

**Reducing Test Anxiety Among Third Grade Students Through the
Implementation of Relaxation Techniques**

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Abstract

The purpose of this study was to reduce the negative effects that self-perceived levels of test anxiety have on third-grade students. The participants in this study consisted of 177 third-grade students at two Midwestern public elementary schools. Students at one school were taught relaxation techniques, while students at the second school served as the control group, receiving no training. The Westside test anxiety scale (Driscoll 2007), elevator breathing and guided relaxation were utilized to measure and manage levels of anxiety. The results indicated that the relaxation intervention had a significant effect in reducing test anxiety in the experimental group. In contrast, no significant decrease in test anxiety was found among the control group. This study highlights the implications for counselors, parents and teachers working with elementary students facing high-stakes testing.

Keywords: test anxiety, relaxation techniques, elementary school students

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Anxiety is a phenomenon that human beings routinely encounter within their daily experience. It is considered to be one of the most prevalent and pervasive human emotions, with a large sector of the world's population suffering from excessive and overbearing levels (Rachman, 2004). Anxiety can be described as a perceived notion of psychological distress which occurs due to the expectation of a disconcerting and potentially threatening event. Although extensive research has focused on the concept of anxiety, it cannot be defined by purely objective or concrete means (Rachman, 2004). As a result of the ubiquitous nature of anxiety, the construct has been defined as different subtypes (e.g., social anxiety, state-trait anxiety). The focus of the present study was on one other such subtype, namely, test anxiety.

Within the American education system, the prevalence and significance of standardized testing has been increasing along with the stakes of this testing format (Black, 2005). As a result, today's students are associating a greater sense of consequence with the prospect of being tested, resulting in feelings of pressure to perform and fear of not performing adequately. According to Zbornik (as cited in Black, 2005), students who suffered from test anxiety tended to be consumed with feelings of anxiousness, worthlessness, and/or absolute dread in regard to their academic achievement. Test anxiety can produce a physiological hyper-arousal, interfering with students' mental processes and debilitating their ability to function during a test, as well as in the days and weeks leading up to a test (Soffer, 2008). Due to the pressure to perform, and the perceived importance of high-stakes testing, students' mental states

and sense of emotional stability can become impaired. Rather than feel confident about high-stakes tests and the higher level thinking they require, test-anxious students may become overly concerned with the repercussions of failure (Spielberger & Vagg, 1995). In addition to the adverse effects on cognitive processes, anxiety can produce physiological hyper-arousal, negative emotional responses, as well as behavioral problems in children.

Physiological arousal is defined by the American Psychological Association Dictionary of Psychology as aspects of arousal shown by physiological responses, such as increases in blood pressure and rate of respiration and decreased activity of the gastrointestinal system (Vandenbos, 2007). Other physiological effects of test anxiety include constricted blood vessels, raised body temperature, increased dilation of the eyes, muscle spasms, increased blood flow to muscles, and decreased blood flow to the skin (Zeidner, 1998). The Educational Testing Service (ETS: 2005) has also identified nausea, muscular cramps, faintness, and dry mouth to the list of physiological symptoms as a result of test anxiety.

Emotionality is a link between the cognitive affects of test anxiety and the physiological effects. Zeidner (1998) defined emotionality as the attention paid to, and interpretations of, affective/physiological arousal. Thus, two students who are overcome by the same physiological symptoms of test anxiety may have different levels of anxiety based on their differing awareness of physiological changes and bodily arousal. Triplett and Barksdale (2005) identified specific symptoms of emotionality in a study measuring levels of test anxiety, including feelings of hate, anger, nervousness, boredom, confusion, and frustration. Cheek, Bradley, Reynolds, and Coy (2002) found, from

teachers' reports, that following testing, some children exhibited several behavioral problems such as avoidance, crying, illness, and outburst of anger.

Test Anxiety and Relaxation Training

Various forms of relaxation training have been used to mitigate the deleterious effects of anxiety. Two particular techniques, deep breathing and muscle relaxation, have been shown to effectively decrease anxiety levels in individuals who have difficulty relaxing in anxious situations (Zuercher-White, 1998). These techniques can result in individuals' increased focus on the task at hand rather than on their level of anxiety.

Deep breathing can be defined as slow, diaphragmatic breathing that balances out the oxygen and carbon dioxide levels in the body (Nassau, 2007). While utilizing diaphragmatic breathing, it is important that air is inhaled through the nose and exhaled through the mouth. In response to this sensation, the body will react with less severe symptoms in a time of high anxiety or panic (Zuercher-White, 1998). The author recommended that when training individuals how to utilize this technique, inform them of the purpose of this training and what the outcome of the techniques will be. A longitudinal study conducted over two years with 64 post-baccalaureate premedical students investigated perceived experience of test anxiety (Paul, Elam, & Verhulst, 2007). The students were taught to utilize deep breathing techniques to reduce their anxious feelings. The students' self-reports after the intervention indicated that they felt less test anxiety, more relaxed, and more confident.

Progressive muscle relaxation is a process that involves decreasing the physiological aspects of anxiety while distracting the individual from their awareness of anxious feelings (Nassau, 2001). The progressive muscle relaxation technique consists

of a sequential tensing and relaxing of different muscle groups. The individual progresses through the major muscle groups in the body, usually progressing from the head and neck muscles to the legs and ankles, or visa versa.

Rasid and Parish (1998) conducted a study examining the effects of two types of relaxation training with 55 high school students' levels of anxiety using an experimental-control group design. Results showed that both behavioral relaxation and progressive muscle relaxation techniques produced significantly lower anxiety scores in the experimental group as compared to the control group. Zaichkowsky & Zaichkowsky (1984) found that children as young as nine years of age can learn stress control in a short period of six weeks. Children were taught progressive muscle and imagery-based techniques to control physiological arousal (i.e., heart rate, respiration, and skin temperature). The authors found decreases in all three of the children's physiological responses to anxiety. In a more recent study, Lohaus and Klein-Hessling (2003), utilized progressive muscle relaxation in an effort to reduce test anxiety in 160 fourth- and sixth-grade students. They found that relaxation techniques can have a more significant calming effect in children over the short-term (i.e., five sessions) as compared to additional training sessions (i.e., ten sessions). These results suggested that children are capable of learning relaxation techniques over a relatively short period of time.

It is clear from previous research with both young adults and children, relaxation techniques can reduce test anxiety. The present study tested three hypotheses: 1) the pre-and post-test differences for the experimental group will show a significant decrease in anxiety level; and 2) the pre-and post-test differences for the control group will show

no significant decrease in anxiety levels 3) there will be a significant post-test difference in anxiety levels between the experimental and control groups.

Method

Participants

The sample was made up of two cohorts of third-grade students (N=177, 87 males and 89 females), each enrolled in two Midwestern public elementary schools. Ages ranged from 8 to 10 years with a median of 9 years. The greatest percentage of participants reported their race as Caucasian (89.3%), followed by African American (5.1%), Hispanic (0.6%). The remaining participants identified themselves as Mixed race (5.8%) or indicated "other" (2.8%).

Instrumentation

Westside Test Anxiety Scale. The Westside Test Anxiety Scale (WTAS: Driscoll, 2007) was designed to identify participants with anxiety impairments who could benefit from anxiety-reduction and yields a general test anxiety score. The WTAS consists of 10 items, each using a Likert response scale where 1 = "never true" and 5 = "always true." The instrument was modified for the purpose of this study in an attempt to make the items easier to understand by the young participants. For example "exam" was replaced with "test," "fail" was replaced with "bad job" and "mind sometimes wanders" was replaced with "daydream."

The WTAS was constructed to measure anxiety impairments with six items assessing incapacity (i.e., memory loss and poor cognitive processing) and four items measuring worry and dread (i.e., catastrophizing) which interferes with concentration (Driscoll, 2007). Scores for the two subscales, incapacity (items 1, 4, 5, 6, 8, & 10) and

worry (items 2, 3, 7, & 9) are obtained by summing the respective item responses. A total score is obtained by adding up the scores and dividing by 10, where higher scores indicate a greater level of test anxiety (Driscoll, 2004). The present researchers used the total score to obtain a general level of test anxiety.

Validity has been shown in some small samples. The WTAS has yielded a moderate positive correlation with the Cognitive Test Anxiety Scale (Cassidy & Johnson, 2002). The WTAS has also shown a negative relationship with gains in test scores (Driscoll, 2007). That is, as WTAS scores decreased, test scores increased. At the time this study was conducted, reliability information was unavailable. However, internal consistency estimates were calculated for the present study.

Procedure

Data collection took place at two Midwestern public elementary schools in separate school districts. All third-grade students were invited to participate in the study. Those students who returned a signed parental consent form were included. The students at one of these schools comprised the control group while the other school's students served as the experimental group. All participants were given the WTAS (pre-test) and a short demographic questionnaire to complete.

Members of the experimental group were taught relaxation techniques by one of the investigators. Training took place at school, two days a week, over a five-week period. On training days, the participants either stayed in their classrooms or moved to another location within the school building. During training, relaxing music was played in the background. While in training, participants in the experimental group were taught

both deep breathing exercises (i.e., elevator breathing) and progressive muscle relaxation (i.e., guided relaxation for children).

Elevator Breathing. Elevator breathing (Teel, 2005a) was one of the interventions utilized in this study to help children relax quickly when facing stressful situations. Breathing techniques are very important for inducing relaxation. Through training, an individual's breathing will automatically slow down and deepen, bringing more oxygen into their bodies and helping them to relax. Diaphragmatic breathing, or "belly breathing," is a particularly helpful way to release mental and physical stress and tension. It calms the mind and induces a state of relaxation in one's body. Elevator breathing incorporates visualization for children. Participants practiced breathing exercises for five minutes at each of the 10 sessions.

Guided Relaxation for Children. Guided relaxation for children (Teel, 2005b) was also utilized in this study to help manage levels of anxiety that children may be experiencing. Progressively relaxing each of the muscle groups along with deep breathing is intended to promote relaxation and counter the physiological components of arousal by first tensing the major muscle groups then relaxing those muscles. The investigator would instruct the students to get comfortable (e.g., lying down, closing eyes, or resting against a wall) and then began reading the relaxation script to the participants while incorporating the deep breathing. This portion of the experiment took approximately 8 to 10 minutes at each session.

At the conclusion of the five weeks, all participants in both the experimental and control groups completed the Westside Test Anxiety Scale (post-test).

Data Analyses

In an attempt to ameliorate the effects of large differences in sample sizes between the experimental and control groups ($N = 124$ and $N = 53$, respectively), the experimental group was partitioned into two subgroups using the SPSS random selection routine. The two subsamples consisted of 29 females, 27 males and 32 females, 36 males, respectively. The control group consisted of 28 females and 25 males. Pre- and post-test differences were analyzed for each experimental subgroup as well as for the control group. Post-test differences between each experimental subgroup and the control group were also conducted. Both pre- and post-test differences, as well as differences between the experimental groups and the control group were tested using t -test analyses.

Results

Table 1 contains the separate descriptive and inferential statistics for the pre- and post-test differences for each of the groups (i.e., both experimental subgroups and the control group). For both experimental subgroups, significant differences between the pre-test and post-test means were found ($t(55) = 2.24, p = .029$ and $t(67) = 4.07, p = .000$, respectively). These results indicated that the relaxation intervention had a significant effect in reducing test anxiety. By contrast, no significant difference was found between the control group's pre- and post-test means ($t(52) = 0.39, p = .699$). These findings supported the first two hypothesis tested in this study. Post-test differences between the respective experimental subgroups and control group yielded non-significant results ($t(107) = -0.79, p = .431$, and $t(119) = -0.57, p = .573$, respectively). These findings did not support the third hypothesis tested in this study.

Table 1

Pre- and post-test means, standard deviations, t- values, and coefficient alphas for experimental and control groups

Group	Mean / sd (pre-test)	Mean / sd (post-test)	t-value (pre – post)	df	alpha
Experimental 1	2.5 (.89)	2.3 (.88)	2.24 *	55	.88
Experimental 2	2.8 (.87)	2.3 (1.02)	4.07 *	67	.89
Control	2.4 (.84)	2.3 (1.17)	0.39	52	.75

Note. * $p < .05$.

Discussion

The submitted study explored the effects of relaxation techniques on test anxiety in elementary school students. The analyses in this study yielded mixed results. The present results supported the first hypothesis. The experimental group was taught two relaxation techniques, deep breathing and muscle relaxation after which the experimental group showed a significant decrease in anxiety. In contrast, a group of their peers, receiving no relaxation training, conveyed no significant difference in test anxiety. The results support earlier findings that relaxation techniques can be learned and utilized successfully by young children (Zaichkowsky & Zaichkowsky, 1984; Lohaus and Klein-Hessling, 2003). Thus, the first two hypotheses presented above were supported. Students receiving relaxation training achieved a significant reduction in test anxiety scores, and students receiving no training demonstrated no significant decrease in test anxiety scores.

By contrast, the third hypothesis presented in this study was not supported by the findings. No significant difference in test anxiety scores between the experimental and

control groups was found. In an attempt to avoid practice effects and the influence of demand characteristics we used an experimental group comprised of third grade students that attended a different school district than the students in the control group. Therefore, we think it is highly unlikely that communication between the two groups and competition between the members had any effect on the study, and even more unlikely that they would be able to guess that our study was predicting a statistical interaction and artificially produce one (Heppner, Linlighan, & Wampold, 1999).

Interestingly, the participants were faced with high-stakes testing when they were trained in the relaxation techniques. Some limitations of the present research are worth noting. While the intent was to conduct the study in two schools of similar cultural effect, it is still likely that several environmental factors within each respective school had differing effects on test anxiety. Due to the pressure to perform and perceived importance of high-stakes testing, students' mental states and sense of emotional stability may become adversely affected (Spielberger & Vagg, 1995; Paul, Elam, & Werhulst, 2007). Through a follow-up interview with the control group's principal and teachers, we speculate that the pressure to perform in the learning environment that has been created at the site of the control group, by parents, teachers, and administrators, may not have been as heightened as the pressure created over high-stakes testing at the site of the experimental group (Maleske, K., personal communication, May 13, 2009). Likewise, the emotional climate created at one school regarding high-stakes testing may have contrasted with that of the other elementary school. The experimental group is located in a school district that is in close proximity to a University. The experimental group therefore, may be in an atmosphere that has more

pressure to perform due to the presence of higher academic achievement. In fact, it is reported that 33.1 % of the population in the city of the experimental group have a bachelor's degree or higher (city-data, 2009). From this we can infer that a higher percentage of children in the experimental group could be children of University faculty and may experience more pressure to perform and prepare for a college education. In addition, a part of the control group's school culture is to celebrate state-mandated examinations (Maleske, K., personal communication, May 13, 2009). These environmental factors should be considered when selecting comparison groups.

Conclusion

High-stakes testing appears to be the 'norm' in the American public schools and children need interventions to combat the adverse behavioral, cognitive and physiological effects (Carter, Williams, & Silverman, 2008). The results of the present study along with previous work demonstrate that children can benefit from relaxation training (Zaichkowsky & Zaichkowsky, 1984). These findings may have implications for psychological intervention. United States Secretary of Education, Arne Duncan (2009) spearheaded the "Race to the Top" competition where he challenged states to devise educational reform plans. Based on these proposed reforms it is suggested that data systems, linking teacher evaluations to student gains, and buy-in from districts around the state are key elements to be considered when making an educational reform plan (The Christian Science Monitor, 2009). Despite these proposed reforms it is unlikely that high-stakes testing will be eliminated or significantly reduced in the near future (No Child Left Behind Act, 2002; Triplett & Barksdale, 2005). Schools can play a role in addressing test anxiety by incorporating intervention programs such as relaxation

training into the curriculum (Cheek, Bradley, Reynolds, & Coy, 2002). School counselors and teachers can have a scheduled time of the day to teach students how to respond to physiological and psychological responses to anxiety and stress through the utilization of relaxation training. The interventions discussed in this article are brief and not difficult for children to learn. These interventions and techniques can be implemented in the academic environment to mediate anxiety and can be generalized to life skills. Another implication of this research is to alert administrators, parents, and teachers that children are experiencing adverse effects from having pressure to perform and that there is a need to address this with children (Cheek, Bradley, Reynolds, & Coy, 2002). Principals, administrators, and teachers can model for children how to respond to stress and anxiety and thus impact children's responses to pressure and anxiety. If performance anxiety is not addressed in elementary school, it could continue through the adult years and impact quality of life and career paths (Miller, Morton, Driscoll, & Davis, 2006). Lastly, the tone that the school sets can have an effect on student performance and anxiety, and ultimately their love for learning (Triplett & Barksdale, 2005). A warm and energetic environment can elicit greater success and psychological equilibrium in children.

These findings suggest a number of different possibilities for future research. The potential for parents' and teachers' anxiety levels, as well as the overall atmosphere of the school to influence children's perceived levels of anxiety, is a promising area of future research. Principals have the responsibility to lead their school to success on high-stakes testing in order to continue to receive school funding. The principals in effect, give teachers the responsibility to promote desired results on high-stakes testing.

As a result, teachers experience pressure to produce high test scores which relates to their job security. Consequently, this causes teachers to feel disempowered, anxious, and alienated (Triplett & Barksdale, 2005). It is important for future research to determine whether children are impacted by the levels of stress and anxiety that they perceive in their principals and teachers. Parents' and teachers' expectations may correlate with students' anxiety. Future research using measures to empirically investigate the anxiety levels of teachers, principals and parents are needed to understand the impact it has on school children.

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