%) were worried while taking tests before listening to the book on tape. That number remained the same (18%) after listening to the book on tape. More than half of the students (54%) were bothered by others before listening to the book on tape. That number decreased to 36% who were bothered by others after listening to book on tape.

Results for Research Question 4

Will the students use what they learned, as measured by teacher observations?

Two teachers who did not implement the intervention in the classroom completed surveys to share their perceptions of what the students learned and if they had observed the students using the intervention techniques. The researcher used Statistical Solutions Pro to analyze the data. Frequencies and percentages for the nominal and ordinal variables for the experimental and control groups can be found in Appendix F.

For the experimental group, the teachers observed only 24% of the students being relaxed before listening to the CD on relaxation techniques. However, the teachers observed 30% of the students being relaxed after listening to the CD on relaxation techniques. The teachers observed most of the students (69%) concentrating while taking tests after listening to the CD on relaxation techniques. The teachers observed more than half of the students (54%) showing confidence after listening to the CD on relaxation techniques. The teachers observed 46% of the students being worried while taking tests before listening to the CD on relaxation techniques. Only 39% were worried while taking tests after listening to the CD on relaxation techniques. The teachers observed 38% of the students being distracted before listening to the CD on relaxation techniques while taking tests. After the intervention, teachers observed only 23% of the students being distracted.

For ease of comparison, the percentages for *almost always* and *most of the time*, as well as for *some of the time* and *almost never*, were combined for each question. For the control group, the teachers observed more than half (56%) of the students being relaxed before listening to the book on tape. The teachers observed the same percentage of the students (56%) being relaxed after listening to the book on tape. The teachers observed most of the students (77%) concentrating while taking tests after listening to the

book on tape. The teachers observed more than half of the students (56%) showing confidence after listening to the book on tape. The teachers observed 23% of the students being worried while taking tests before listening to the book on tape. That percentage did not change (23%) after they listened to the book on tape. The teachers observed 45% of the students being distracted while taking tests before listening to the book on tape. They observed 44% of the students being distracted after listening to the book on tape.

Conclusion

The researcher investigated and answered four research questions during this research study. The results for Research Questions 1 and 2 showed that there were no statistically significant results of the study. However, one academic subset of the WRAT-4, sentence comprehension, showed that the posttest scores were significantly higher than the pretest scores. In addition, the control group's scores decreased on the spelling posttest, whereas the experimental group's scores on the spelling posttest increased. The researcher examined the results of a survey to determine the perceptions of the students after the intervention. Finally, the researcher examined the results of a survey to determine teachers' observations of the students' behaviors in the control and experimental group.

Chapter 5: Discussion

Introduction

The purpose of the research was to determine if teaching relaxation techniques would improve achievement and alleviate the anxiety of students with specific learning disabilities in an independent school. The study utilized a quasi-experimental, pretest-posttest, quantitative methods design. The measurements included the CTAS, WRAT-4, and researcher-developed surveys. The CTAS measured the level of test anxiety in students in the experimental and control groups before and after the intervention was introduced. The WRAT-4 measured the test scores of students. The researcher used results from the surveys to determine the students' perceptions of what they learned, the teachers' perceptions of what the students learned, and the teachers' observations of student behavior. Statistical Solutions Pro was used to calculate the descriptive statistics for the three measurement instruments. The one-within, one-between ANOVA was used as the major inferential statistic in the study. The following were the four quantitative research questions:

1. Will learning relaxation techniques lower test anxiety, as measured by the CTAS?
2. Will learning relaxation techniques affect scores, as measured by the WRAT-4?
3. What will be the students' perceptions of what they learned, as measured by a survey?
4. Will the students use what they learned, as measured by teacher observations?

Summary and Interpretation of the Findings

Research Question 1. For the first research question regarding whether the

relaxation techniques lowered test anxiety, there were no significant differences between the pretest and posttest scores for the CTAS after the completion of the intervention. Analysis of the data showed there were no significant differences between the two groups, thus not supporting the hypothesis. However, levels of test anxiety did lower slightly in both groups. A possibility for lack of significant findings between groups was the small sample size. In addition, the majority of the students in the experimental group did not practice the relaxation techniques at home or outside the classroom. Furthermore, the results could not be analyzed by age due to the small sample size.

Previous research indicated that test anxiety intensifies in fourth grade. Therefore, beginning relaxation training earlier than fourth grade may ensure that students have the relaxation skills training before fourth grade (Hembree, 1988). Only one third of the students reported being calm while listening to the CD on relaxation techniques; therefore, this particular CD may not have been effective in reducing test anxiety. Also, the findings contradict an earlier research study that showed there was a substantial decline in the test-anxiety scores of the members of the experimental group who received relaxation techniques (Larson et al., 2010).

Gregor (2005) found that using both relaxation techniques and cognitive-behavioral therapy was effective in decreasing anxiety and increasing performance on tests. Several research studies that were conducted suggested that using a multimodal approach to reducing test anxiety included teaching study skills, test-taking strategies, and implementing physical activities. Although these activities were taught or used separately at the research location, perhaps the development of a program that includes all of these components will decrease test anxiety and yield significant findings (Breso et al., 2011; Damer & Melendres, 2011; Dendato & Diener, 1986; Ergene, 2003; Kitsantas

et al., 2008; Salend, 2011; Sansgiry & Sail, 2006; Sena et al., 2007; Weems et al., 2009). Another possibility for lack of significant findings was that mental health counseling was not part of the intervention program for the experimental group. Cognitive-behavioral therapy could provide students with opportunities to develop higher levels of self-efficacy.

As previous research has suggested, students with higher self-efficacy had a reduction in test anxiety (Gregor, 2005; Sapp, 1999). Finally, as Putwain et al. (2010) and Zeidner and Matthews (2010) found in their studies, test-irrelevant thinking disrupts ideas that are not associated with the test. As there were students who had a diagnosis of attention deficit hyperactivity disorder, there is a possibility they were not paying attention and were daydreaming during relaxation techniques instruction, leaving them unable to apply the strategies when taking tests to help reduce test anxiety.

Research Question 2. The findings for the second research question showed no significant differences between the pretest and posttest scores of the WRAT-4, with the exception of the results of the sentence-comprehension subtest. The results for the word reading, spelling, and math-computation subtests of the experimental and control groups showed there were no significant differences between the two groups; therefore, the results did not support the hypothesis. However, the results of the sentence-comprehension pretest and posttest scores showed there was a statistically significant increase in the pretest and posttest scores for all participants in the sentence comprehension subtest of the WRAT-4.

A possibility for the significant increase in the pretest and posttest sentence-comprehension scores could have been a focus on reading-comprehension instruction during the 6 weeks when the study took place. Another possibility for the lack of

significant findings between groups was the small sample size. A third possibility for the lack of significant findings is that relaxation techniques did not significantly lower anxiety. It was assumed that decreased anxiety would result in increased test scores. If there was no decreased anxiety, it follows that achievement scores would not be increased.

Research Question 3. According to the results of the student surveys for the experimental group, there were changes in student perceptions of relaxation and concentration. However, about half of the the students liked listening to the CD on relaxation techniques, although only 36% reported being calm while listening to it. Only about 36% of the students practiced the relaxation at home or outside the classroom. The students reported a small decrease (9%) in calmness while taking tests after listening to the CD on relaxation techniques. The students reported a 29% increase in being able to concentrate while taking tests after listening to the CD on relaxation techniques. Their feelings of being worried did not change after listening to the CD on relaxation techniques. They reported a decrease (9%) in being bothered by others. Furthermore, the lack of practice of relaxation techniques outside of the classroom may also explain why there was not a significant reduction in anxiety in control group participants.

For the control group, about half liked listening to the book on tape. The students in the control group reported being calmer than the experimental group while listening to the book on tape (63% vs. 36%). There was an 18% increase in their calmness while taking tests after listening to the book on tape, which was higher than the experimental group, indicating that the book on tape might be a good tool for encouraging relaxation. They also reported a slight increase (9%) in the ability to concentrate. Similar to the experimental group, their feelings of being worried did not change after listening to the

book on tape. They also reported a decrease in being bothered by others by 18%.

Research Question 4. Two classroom teachers completed surveys for each participant in the study. The teacher survey results did not show that the students in the control group were as relaxed as those students reported. This may be due to the social desirability effect in which the students responded in such a way to please their teachers. However, the response of the teachers and the experimental group students did correlate. The teachers did not see an increase in the ability to concentrate as the experimental group reported. They also reported those students as being more worried and more distracted than the students reported. This could be an explanation for the lack of significant findings between groups. Otherwise, there was consistency between what the teachers observed and what the students reported.

Further Teacher Observations

One of the classroom teachers who administered the intervention reported that students were resistant to listening to the CD on relaxation techniques. Another classroom teacher observed a dramatic decrease in test anxiety in one student in the experimental group during test-taking situations. The teacher could not attribute the changes to outside influences such as therapy. According to the pretest and posttest CTAS scores, this particular student's raw scores decreased by 10 points. However, his pretest and posttest scores from the WRAT-4 remained relatively the same.

The teachers also observed that students' performances on tests seemed to vary depending on their diagnoses. In this study, the results could not be analyzed by learning disability because of the small sample size. They mentioned that a student who had attention deficit hyperactivity disorder in the experimental group had difficulty maintaining concentration. However, if the student took the medication prescribed by his

doctor to control his level of attention, the teacher observed that his level of attention and ability to concentrate improved. The student participated in the intervention before the medication was administered. The teacher suggested that, if the intervention had been planned at a different period during the day, perhaps the student would have been able to concentrate during the relaxation-technique lessons.

Noteworthy Findings

In comparing the scores of two students in the experimental group, one student's scores decreased from 72 points on the CTAS pretest to 41 points on the CTAS posttest. The classroom teacher reported that a possibility for the student's decrease in scores could be due to the relaxation-technique lessons because he was the type of student who would have listened to the CD and internalized the lessons. The scores of the other student, who was also in the experimental group, increased by 61 points on the CTAS pretest to 102 points on the CTAS posttest. A possibility for his dramatic increase in scores was his diagnosis of oppositional-defiant disorder.

Implications

Although the results of this study did not show support for the advantage of using relaxation techniques to help reduce test anxiety and increase achievement scores, many other studies have shown that the relaxation-technique intervention can be an effective strategy to help students become successful in test-taking situations. For many years, researchers have been conducting studies in which they used relaxation techniques to help reduce test anxiety during test-taking situations. Early research by Jacobson (1938) helped to identify relaxation techniques as a way to decrease thoughts that increased anxiety in individuals. Zeidner (1998) used cognitive-behavioral therapy to successfully reduce test anxiety in test-taking situations. Larson et al. (2010) found that relaxation-

technique instruction significantly reduced test anxiety in third-grade students.

Doan et al. (1995) found that participants' anxiety levels decreased when they participated in aerobic exercises and relaxation techniques. Despite the results of other studies, the results of this study did not show significant differences that the researcher was expecting to find. However, future researchers should continue to investigate effective strategies to help students with learning differences become successful in all types of testing situations because there has not been extensive research done on reducing test anxiety in students with learning disabilities (Beauchemin et al., 2008; Lufi et al., 2004; Peleg, 2009; Sena et al., 2007).

Furthermore, Carter et al. (2005) found that poor performance on achievement tests increased students' chances to be recommended for special education services. Two students who participated in the study were receiving services in a special education setting because, although they did not possess significant academic challenges, their level of anxiety made it difficult for them to perform well in the mainstream setting. Therefore, researchers should continue to explore possible strategies to lower test anxiety so students can perform successfully in a mainstream setting.

Limitations

There may have been some limitations that affected the validity of the dissertation's outcome. First, there may have been a threat to the external validity. The individuals involved in the study may not have been a true representation of the population as it was a sample of convenience. The research site was an independent school, and the socioeconomic backgrounds of the students included middle to upper classes. Also, the demographics of the study participants were limited to two ethnic groups: Caucasian and Hispanic.

There may have been threats to the internal validity of the study. First, because the experiment was a quasi-experimental approach, there could have been potential threats to maturation, selection, and mortality. In addition, four potential study participants did not receive parental permission to participate in the study. Another limitation may have been that the students acquired pretest sensitization to the treatment. Because the students were answering a survey that asked them about how they felt when they took a test, they may have been aware of the study's objectives (D. Wren, personal communication, August 1, 2013).

Moreover, there may have been temporal effects. Student maturation and continued academic lessons may have allowed students to perform better on the subtests of the WRAT-4, as opposed to the intervention helping to decrease test anxiety and increase student achievement, even though alternate forms of the WRAT-4 were used. The students were in an intensive academic program to help strengthen academic skills. It is possible that student maturation and continued academic lessons helped students to perform better on the sentence-comprehension subtest of the WRAT-4.

Another possible limitation is that the survey responses may have not been accurate. Some children, especially males, may not have answered questions honestly due to societal conditioning (Hembree, 1988; Lowe & Lee, 2008; Sarason, 1980; Zeidner, 1998). However, in comparing student perceptions and teacher perceptions and observations, it appeared that there were similar findings.

Because teachers may not be trained researchers, the responses on the teacher survey may have been based on preconceived ideas about the students. Therefore, the teachers' responses may not have been accurate (Sarason et al., 1960). In addition, the teacher survey results did not show that the students were as relaxed as the students

reported. This may be due to the social desirability effect in which the students responded in such a way to please their teachers. This could be an explanation for the lack of significant findings between groups.

Upon the analysis of the results, the researcher should have included survey questions that provided a clearer understanding of student behavior before and after the intervention. For example, on the survey in which students gave their perceptions of what they learned, Question 8 asked the following: How confident were you in taking tests before listening to the book on tape or CD on relaxation techniques? The researcher did not include a follow-up question on the survey asking how confident the student felt after listening to the book on tape or the CD on relaxation techniques. Finally, the researcher should have ensured that there were similar testing situations between classrooms. The students in the lower grades had fewer opportunities to take tests compared to the students in the upper elementary grades. Teachers were unable to observe the students in testing situations in the second and third grades as often as the teachers in the fourth and fifth grades.

Conclusion

This study investigated the effect of teaching relaxation techniques to improve achievement and alleviate anxiety of students. However, the results of the study showed no significant differences by group between the pretest and posttest results of the CTAS and the WRAT-4. Nevertheless, it is important to continue to identify ways in which students can feel and be successful in testing situations, especially because there has not been extensive research done on identifying ways to treat test anxiety in students with learning disabilities. Standardized testing in American schools has become common practice to monitor student progress; therefore, empirically based programs should be put

in place to help all students be successful in testing situations.

Recommendations

Based on the results of this study, the researcher makes the following recommendations for further research:

1. A larger sample size should be used in future research studies in order to analyze differences by age, gender, ethnicity, and learning disability.
2. The participants should be a true representation of the population.
3. Researchers should consider developing empirically based programs in which students can practice the relaxation techniques at home or outside the classroom.
4. Researchers should ensure that the students are invested in the relaxation-technique activities perhaps by instituting a reward program for listening and practicing the relaxation techniques.
5. Researchers should conduct research to identify more effective ways to decrease test anxiety to help students with specific learning disabilities perform well on assessments (Lowe & Lee, 2008). These interventions might contain a mixture of cognitive and behavioral treatments with skill-focused approaches (Ergene, 2003; Hembree, 1988).
6. Researchers should conduct the relaxation-technique lessons when the participants are working at their optimal levels.
7. Researchers should develop empirically based programs that are individualized based on a student's learning-disability diagnosis and test-taking needs (Neuderth et al., 2008). Some of these needs may include test-taking strategies, teaching study skills, relaxation-technique training, counseling, and physical activities (Breso et al., 2011; Damer & Melendres, 2011; Dendato & Diener, 1986; Ergene, 2003; Kitsantas et al.,

2008; Salend, 2011; Sapp, 1999; Sansgiry & Sail, 2006; Sena et al., 2007; Weems et al., 2009).

8. Relaxation training should start earlier than fourth grade to ensure that students have the relaxation skills training before fourth grade.

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Appendix A

Frequencies and Percentages for Nominal Variables for Gender and Learning Disability

Frequencies and Percentages for Nominal Variables for Gender and Learning Disability

Variables	<i>N</i>	%
Gender		
Female	5	23
Male	17	77
Group		
Control	9	41
Experimental	13	59
Anxiety and anxiousness		
Does not have disability	17	77
Has disability	5	23
Other health impairments		
Does not have disability	21	95
Has disability	1	5
Orthopedic impairment		
Does not have disability	21	95
Has disability	1	5
Perceptual disabilities		
Does not have disability	16	73
Has disability	6	27
Speech and language impairment		
Does not have disability	21	95
Has disability	1	5
Autism spectrum disorders		
Does not have disability	14	64
Has disability	8	36
Attention deficit hyperactivity		
Does not have disability	15	68
Has disability	7	32
Dyslexia		
Does not have disability	22	100
Emotional disturbance		
Does not have disability	21	95
Has disability	1	5

Note. Due to rounding error, percentages may not add up to 100.

Appendix B

Postintervention Student Survey for Experimental Group

Postintervention Student Survey for Experimental Group

Directions: Please read each question carefully and choose the answer that fits you. There are no right or wrong answers.

1.) How much did you like listening to the CD?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

2.) How calm were you while listening to the CD?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

3.) How often did you practice relaxation at home or outside of the classroom?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

4.) How calm were you while taking the test before you had listened to the CD?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

5.) How calm were you while taking tests after you listened to the CD?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

6.) How much were able to concentrate while taking tests before listening to the CD?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

7.) How much were you able to concentrate while taking tests after listening to the CD?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

8.) How confident were you in taking tests before listening to the CD?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

9.) How worried were you during test taking before listening to the CD?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

10.) How worried were you during test listening to the CD?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

11.) How bothered were you by others during test taking before listening to the CD?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

12.) How bothered were you by others during test taking after listening to the CD?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

Appendix C

Postintervention Student Survey for Control Group

Postintervention Student Survey for Control Group

Directions: Please read each question carefully and choose the answer that fits you. There are no right or wrong answers.

1.) How much did you like listening to the book on tape?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

2.) How calm were you while listening to the book on tape?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

3.) How often did you practice reading a book on tape at home or outside of the classroom?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

4.) How calm were you while taking tests before you read a book on tape?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

5.) How calm were you while taking tests after you listened to a book on tape?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

6.) How much were able to concentrate while taking tests before listening to a book on tape?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

7.) How much were you able to concentrate while taking tests after listening to a book on tape?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

8.) How confident were you in taking tests before listening to a book on tape?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

9.) How worried were you during test taking before listening to a book on tape?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

10.) How worried were you during test taking after listening to a book on tape?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

11.) How distracted were you by others during test taking before listening to a book on tape?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

12.) How distracted were you by others during test taking after listening to a book on tape?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

Appendix D

Postintervention Teacher Survey

Postintervention Teacher Survey

Directions: Please read each question carefully and choose the appropriate answer based on your observations of the student.

1.) How relaxed was the student before the audio instruction?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

2.) How relaxed did the student appear after the audio instruction?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

3.) Did the student appear to be concentrating while taking tests after the instruction?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

4.) How confident did the student appear while taking tests after the audio instruction?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

5.) How worried did the student appear during test taking before listening to the audio instruction?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

6.) How worried did the student appear during test taking after listening to the audio instruction?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

7.) How distracted did the student appear by others before listening to the audio instruction?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

8.) How distracted did the student appear by others during test taking after the audio instruction?

1.) Almost always 2.) Most of the time 3.) Some of the time 4.) Almost never

Appendix E

Frequencies and Percentages for Variables on Student Survey

Frequencies and Percentages for Variables on Student Survey

Experimental Group

Variables	<i>n</i>	%
Question 1		
Almost always	2	18
Most of the time	3	27
Some of the time	2	18
Almost never	2	36
Question 2		
Almost always	2	18
Most of the time	2	18
Some of the time	5	45
Almost never	2	18
Question 3		
Almost always	0	0
Most of the time	4	36
Some of the time	2	18
Almost never	5	45
Question 4		
Almost always	3	27
Most of the time	2	18
Some of the time	4	36
Almost never	2	18
Question 5		
Almost always	1	9
Most of the time	3	27
Some of the time	2	18
Almost never	5	45
Question 6		
Almost always	1	9
Most of the time	5	45
Some of the time	4	36
Almost never	1	9
Question 7		
Almost always	2	18
Most of the time	7	64
Some of the time	2	18
Almost never	0	0
Question 8		
Almost always	3	27
Most of the time	2	18

Some of the time	4	36
Almost never	2	18
Question 9		
Almost always	1	9
Most of the time	2	18
Some of the time	4	36
Almost never	4	36
Question 10		
Almost always	2	18
Most of the time	1	9
Some of the time	4	36
Almost never	4	36
Question 11		
Almost always	3	27
Most of the time	2	18
Some of the time	2	18
Almost never	4	36
Question 12		
Almost always	3	27
Most of the time	1	9
Some of the time	1	9
Almost never	6	55

Note. Due to rounding error, percentages may not add up to 100.

Control Group

Variables	<i>n</i>	%
Question 1		
Almost always	4	36
Most of the time	1	9
Some of the time	6	55
Almost never	0	0
Question 2		
Almost always	5	45
Most of the time	2	18
Some of the time	3	27
Almost never	0	0
Did not answer	1	9
Question 3		
Almost always	4	36
Most of the time	0	0
Some of the time	4	36
Almost never	3	27
Question 4		
Almost always	6	55
Most of the time	1	9
Some of the time	3	27
Almost never	1	9
Question 5		
Almost always	7	64
Most of the time	2	18
Some of the time	2	18
Almost never	1	9
Question 6		
Almost always	5	45
Most of the time	1	9
Some of the time	4	36
Almost never	1	9
Question 7		
Almost always	5	45
Most of the time	2	18
Some of the time	4	36
Almost never	0	0
Question 8		
Almost always	6	55
Most of the time	1	9
Some of the time	2	18

Almost never	1	9
Did not answer	0	0
Question 9		
Almost always	2	18
Most of the time	0	0
Some of the time	5	45
Almost never	4	36
Question 10		
Almost always	2	18
Most of the time	0	0
Some of the time	4	36
Almost never	5	45
Question 11		
Almost always	1	9
Most of the time	5	45
Some of the time	1	9
Almost never	4	36
Question 12		
Almost always	2	18
Most of the time	2	18
Some of the time	2	18
Almost never	5	45

Note. Due to rounding error, percentages may not add up to 100.

Appendix F

Frequencies and Percentages for Variables on Teacher Survey

Frequencies and Percentages for Variables on Teacher Survey

Experimental Group

Variables	<i>n</i>	%
Question 1		
Almost always	2	16
Most of the time	1	8
Some of the time	5	38
Almost never	5	38
Question 2		
Almost always	2	15
Most of the time	2	15
Some of the time	6	46
Almost never	3	24
Question 3		
Almost always	5	38
Most of the time	4	31
Some of the time	3	23
Almost never	1	8
Question 4		
Almost always	2	16
Most of the time	5	38
Some of the time	6	46
Almost never	0	0
Question 5		
Almost always	4	31
Most of the time	2	15
Some of the time	4	31
Almost never	3	23
Question 6		
Almost always	1	8
Most of the time	4	31
Some of the time	5	38
Almost never	3	23
Question 7		
Almost always	2	15
Most of the time	3	23
Some of the time	4	31
Almost never	4	31
Question 8		
Almost always	0	0
Most of the time	3	23

Some of the time	6	46
Almost never	4	31

Note. Due to rounding error, percentages may not add up to 100

Control Group

Variables	<i>n</i>	%
Question 1		
Almost always	1	12
Most of the time	4	44
Some of the time	4	44
Almost never	0	0
Question 2		
Almost always	1	12
Most of the time	4	44
Some of the time	4	44
Almost never	0	0
Question 3		
Almost always	4	44
Most of the time	3	33
Some of the time	2	23
Almost never	0	0
Question 4		
Almost always	1	12
Most of the time	4	44
Some of the time	4	44
Almost never	0	0
Question 5		
Almost always	0	0
Most of the time	2	23
Some of the time	4	44
Almost never	3	33
Question 6		
Almost always	0	0
Most of the time	2	23
Some of the time	4	44
Almost never	3	33
Question 7		
Almost always	2	23
Most of the time	1	12
Some of the time	2	23
Almost never	4	44
Question 8		

Almost always	2	22
Most of the time	1	12
Some of the time	2	22
Almost never	4	44

Note. Due to rounding error, percentages may not add up to 100.