

TEST ANXIETY: AN EDUCATIONAL INTERVENTION

by

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I would like to dedicate this thesis to my husband Ryan and my daughter Camden Rae. Without your endless love and support, my journey through graduate school would not be possible. You two keep me going and motivate me to be the best person I can be. I love you more than words could ever express.

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## **ABSTRACT**

The purpose of the current study was to examine the effectiveness of an intervention targeted at reducing test anxiety while improving test-taking skills and study strategies. Specifically, the current study explored the effectiveness of the intervention with a population of university students identified as having learning difficulties through the university's center for students with disabilities. Although not statistically significant, the current study did find meaningful differences (greater than 1 SD) among Test Anxiety Inventory pretest and posttest scores for 2 of the 3 participants in the study after 4 weeks of intervention, all participants' self-reported Total TAI scores were lower following intervention. The current study did not find an increase in self-reported learning strategy usage from pre-test to post-test among the participants. Additionally, all scores on the summative evaluation were positive. Specifically, participants strongly agreed that they had learned something new, it would benefit them in the future, they were happy with the sessions overall.

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## **CHAPTER I**

### **Introduction**

#### **Overview**

When students enroll in college it is understood that they will undergo testing in order to measure how much they are learning. In fact, almost all schools use formal testing situations and examinations in order to assess students' progress throughout the years (Rothman, 2004). Unfortunately for some students, the high-stakes decisions that are made based on these formal tests (i.e., acceptance to college, financial aid, military positions, etc.) can put so much pressure on them that they develop test anxiety (Damer & Melendres, 2011). Test anxiety can in some cases be facilitating, but it also can range from mildly unpleasant to debilitating, especially for students with learning disabilities (Cohen, Lufi & Okasha, 2004). As long as testing continues to be the primary measure of achievement and learning, it is critical that people find successful ways to manage and channel their test anxiety. The purpose of this study is to examine an intervention to reduce test anxiety and improve grades among a sample of students with diagnosed learning difficulties.

#### **Definition of Test Anxiety**

The concept of test anxiety has been present in scientific literature since the early 1950's (Mandler & Sarason, 1952) and has been an important area of study since its inception (Bonaccio & Reeve, 2010). Test anxiety has been defined as "the negative affect, worry, physiological arousal, and behavioral responses that accompany concerns about failure or lack of competence on an exam or similar evaluative situation" (Matthews, Zeidner, & Roberts, 2006, p. 175).

In order to understand why some students have high levels of test anxiety both leading up to and occurring during a testing situation (Acka, 2011), many theories have been developed to explain what comprises test anxiety. Although the general consensus is that there are different kinds of test anxiety brought on by different triggers, there are a few main components that have emerged from the literature (Damer & Melendres, 2011).

Anxiety can be found in two forms: (a) trait anxiety; and (b) state anxiety (Schmukel & Egloff, 2004). Trait anxiety is associated with a person's personality and it has been shown to be stable over a lifetime (Schmukel & Egloff, 2004). In contrast, state anxiety can vary greatly from situation to situation (Schmukel & Egloff, 2004), and has been defined as the actual experience of anxiety in a particular situation (Bertrams, Englert, & Dickhäuser, 2010). Past research has found that although it seems like a person's levels of trait anxiety should predict their levels of state anxiety in a stressful situation, this is not always the case. Some studies suggest that self-control is a moderator between the two types of anxiety (Bertrams et al., 2010). Huberty and Dick (2006) suggest however, that a person with high trait anxiety might be more likely to experience state anxiety as a result of viewing situations as more dangerous than a person with low trait anxiety.

Two of the components of test anxiety are emotionality and worry (Bembenutty, 2009; Bonaccio, Reeve & Winford, 2011; Damer & Melendres, 2011). Emotionality refers to the actual physical response that occurs during test anxiety; worry refers to the cognitions and thoughts that the student experiences during a testing situation (Bonaccio et al., 2011). The physical and emotional effects of test anxiety can, in manageable amounts, push a person to perform better (Daly, Chamberlain, & Spalding, 2011). In

higher amounts, these aspects of anxiety can facilitate off-task and distracting behavior (Bonaccio et al., 2011). In extreme cases, they can be debilitating and even pose health risks to people who cannot overcome their test anxiety (Damer & Melendres, 2011).

### **Prevalence**

Although general anxiety is among the most common mental health problems in the United States (Barlow, 2002), test anxiety is a more specific form of anxiety in which a person feels worried and negatively aroused when he or she being evaluated in a formal situation (Weiner & Carton, 2011). As a result of the increased frequency of formal evaluations being used for high stake decisions (Cohen, Ben-Zur, & Rosenfield 2008), test anxiety may be present within many students from grade school through post-secondary school levels (Peleg, 2009).

There are several different estimates for the prevalence of test anxiety, with numbers ranging from 10%-30% among high school and university students (Damer & Melendres, 2011; Peleg, 2009; Weiner & Carton, 2011). Damer and Melendres found that 29.1% of undergraduate university freshmen reported feeling heavily burdened by their school demands and this increasing pressure on students may have an impact on test anxiety. In a recent meta-analysis, Nelson and Harwood (2010) found that students with learning disabilities were significantly more likely to experience higher levels of test anxiety than students without a learning disability.

### **Factors Related to Test Anxiety**

Some studies report a relation between age, gender, ethnic, socio-economic factors and test anxiety rates (Putwain, Woods & Symes, 2010). For example, a study by Putwain (2007) found that the combination of age, gender, ethnic, and socio-economic

factors accounted for 9% of the variance of test anxiety. Several studies have found that females rate themselves as more test anxious than males (e.g., Putwain, 2008; Sena, Lowe, & Lee, 2007). Additionally, students of a lower socioeconomic background have been found to rate themselves as more test anxious than students of a higher socioeconomic background (Putwain, 2008).

### **Impact of Test Anxiety**

Some research conducted on the impact of test anxiety has reported that higher rates of test anxiety can lead to lower performance, although some studies have found no correlations (Cohen et al., 2008). When test anxiety is present in manageable amounts, the presence of test anxiety can act as a motivator, increasing performance (Daly et al., 2011). Bonaccio and colleagues (2011), however, found that extreme levels of test anxiety could have a negative impact on performance. Specifically, in their study on the predictive validity of test anxiety, they found that in any amounts less than extreme, test anxiety did not have a significant impact on cognitive test performance such as an IQ test; however, when a person experienced extreme levels of test anxiety, his or her performance on a cognitive test was lower compared to when he or she did not report extreme levels of anxiety. Similarly high levels of test anxiety have been shown to negatively affect performance in work settings (e.g., Ackerman & Heggstad, 1997, Bonaccio & Reeve 2010).

Test anxiety also can have negative academic consequences. Similar to the research on performance, some studies have reported that higher levels of test anxiety can result in lower grade point averages in schools (e.g., Chapell et al., 2005). For example, Bembenuddy (2009) found that college students with high levels of test anxiety had lower

grades in their classes compared to students who reported low levels of test anxiety. In a study by Wachelka and Katz (1999), a reported 20% of students with test anxiety drop out of school as a result of their academic struggles.

In addition to the academic impacts, test anxiety has been found to negatively relate to self-esteem (e.g., Peleg, 2009, Thomas & Gadbois, 2007), as well as mental and physical health (Damer & Melendres 2011). For example, Damer and Melendres noted that test anxiety was correlated with depression and feelings of hopelessness. High levels of test anxiety have been linked to sickness as a result of a weakened immune system (Borella et. al., 1999). Further, high levels of test anxiety have been associated with increases in blood pressure with the potential for future damaging health consequences (Conley & Lehman, 2011).

### **Relation Between Test Anxiety and Learning Disabilities**

Some researchers have noted a relation between test anxiety and a history of learning difficulties (e.g., Peleg, 2009; Sena et al., 2007). For example, Peleg (2009) found that among students with a learning disability, test anxiety was significantly higher when compared to rates of test anxiety among students without a history of learning disabilities. Sena and colleagues reported that because students with learning disabilities were more likely to have negative testing experiences such as failing grades, they may be more test anxious than a student without a history of learning difficulties. Test anxiety has been identified as a major obstacle many students with learning disabilities face (Cohen et. al., 2004).

For students with learning disabilities, the consequences of test anxiety may be more severe (e.g., Holzer, Madaus, Bray, & Kehle, 2009). For example, the research

indicates that students with learning disabilities are less likely to use test-taking strategies (i.e., reading the questions first to know what to read for) than their peers without learning disabilities, and are considered to be less test-wise (Holzer, Madaus, Bray & Kehle, 2009). Test anxiety among students with learning disabilities has been linked to academic performance problems as well as more behavior problems and hostile feelings about school, as compared to students with no identified learning disability (Peleg, 2009). Specifically, students with learning disabilities are more likely to report feeling more stress, nervousness, frustration, helplessness, and uncertainty about timed tests than students without learning disabilities (Holzer et al., 2009).

### **Evaluating Interventions for Test Anxiety**

Research on test anxiety in the general school population has suggested that lessening test anxiety in isolation does not improve student's test scores (Damer & Melendres, 2010). Damer and Melendres note that one reason why some students have test anxiety is a result of poor study skills and not having the strategies to learn the material effectively. In a meta-analysis, Ergene (2003) found that the interventions that yield the largest effect sizes for students include components that address both the test anxiety (either behavioral or cognitive) and specific learning strategies (such as study skills or test-taking strategies). According to this meta-analysis, behavioral and cognitive approaches to decreasing test anxiety alone had large effect sizes ( $d = 0.80$ ) and moderate effect sizes ( $d = 0.63$ ), respectively. When an intervention targeted skills alone (i.e., study skills or test-taking strategies), a lower effect size ( $d = 0.42$ ) was found. However, when the approaches were combined, high effect sizes were reported. For a combination of behavioral therapy and skills training a large effect size ( $d = 1.10$ ) was reported. The

largest effect sizes were reported for a combination of cognitive therapy and skills training ( $d = 1.22$ ). Interestingly, a combination of all three (behavioral, cognitive, and skills training) resulted in a lower effect size ( $d = 0.72$ ) than cognitive therapy and skills training.

In addition to the intervention approach, the meta-analysis also examined the type of intervention technique. The techniques that produced the largest effect sizes were cognitive restructuring ( $d = 1.11$ ), anxiety management training ( $d = 0.97$ ), and systematic desensitization ( $d = 0.90$ ). Additionally, when researchers combined skills-focused approaches (specific learning skills and strategies) with cognitive techniques, a large effect size also was produced ( $d = 1.07$ ). Some techniques that produced moderate effect sizes include rational-emotive therapy ( $d = 0.54$ ), stress inoculation training ( $d = 0.53$ ), and relaxation training ( $d = 0.52$ ). The techniques that produced small effect sizes were study-skills training alone ( $d = 0.28$ ) and cognitive-behavioral modification ( $d = 0.08$ ). These data suggest that the most effective type of intervention was a combination of a skills-focused (i.e., study skills, test-taking strategies, etc.) and cognitive techniques (i.e., cognitive restructuring).

Another component the meta-analysis addressed was intervention design. The meta-analysis looked at studies that involved group therapies only, which produced a moderate effect size ( $d = 0.67$ ), individual therapy only, which produced a small effect size ( $d = 0.34$ ), and a combination of group and individual therapy, which produced a large effect size ( $d = 0.84$ ). There were six options for time in therapy addressed in the meta-analysis: (a) 0-60 minutes, which produced a small effect size ( $d = 0.34$ ); (b) 61-200



minutes, which produced a moderate effect size ( $d = 0.52$ ); (c) 201-350 minutes, which produced a large effect size ( $d = 0.91$ ); (d) 351-500 minutes, which also produced a large effect size ( $d = 0.79$ ); (e) 501-650 minutes, which produced a moderate effect size ( $d = 0.51$ ); and (f) 651 minutes and more, which also produced a moderate effect size ( $d = 0.43$ ). These data suggest that the optimal amount of time spent for the most effective intervention falls between 201-350 minutes.

The meta-analysis also investigated the differences between the client education levels as well as the differences between published and unpublished studies. The effect sizes of client education levels were different, ranging from smallest being high school ( $d = 0.25$ ) to largest being college/university with a moderate effect size ( $d = 0.68$ ). This suggests that there will be more of an effect with a college-aged population when implementing an intervention. In addition, the study looked at the differences between effect sizes in published and unpublished studies, and it was reported that there were no statistical differences in the effect sizes between published and unpublished studies, which eliminates the threat of publication bias in this meta-analysis.

Ergene's (2003) meta-analysis results suggest that there were many different components that influence the difficulties that students with test anxiety report feeling. This evidence suggests that students might not be prepared for tests as a result of not having the skills to study effectively and efficiently, which in turn caused emotional stress when the time came to take the test. The most effective interventions were those that helped the student study and taught organizational strategies, as well as how to deal with the worry and anxiety that they felt immediately before and during an actual testing session. This included both changing the way they thought about the testing situation as

well as learning how to regulate the physiological responses that their bodies had to a stressful situation. The optimal intervention according to this meta-analysis would be a combination of cognitive restructuring and study-skills lasting between 201-350 minutes and including both group and individual components with college students. Ergene included five specific recommendations for a successful intervention: (a) provide studying and test-taking skills; (b) provide the opportunity to watch another person take a test; (c) teach the participants how to self-monitor as well as strategies for self control; (d) work on paying attention to the task in front of the participant and not get distracted by irrelevant factors; and (e) teach relaxation strategies.

### **Research Related to Learning Strategies**

In addition to the research done on factors related to test anxiety, some studies have looked at the impact of lacking specific learning strategies on students' achievement. More specifically, students with a documented learning difficulties tended to rate themselves as less strategic academically than their peers without any documented learning difficulties (Meltzer, Katzir, Miller, Reddy & Roditi, 2004). This perception has been found to extend to teachers of students with learning disabilities, who not only perceived the students as less strategic than students without a learning disability, but teachers also perceived these students as putting less effort into their schoolwork (Meltzer et al., 2004).

The research on specific learning strategies clusters strategies into four main types: (a) repetition/rehearsal; (b) procedural/organizational; (c) cognitive based; and (d) meta-cognitive based (Gettinger & Seibert, 2002). Repetition and rehearsal strategies involve simple tactics such as rereading and rehearsing information. This technique has

been found to be helpful for short term or small amounts of information, but overall research has deemed this strategy to be of little use for students (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013; Gettinger & Seibert, 2002). Procedural and organizational types of strategies that involve efficient use of time, organized materials, and study routines have been found to have more utility for students, especially those relating to time management and use of study environment skills (Burlison, Murphy, & Dwyer, 2009). Cognitive study skills that involve techniques to learn about the content of the material have been shown to be effective through various techniques such as activating prior learning, elaboration, self-explanation, generating questions about the material, and other similar strategies (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013; Gettinger & Seibert, 2002; Harvey & Chickie-Wolfe, 2007). Meta-cognitive skills address how aware the student is of his or her learning. Studying strategies can be taught explicitly by looking at checklists or asking questions such as “Am I ready for this test?” and “What is my plan for studying?” These skills have been shown to be employed by good learners, and are important for studying effectively (Gettinger & Seibert, 2002; Harvey & Chickie-Wolfe, 2007).

### **Examples of Specific Interventions for Test Anxiety**

Dundas, Wormnes, and Hauge, (2009) incorporated some of the elements found to be important in the meta-analysis performed by Ergene (2003). In their study, 36 participants at a university in Norway completed an intervention targeting test anxiety. Their ages ranged from 19-46 years old ( $M = 26$ ,  $SD = 7$ ). The majority were women ( $n = 27$ ) with only 9 of the participants being men. The intervention took place over several weeks.

The intervention presented to the participants consisted of three sessions in a group format. The first session was 3 hours and included 12 group members (3 groups total), while the second and third sessions lasted for 2 hours and included 6 group members, broken down into multiple small groups to include all participants. In the initial session, the authors of the study engaged in cognitive behavioral therapy with the participants and asked them to both identify and change the negative thoughts the participants felt in a testing situation. They also asked the participants to engage in positive thinking (to either gain confidence or calm the physiological arousal associated with anxiety) when in a testing situation.

The data from this study indicated that the participants thought that the intervention was helpful. After the intervention was complete, the participants released their exam grades to the researchers. There was one A grade and two failing grades, with the other grades falling somewhere in between. When interviewed, 30 out of 36 participants stated that on a scale of 1-100 the intervention was at least 50 or better in terms of being useful during their exams. A majority of the students reported that the intervention helped them to cope with their symptoms of anxiety based on their own self-report of anxiety levels,  $t(df=33) = 2.04, p < 0.05$ . A strength of this study was that the participants found it to be a helpful intervention and learned new ways to manage their anxiety in new situations. Many elements of the intervention match the findings reported from the meta-analysis performed by Ergene (2003), such as including a cognitive behavioral element, skill training such as increasing self-monitoring abilities, practicing how to relax, and working in a group setting.

Although the participants rated the intervention as helpful, there were some limitations in the interpretation of this study. One limitation was that the study did not include a normative measure of test anxiety, so the degree of anxiety symptoms among the students was unknown. Although it was possible to compare the participants' reported levels of anxiety, there was no way to compare the self-reported levels to test anxiety in the general population, which may limit generalizability. Additionally, although the results state that there was one A and two F grades on the exams, there were no previous grades to compare the scores to. An additional limitation to the study was the lack of a control group to compare the effects to. Another limitation was that the interviews and information were all translated into English when the study was near completion, so it is possible that some information may have been lost in translation.

Some of the elements of the intervention differed slightly from what the meta-analysis by Ergene (2003) suggested as most effective. For example, Ergene recommended a time span between 201-350 minutes in therapy, as more time tended to produce a smaller effect size. Other examples included not adding an individual element in addition to the group work, and the study also did not address study skills or test taking strategies.

In a study by Nelson and Knight (2010), the influence of optimism in reducing test anxiety in students was explored. Their study included 118 undergraduate students enrolled in a psychology course. Of those, 77 participants were women and 41 were men. The intervention involved randomly assigning half of the class to a *positive* condition, and half of the class to a *control* condition before taking a pop-quiz. Those students in the *positive* condition were asked to write about a time in their life that they

conquered a challenge, feeling joy and happiness. The students in the *control* condition were asked to write about their typical mornings.

After writing, participants filled out shortened adaptations of the *Positive and Negative Affect Scale* (PANAS) to quantify the positive and negative emotions they felt, the *Life Orientation Test* (LOT) to rate the levels of optimism the students had about the quiz, and 20 adapted items taken from the *Test Anxiety Inventory* (TAI) to determine how anxious they were about the quiz. They also completed a Likert-type survey about how confident they felt about the quiz and their score on it.

The results of the study indicated that overall the intervention was effective in reducing test anxiety. The authors report that the students in the *positive* group showed a more optimistic attitude about the quiz ( $M = 3.23$  on a 5 point scale) than the students in the *control* group ( $M = 2.50$ ),  $F(1, 116) = 40.45, p < .01$ . In addition, the students in the *positive* group reported lower test anxiety symptoms from the modified *Test Anxiety Inventory* ( $M = 1.70$  on a 4 point scale) compared to the students in the *control* group ( $M = 2.19$ ),  $F(1, 116) = 15.96, p < .01$ . The *positive* group ( $M = 9.55$ ) also had a higher test score average than the control group ( $M = 8.29$ )  $F(1, 116) = 9.06, p < .01$  on the 15 point pop quiz. The results of this study suggest that priming students to be optimistic can help lessen the impact of test anxiety on grades.

There were several limitations in this study. Although the data indicate that the intervention was helpful in reducing the symptoms of test anxiety, both groups had low scores on the pop quiz (64% for the *positive* group and 55% for the *control* group). The fact that the *positive* group still obtained low quiz scores was consistent with Ergene's (2003) meta-analysis results that reported the biggest effect size from studies that

addressed both anxiety and specific learning strategies. An additional limitation of this study was a design flaw. Although the researchers measured the participants' levels of test anxiety, there was no pre-assessment measure of test anxiety prior to the writing exercise. Another major limitation was that only high levels of test anxiety have been found to impact test performance, and a 15-point pop quiz in class may not have been enough of a stressor to trigger high levels of test anxiety.

Holzer and colleagues (2009) developed an intervention that targeted both test anxiety and performance by teaching a test-taking strategy. The participants were 5 undergraduate students enrolled in university classes, 2 of which were women and 3 were men. The students all had a documented learning disability and were registered with the university as having a specific learning disability. The students all completed the *Test Anxiety Inventory*, the *PIRATES* (a test-taking strategy program) pretest, and a performance prompt that was taken from the *GRE* exam. To qualify, the students had to score above the mean on the *TAI*, show non-mastery of the *PIRATES* strategy (less than 90% knowledge), and score 80% or less correct on the performance prompt.

The study included a multiple baseline design and collected data for 5 weeks for baseline, 2 weeks for intervention, and followed up at 2 weeks post intervention. The participants completed the practice prompts during all phases and were scored based on: (a) % correct; (b) % strategy used; (c) time on task; and (d) extended time used. The participants were taught the *PIRATES* strategy using the directions in the manual during 3-4 (based on achieving mastery) 1-hour sessions, one-on-one with the researcher.

During the intervention phase, the participants completed 5 performance prompts over 2 weeks. Two weeks past intervention they completed 4 performance prompts, the

*Test Anxiety Inventory* again and a customer satisfaction survey for the *PIRATES* system. The researchers found that often the participants used the strategy more immediately after the intervention concluded, however, strategy use dropped slightly at the maintenance follow-up (23-30% strategy usage at baseline, 63-94% at intervention, and 62-96% usage at follow-up). Four participants of the 5 improved their performance on the performance prompts and 1 participant's performance decreased after the intervention. Four of the 5 also had lower test anxiety scores (55 pretest v. 53 posttest; 49 pretest v. 40 posttest; 44 pretest v. 27 posttest; and 57 pretest v. 48 posttest), although 1 participant's *TAI* scores went up significantly from 59 points to 64 points. Time used went down for 1 participant, up for 1 participant, and remained constant for the other 3 participants.

This study showed evidence for targeting study skills in a sample of students with learning disabilities. However, the data showed that this specific strategy did not work for every student, and one limitation was the small sample size and the specificity of the training strategy/performance prompts. Although there needs to be more evidence on the generalizability of these results, the design of this study was strong and thorough in the inclusion of a multiple baseline design and pre- posttest measures. This study suggests that teaching specific learning strategies to students with learning disabilities may help to improve performance as well as reduce test anxiety for some students. Although this study did not involve a specific intervention on reducing test anxiety, it did show reduced scores on the *Test Anxiety Inventory* for 4 of the 5 participants.

This study met several of the components for a successful intervention suggested by Ergene's meta-analysis, but had several limitations as well. Of the five specific suggestions from Ergene, this study met three and lacked only providing the opportunity



to watch another person take a test and teaching relaxation strategies. The intervention took place over either 180 or 240 minutes depending on the student, which falls short of the most effective intervention time for the students who needed less time to master the *PIRATES* system. Another limitation related to the findings from the meta-analysis was the use of intervention training provided one-on-one with no group components. The biggest limitation of this study in comparison to the meta-analysis was that the study was missing a cognitive-behavioral component in the intervention.

Damer and Melendres (2011) developed an intervention that targeted both test anxiety and study skills. The participants were 15 undergraduate students and 2 graduate students enrolled in a university with ages ranging from 19-41 ( $M = 24.8$ ,  $SD = 8.8$ ). Of the participants, 13 were women and 4 were men. Before they began the intervention, participants completed the Test Anxiety Inventory (TAI), where the mean score was found to be of 64.3 ( $SD = 7$ ). The range of possible scores on the TAI is 20-80, and the mean score for undergraduate students is  $M = 36$  ( $SD = 10$ ).

Participants were recruited through advertisements online through their school's counseling center website, flyers, and through emails from advisors. There was no screening for a history of learning disabilities included. The intervention consisted of four sessions each lasting 1.25 hours. Each session accommodated between 6 and 10 participants in a small group format. During the sessions, participants periodically broke down into pairs. This addressed the individual factor recommended by Ergene's (2003) meta-analysis. Within the groups, the intervention focused on cognitive restructuring, learning about anxiety, coping and management skills, study skills, as well as relaxation techniques.

Session 1 started with an introductory discussion. Members introduced and shared some information about themselves (i.e., major in school, fun facts, etc.). They then broke down into pairs to discuss their experiences with test anxiety with their partners. The group then discussed the ways that members experienced and coped with test anxiety differently. After the introductory period, the session leader showed the participants a cognitive behavioral diagram of anxiety and explained some of the snares and spirals that can happen during a testing situation. They also were showed a bell curve of anxiety to demonstrate that anxiety can be positive and helpful up to a certain point to introduce the goal of learning to channel anxiety into something more helpful. Finally, participants were presented with some of the common errors in thinking (catastrophizing, black and white thinking, etc.), and then some ways to challenge those kinds of thoughts. The participants were given homework that involved completing a worksheet monitoring their thinking errors.

Session 2 began by having the members talk about their homework. The members of the group were asked to help think of positive thoughts to replace the negative thoughts that their group mates had experienced. The main focus of the second session was to introduce good study skills and habits. The leaders talked about how poor study skills could cause a downward spiral when a student does not feel adequately prepared for a test. Time management skills were covered using the Time Management Matrix, which required participants to prioritize tasks based on importance and urgency. Next, group leaders asked participants to identify the study skills and learning facilitation skills that would be most helpful for them (i.e., a quiet studying environment, teaching information to other students, taking practice tests, etc.). Finally, they were introduced to

Bloom's Taxonomy of Learning Objectives in order to help them understand the expectations that college professors have of the people enrolled in their courses. The homework required participants to identify the actual skills and strategies that they thought would be best to include in their day-to-day activities.

Session 3 involved teaching relaxation strategies to the participants including breathing exercises, mindfulness strategies, and visualization techniques. Specifically, participants were asked to picture themselves in a stressful testing environment and then to picture themselves overcoming the anxiety and having a successful outcome. Homework for this session involved practicing the techniques that they learned in the session and selecting the best one(s) for them.

Session 4 involved specific test-taking skills and strategies (i.e., eliminating unnecessary stress before testing, eating breakfast, looking at the questions first, pacing, etc.). The group members were asked to share their strategies and discuss what worked best for them. They were also provided information about resources on that campus such as workshops and tutors. The participants also were exposed to a fake exam where they had the opportunity to practice all of their new skills, and then discuss what it was like with the other members. The session concluded by having a group discussion about what the participants learned, what was most helpful, and what they thought that they would take from the intervention.

The students who participated in this study had a strong positive reaction to the intervention. The mean score on the *Test Anxiety Inventory* for the group dropped from 64.3 ( $SD = 7$ ) to 46.7 ( $SD = 8.1$ ). Participants reported that they learned new ways to face and manage their test anxiety on a Likert-type survey about the intervention's

effectiveness. The intervention received such strong reviews that it was adopted into the academic help programs the university offered to all students. In many ways, this study addresses most of the recommendations set forth in Ergene's 2003 meta-analysis. In addition to combining cognitive therapies with study and test taking skills, the intervention contained each of Ergene's five specific recommendations: (a) study skills and test taking skills; (b) opportunity to observe somebody else taking a test; (c) increase the ability to self-monitor; (d) practice with directing attention at the current task and not distractions; and (e) relaxation techniques for tests. It also contains both group and individual elements and stays within the recommended time frame for the most effective interventions.

The study was carried out over a 4-week period, and although there was a significant drop in the overall mean of *Test Anxiety Inventory* scores, the authors did not provide data on the participants' grades throughout the study. In order to fully understand the results of the intervention it would be helpful to know if students' exam grades improved in addition to their symptoms of test anxiety decreasing.

In relation to the meta-analysis, this study had many strengths. The intervention included both group and individual components, a cognitive component, study skills training, and 240 minutes in therapy, all of which had a large effect size in the meta-analysis. The study also met each of the five specific suggestions set by Ergene in the meta-analysis.

### **Summary**

Test anxiety is a problem for many college students (Peleg 2009). Combined with a lack of effective study skills, test anxiety may impact a student's ability to perform

during stressful situations, resulting in lower test scores and GPAs (Bembenutty, 2009; Chappell et al., 2005). In addition, students with a preexisting learning disability have been found to be more likely to experience test anxiety than students with no learning disabilities (Peleg 2009). Further, test anxiety has been reported to be one of the biggest struggles for students with learning disabilities (Cohen et. al., 2004).

Although there have been several studies that have looked at appropriate interventions for students with test anxiety (e.g., Damer & Melendres 2011; Dundas, et. al., 2009; Nelson & Knight 2010), few have addressed the effectiveness of test anxiety interventions for students with identified learning difficulties (e.g., Kovach, Wilgosh, & Stewin 1998).

The literature has provided some insight into what an effective intervention for test anxiety reduction might include (Ergene, 2003). Some important factors include the type of intervention (meta-analysis suggests cognitive and skill-focused education), the specific intervention techniques (i.e., cognitive psychoeducational and skills training), the intervention modality (a combination of group and individual is best), time in therapy (optimal time is between 201-350 minutes), and client education level (largest results with college students).

Although there has been research that has shown effectiveness in reducing levels of test anxiety, there has not been enough research done to examine the relationship between teaching study skills/test-wiseness in conjunction with reducing test anxiety. If a combination of skills focused training and test anxiety reduction could potentially improve students with learning disabilities' study skills, it could potentially impact their grades and overall academic careers positively.

**Purpose.** The purpose of the current study was to determine whether an intervention targeted at reducing test anxiety while improving test-taking skills and study strategies was effective with a population of students with an identified learning difficulties. An intervention that was found to reduce levels of test anxiety in students and teach specific skills, including relaxation techniques, time management and anxiety education, was combined with an intervention for test-wiseness and study strategies. Study strategies included elaboration activities and note-taking. These studies were structured to specifically accommodate the recommendations established in Ergene's (2003) meta-analysis on test anxiety interventions.

**Hypotheses.**

*Hypothesis 1.* This study predicted that participants would report a lower mean score on the *Test Anxiety Inventory* from the pretest to the posttest. It was hypothesized that students with identified learning difficulties would initially have a higher mean *Test Anxiety Score* before completing 4 weeks of intervention, and a lower mean score following the intervention's completion.

*Hypothesis 2.* This study predicted that strategy usage would increase after the 5 sessions. Specifically, it was hypothesized that the skills addressed directly in the intervention of Elaboration, use of Time and Study Environment, and Organization would increase as measured by the *Motivated Strategies for Learning Questionnaire* from the pretest and posttest.

## CHAPTER II

### Method

#### Participants

Participants were recruited a midsized, southeastern university center for students with disabilities. Four students were recruited to join the study. Of the 4 students initially recruited, 3 students were present at each of the 5 sessions and included in the analysis. Two of the participants were women age 20-21 years old, and one participant was a man who was over 21 years of age.

#### Measures

**Test Anxiety Inventory.** The *Test Anxiety Inventory* (TAI) is an individually administered normative measure of test anxiety (Spielberger et al., 1980). Consisting of 20 items, participants rated their responses on a Likert-type scale of 1-4, with responses ranging from *Almost Never* to *Almost Always*. The scores possible range from a minimum of 20 to a maximum of 80. The TAI produces an overall anxiety score as well as scores for both *Emotionality* and *Worry* subscales. The manual defines *emotionality* as “reactions of the autonomic nervous system that are evoked by evaluative stress” and *worry* as “cognitive concerns about the consequences of failure” (p. 3). The two subscales are each comprised of 8 items and the scores possible range from a minimum of 8 to a maximum of 32.

According to the Test Anxiety Manual (Spielberger et al., 1980), the TAI has normative data collected from 1,4449 undergraduate students plus 1,129 incoming

undergraduate freshmen. In the normative data, women's scores on the overall TAI were on average 3-5 points higher than the scores of the men in the group.

The mean overall TAI score for college undergraduate men was reported to be 38.64 ( $SD = 12.43$ ) and for women was reported to be 42.79 ( $SD = 13.70$ ). The mean score for the *Worry* subscale for men was reported to be 13.61 ( $SD = 4.98$ ) and the mean score for women was reported to be 14.90 ( $SD = 5.51$ ). On the *Emotionality* subscale, the mean score for men was reported to be 16.85 ( $SD = 5.64$ ) and the mean score for women was reported to be 18.94 ( $SD = 6.31$ ).

***Reliability and Validity.*** When 159 undergraduate students were assessed multiple times with a 3 week time lapse, the test-retest reliability coefficient was reported to be .80 (Spielberger et al 1980). According to the manual, The TAI has high convergent validity scores ( $r = .82$  for men,  $r = .83$  for women) with the *Test Anxiety Scale*. In addition, the TAI has relatively high convergent validity with the *Worry and Emotionality Questionnaire* (WEQ) for worry ( $r = .73$  for men,  $r = .69$  for women) and emotionality ( $r = .77$  for men,  $r = .85$  for women).

***Motivated Strategies for Learning Questionnaire.*** The *Motivated Strategies for Learning Questionnaire* (MSLQ) is an individually administered self-report measure of learning strategy use of college students (Pintrich, Smith, Garcia, & McKeachie, 1991). Participants rated their responses on a Likert-type scale of 1-7 for a total of 81 items, with responses ranging from *not at all true of me* to *very true of me*. There are two scales within the MSLQ, *Motivation* and *Learning Strategies*. The MSLQ does not convert scores to compare with norms.



*Learning Strategy Scale.* Within the Learning Strategies portion of the MSLQ there are 31 items measuring the use of strategies and 19 items that measure resource management for a total of 50 items. The specific strategies measured by the MSLQ include Rehearsal, Elaboration, Organization, Critical Thinking, Meta-cognitive Self-Regulation, Time and Study Environment (Management), Effort Regulation, Peer Learning, and Help Seeking. The strategies that will be addressed in this intervention will be discussed in further detail below.

*Rehearsal.* The authors of the MSLQ report that rehearsal strategies involve reciting or repeating basic information (i.e., I make lists of important terms for this course and memorize the lists). These strategies work best for working memory type tasks rather than working to convert facts into long-term memory. This subscale is measured through 4 items that assess a students' use of rehearsal strategies. The manual reports the internal consistency reliability to be low ( $\alpha = .69$ ).

*Elaboration.* The elaboration subscale consists of 6 items that measure the use of strategies involving creating connections between new information and preexisting knowledge. Strategies that fall under the umbrella of elaboration include paraphrasing, expanding on ideas, and creating summaries (i.e., When reading for this class, I try to relate the material to what I already know). The internal consistency reliability was reported to be in the moderate range ( $\alpha = .76$ ).

*Organization.* The organization subscale consists of 4 items that measure a students' use of strategies that include choosing what needs to be studied and how to connect it to the other information presented. Strategies that are included in this subscale include clustering, outlining, and finding the main idea (i.e., When I study for this course,

I go over my notes and make an outline of important concepts). The authors report that this task engages the student, which leads to increased performance. The internal consistency reliability for this subscale was low ( $\alpha = .64$ ).

*Time and Study Environment.* The time and study environment subscale involves eight items that measure how well a student is able to schedule, plan, and direct their time (i.e., I make good use of my study time for this course) and environments (i.e., I have a regular place set aside for studying). The internal consistency reliability for this subscale was moderate ( $\alpha = .76$ ).

**Session and Workshop Evaluation Scales.** In addition to the TAI and MSLQ, a short scale was created to allow participants to evaluate both the individual sessions and the workshop as a whole. The Session Evaluation forms (see Appendix A) consisted of 7 questions about the session and responses were a Likert-type scale ranging from 1 (*Strongly Disagree*) to 4 (*Strongly Agree*). Similarly, the Workshop Evaluation form (see Appendix B) consisted of 10 questions with responses on a Likert-type scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*).

## **Procedures**

Before the intervention began, permission from the university's center for students with disabilities was obtained to recruit participants and offer the intervention. Following their approval, the proposal for this study was submitted to the Institutional Review Board (IRB) for approval (see Appendix C). Once IRB approved the intervention, the center sent out a recruitment email explaining the study and containing contact information for the researcher. The participants met once a week for 3 weeks during the semester, and twice on the fourth week for a total of 5 sessions. Each session

lasted 1 hour. Sessions took place in a study room in the library on campus. The TAI and MSLQ were used as pre-post test measures of anxiety and study skills.

### **Intervention**

The intervention was based on a combination of the intervention implemented in Melendres and Damer's (2011) study on test anxiety, the intervention implemented in Holzer and colleagues (2009) study on test wiseness, and studying strategies adapted from the *Motivated Strategies for Learning Questionnaire* (Pintrich et al., 1991). Participants met in a small group led by this researcher. The participants filled out the TAI and MSLQ before the first session and again after the final session. In each session, the group discussed the previous session and shared their experiences. Following the initial check-in, each session had a different component addressing cognitive education and/or specific skill building. After the lesson, the group participated in a mini discussion where they selected what they wanted to work on before the next session. Each participant in the study received a folder to bring each week to place the handouts and resources they obtained in. Each session ended with the participants completing a session evaluation form. Additionally, each session had a treatment integrity checklist filled out by the researcher (see Appendix D). The researcher received supervision following each session by her thesis chairperson.

**Session 1.** This session focused on introductions and learning materials about test anxiety. The session began with participants completing the TAI and MSLQ to get a baseline score. After introducing the group, participants were lead in a group discussion regarding test anxiety. Participants were provided with materials on the cycle of test

anxiety, examples of different kinds of coping skills, and the anxiety performance curve. The participants were lead in a discussion regarding strategies for dealing with test anxiety and were then provided with a worksheet to monitor how often they felt the test anxious feelings described in the session.

**Session 2.** This session focused on study skills. Participants discussed their monitoring worksheet from the previous session and were then provided with educational materials on study skills and strategies. The group leader discussed time management, ways to facilitate learning, and the importance of self-care.

**Session 3.** This session focused on teaching the PIRATES mnemonic and test-wiseness skills (Holzer et al., 2009). Participants were shown information about how to incorporate the steps of PIRATES (Prepare to Succeed; Inspect Instructions; Read, Remember, and Reduce; Answer or Abandon; Turn Back, Estimate, and Survey) into their testing routines. In addition, the group were lead in a discussion on specific test-wiseness strategies (i.e., crossing out unlikely options on a multiple choice test or underlining key words in a question) and shared what strategies had worked for them in the past.

**Session 4.** This session focused on test taking. Participants were provided with educational materials covering self-care and test-taking strategies. The main focus of this session was providing the participants with the opportunity to take a mock exam. The mock exam gave participants the chance to practice the strategies they had learned and then a group discussion rounded out the intervention as participants discussed what they learned, liked, disliked, and took from the mock exam.

**Session 5.** This session focused on relaxation techniques. Participants were provided with educational material on breathing and strategies to relax. The participants considered ways to generalize the material being covered to an actual testing situation. A group discussion covered what the students learned, liked, and disliked about the materials from this session. Participants completed a worksheet about which techniques they liked the best. Last, the participants filled out the TAI and MSLQ to see how their scores changed over the course of the intervention. Participants also filled out a survey about their opinions about the overall usefulness of the intervention.

## CHAPTER III

### Results

#### Hypothesis 1

This study predicted that participants would report a lower mean score on the TAI from the pretest to the posttest. It was hypothesized that students with identified learning difficulties would initially have higher mean TAI scores before completing 4 weeks of intervention compared to after completing the intervention's completion. There was partial support for this hypothesis. As can be seen in Table 1, a paired-sample t-test revealed no significant changes in pre-posttest TAI scores.

Table 1.

*Paired Sample t-test for Pre/Post Test Anxiety Inventory*

Variable	<u>Pretest</u>	<u>Posttest</u>	Difference	<i>t</i> ( <i>df</i> )
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )		
Total	65.7 (12.2)	53.3 (9.9)	-12.4	-2.37 (2)
Worry	25.0 ( 5.3)	21.0 (3.0)	-4.0	-1.24 (2)
Emotionality	25.0 ( 5.3)	22.3 (4.6)	-2.6	-1.11 (2)

Despite the lack of significant statistics for the overall sample, as can be seen in Table 2, all participants' reported a lower Total score for the TAI at posttest compared to pretest. Additionally, 2 of the 3 participants reported substantial drops in test anxiety for

the Total score on the TAI. Specifically, for participant 3, this was more than 1 standard deviation lower and for participant 2 this was more than 1.5 standard deviations lower than on the pretest. The scores for those two participants dropped more than 1 standard deviation from pre to post assessment on the Worry scale. One participant also had a much lower (more than 1.5 *SD*) posttest score on the Worry scales of the TAI. Although none of the participants' scores fell below the average anxiety scores reported by the TAI manual for college students, the Total scores for all participants become closer to the average following the intervention.

Table 2.

*Test Anxiety Scores for Participants Compared to Mean College Student Scores*

	<u>Participant 1</u>	<u>Participant 2</u>	<u>Participant 3</u>
<u>Variable</u>	<u>Score (TAI <i>M</i>)</u>	<u>Score (TAI <i>M</i>)</u>	<u>Score (TAI <i>M</i>)</u>
Pre Test Total	63 (42.8)	79 (42.8)	55 (38.6)
Post Test Total	60 (42.8)	58 (42.8)	42 (38.6)
Pre/Post Difference	-3	-21	-13
Pre Test Emotionality	27 (18.9)	32 (18.9)	23 (16.8)
Post Test Emotionality	25 (18.9)	25 (18.9)	17 (16.8)
Pre/Post Difference	-2	-7	-6
Pre Test Worry	23 (14.9)	31 (14.9)	21 (13.6)
Post Test Worry	25 (14.9)	21 (14.9)	18 (13.6)
Pre/Post Difference	+2	-10	-3

*Note.* *TAIM* = Mean College Undergraduate TAI Score as reported by the TAI manual

## Hypothesis 2

This study predicted that strategy usage would increase after 4 weeks of intervention. Specifically, it was hypothesized that the skills addressed directly in the intervention of Elaboration, use of Time and Study Environment, and Organization would improve as measured by the *Motivated Strategies for Learning Questionnaire* from pretest and posttest. As can be seen in Table 3 this hypothesis was not supported.

Table 3.

### Paired Sample t-test for MSLQ Learning Strategy Usage Scores

	<u>Pretest</u>	<u>Posttest</u>		
<u>Variable</u>	<u>M (SD)</u>	<u>M (SD)</u>	<u>Difference</u>	<u>t (df)</u>
Rehearsal	3.2 (2.0)	2.0 (0.7)	-1.2	-1.26 (2)
Elaboration	2.7 (0.6)	1.6 (0.5)	-1.1	-12.12*(2)
Organization	3.2 (1.8)	1.8 (0.4)	-1.4	-2.64 (2)
Time & Study				
<u>Environment</u>	<u>2.8 (1.9)</u>	<u>2.4 (1.1)</u>	<u>-0.4</u>	<u>-2.60 (2)</u>

*Note.* \*  $p \geq .05$ .

Individual participants' self-reported scores on the MSLQ can be found in Table 4. These scores reflect a decrease in strategy usage for Elaboration, Organization, Time



and Study Environment as well as Rehearsal scales from pretest to posttest. All posttest scores were below 3 indicating that participants did not feel that they regularly used the strategies associated with each scale.

Table 4.

*Pre Post Scores for MSLO Learning Strategies Scale*

	<u>Participant 1</u>	<u>Participant 2</u>	<u>Participant 3</u>
<u>Variable</u>	<u>Score</u>	<u>Score</u>	<u>Score</u>
Pretest Elaboration Scale	3.2	2.0	3.0
Posttest Elaboration Scale	2.0	1.0	1.7
Pretest Organization Scale	3.8	2.3	5.8
Posttest Organization Scale	2.0	1.3	2.0
Pretest Time & Study Environment Scale	3.1	1.6	3.5
Posttest Time & Study Environment Scale	2.5	1.3	3.4
Pretest Rehearsal Scale	1.8	2.3	5.5
Posttest Rehearsal Scale	1.3	2.3	2.5

*Note.* 1 (not at all true of me) to 7 (very true of me)

### Additional Analyses

Participants were asked to fill out a Workshop Evaluation form at the end of all 5 sessions. As can be seen in Table 5, the means for all items were in the agree to strongly agree range. Specifically, participants strongly agreed that they had learned something new, it would benefit them in the future, they were happy with the sessions overall and having completed the sessions would still choose to have participated.

Table 5.

#### *Descriptive Statistics for Workshop Evaluation*

Variable	<i>M (SD)</i>
1. I learned something new from the sessions.	4.7 (0.6)
2. I feel the sessions will benefit me in the future.	4.7 (0.6)
3. My feelings of test anxiety have lessened.	4.3 (0.6)
4. I will use the information I learned in school.	4.3 (0.6)
5. I would recommend these sessions to a friend.	4.3 (0.6)
6. I feel the program was a worthwhile use of time.	4.3 (0.6)
7. I am more comfortable in testing situations after this program.	4.3 (0.6)
8. I am happy with the sessions overall.	4.7 (0.6)
9. Looking back, I would still choose to participate in this program with the knowledge that I have now.	4.7 (0.6)

*Note.* 1 (*Strongly Disagree*) to 5 (*Strongly Agree*)

## CHAPTER IV

### Discussion

#### Hypothesis 1

While the current study did not find significant differences among TAI pretest and posttest scores after 4 weeks of intervention, all participants' self-reported Total TAI scores were lower following intervention. Due to the very small sample size, the lack of significant findings may be a problem of statistical power. For example, 2 of the 3 participants experienced a substantial decrease (greater than 1 *SD*) in their Total TAI scores. Although the participants' scores did not come down to the average level for college student reported in the TAI manual, the final TAI scores were closer to that average than they were before the intervention. This was similar to Holzer and colleagues (2009) findings using the TAI after an intervention that also utilized the PIRATES (Prepare to Succeed; Inspect Instructions; Read, Remember, and Reduce; Answer or Abandon; Turn Back, Estimate, and Survey) technique (Holzer et al., 2009). Damer and Melendres (2011) found that TAI Total score for the participants in their study dropped from a mean of 64.3 (*SD* = 7) to 46.7 (*SD* = 8.1), a decrease of 17.6 points. In the current study the TAI total score fell from a mean of 65.7 (*SD* = 12.2) to a mean of 53.3 (*SD* = 9.9), a decrease of 12.4 points.

#### Hypothesis 2

While the current study did not find an increase in self-reported strategy usage for Elaboration, Organization, and Time and Study Environment from pretest to posttest, the decrease in use of rehearsal strategies may be due to the information provided in session 2, where it was discussed that rehearsal is an ineffective study strategy compared to other

techniques techniques(Dunlosky et al., 2013; Gettinger & Seibert, 2002). Additionally, this intervention took place in the final 4 weeks of the semester and participants may have had lower motivation to improve their study skills. Due to the very short time frame of the intervention, the study strategies taught may not have had enough time to generalize to participants' overall study habits. Additionally, these findings also may reflect that prior to direct instruction on specific study strategies and how to use them, students might have overestimated their study skills during pretesting. The overall low rate of self-reported study strategy usage found in this study is consistent with reports that students with a documented learning difficulties tended to rate themselves as less strategic academically than their peers without any documented learning difficulties (Meltzer et al., 2004).

### **Additional Analysis**

Although the TAI score differences were not statistically significant and hypothesis 2 was not supported, participants reported overall satisfaction for the workshop. All scores on the evaluation from ranged from agree to strongly agree. Specifically, participants strongly agreed that they had learned something new, it would benefit them in the future, they were happy with the sessions overall.

### **Limitations**

The current study had several limitations. One limitation of this study was the small sample size, which negatively impacted statistical power. The small sample size also limits the studies generalizability. Specifically, the current study may not be a representative sample of the students served by the center for students with disabilities at

the university. The results of this study may not generalize to all students with identified learning difficulties.

An additional limitation of this study involves the measure of study skills. The MSLQ was designed to be used in relation to a specific course, and in the current study was modified to be used as a measure of study skills in general. In addition, the MSLQ is a self-report measure and was used without additional data to support the responses of participants' perceptions of their own study skills. Another issue with the MSLQ was the low reliability of some of its scales. The scales with the lowest reliabilities had very few items. Specifically, both the Rehearsal ( $\alpha = .69$ ) and Organization scales ( $\alpha = .64$ ) only 4 questions for each scale and therefore may not be a comprehensive measure of these strategies.

Another limitation was related to issues with time. For example, the intervention also took place over a very short time (4 weeks), and this may not have been enough time for new study strategies to generalize into everyday practice. Additionally, the intervention took place at the end of a semester, and it is possible that the participants were less motivated to change their study skills and habits right before final exams.

### **Future Directions**

There are several ways future research could improve upon the current study's design. For example future studies should use a larger sample. Additionally, future studies should include a follow-up with students after the sessions are completed to see if participants have more opportunity to practice and fine-tune the skills and strategies taught in the intervention. Additionally, the intervention could be spaced out over the course of an academic semester, with opportunities to provide practice and feedback after

course exams rather than at the end of a semester as was the case in the current study.

Finally, further researchers could investigate whether this intervention would be effective for students in middle and high school.

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**APPENDICES**

## Appendix A

### Session Evaluation Form

Name: \_\_\_\_\_

Please read the following statement carefully and answer honestly. Indicate your level of agreement with each of the following statements by circling the appropriate number.

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree
I enjoyed attending today's session	1	2	3	4
I actively participated in today's session	1	2	3	4
I had difficulty staying on task today	1	2	3	4
I learned something today that will help me reduce my test anxiety	1	2	3	4
I was very focused in today's session	1	2	3	4
Distractions interfered with my participation today	1	2	3	4
The time I spend in today's session will be beneficial to me	1	2	3	4



## Appendix B

### Workshop Evaluation Form

#### Satisfaction Survey

**This survey is to be completed anonymously**

Please rate your answers from a scale of 1-5 regarding your experiences during this group by circling the number to the right of the question.

- 1 – Strongly Disagree
- 2 – Disagree
- 3 – Neither Disagree nor Agree
- 4 – Agree
- 5 – Strongly Agree

I learned something new from the sessions.	1	2	3	4	5
I feel the sessions will benefit me in the future.	1	2	3	4	5
My feelings of test anxiety have lessened.	1	2	3	4	5
I will use the information I learned in school.	1	2	3	4	5
I would recommend these sessions to a friend.	1	2	3	4	5
I feel the program was a worthwhile use of time.	1	2	3	4	5
I am more comfortable in testing situations after this program.	1	2	3	4	5
I feel like these sessions were a waste of my time.	1	2	3	4	5
I am happy with the sessions overall.	1	2	3	4	5
Looking back, I would still choose to participate in this program if with the knowledge that I have now.	1	2	3	4	5

## Appendix C

### IRB Approval



3/26/2014

Investigator(s): Grace Benedict, Aimee R. Holt  
Department: Psychology  
Investigator(s) Email: gew2i@mtmail.mtsu.edu; Aimee.Holt@mtsu.edu

Protocol Title: "Test Anxiety: An Educational Intervention "

Protocol Number: 14-308

Dear Investigator(s),

The MTSU Institutional Review Board, or a representative of the IRB, has reviewed the research proposal identified above. The MTSU IRB or its representative has determined that the study poses minimal risk to participants and qualifies for an expedited review under 45 CFR 46.110 and 21 CFR 56.110, and you have satisfactorily addressed all of the points brought up during the review.

Approval is granted for one (1) year from the date of this letter for 8 participants.

Please note that any unanticipated harms to participants or adverse events must be reported to the Office of Compliance at (615) 494-8918. Any change to the protocol must be submitted to the IRB before implementing this change.

You will need to submit an end-of-project form to the Office of Compliance upon completion of your research located on the IRB website. Complete research means that you have finished collecting and analyzing data. **Should you not finish your research within the one (1) year period, you must submit a Progress Report and request a continuation prior to the expiration date.** Please allow time for review and requested revisions. Failure to submit a Progress Report and request for continuation will automatically result in cancellation of your research study. Therefore, you will not be able to use any data and/or collect any data. Your study expires **3/26/2015**.

According to MTSU Policy, a researcher is defined as anyone who works with data or has contact with participants. Anyone meeting this definition needs to be listed on the protocol and needs to complete the required training. **If you add researchers to an approved project, please forward an updated list of researchers to the Office of Compliance before they begin to work on the project.**

All research materials must be retained by the PI or faculty advisor (if the PI is a student) for at least three (3) years after study completion and then destroyed in a manner that maintains confidentiality and anonymity.

Sincerely,

Kellie Hilker  
Compliance Officer/ MTSU Institutional Review Board Member

## Appendix D

### Treatment Integrity Checklists

#### Session 1.

Activity	Initial upon Completion
Introductions (name, year, major, fun fact)	
Instructions for pair activity	
Pair discussions about test anxiety	
Group similarities/differences discussion	
Common themes written on whiteboard	
Anonymous negative thought instructions	
Negative thoughts submitted	
Cognitive model of anxiety drawn on board	
Group discussion about the model on the board	
Yerkes Dodson performance curve handouts	
Discussion about YD performance curve	
Black & white thinking errors handout (Burns, 1999)	
Pair discussions on thinking errors	
Group discussion on challenging thinking	
Read & challenge anonymous thoughts	
How do you feel about the session today? – discussion	
Assign worksheet for homework (Thought Substitution Worksheet, n.d.)	

**Session 2.**

Activity	Initial upon Completion
Challenge thoughts from last session's "homework"	
Self-fulfilling prophecy discussion	
Self-fulfilling prophecy drawn on whiteboard	
Group self-fulfilling prophecy worksheet	
Time Management Matrix discussion	
Time Management Matrix hand-outs distributed (Covey, Merrill, & Merrill, 1994)	
Study environment discussion	
Study environment worksheets completed (Analysis of Study Environment)	
Group discussion about the model on the board	
Study skills discussion (Congos, n.d.)	
Group conversation sharing successful study skills	
Bloom's Taxonomy of Learning Objectives handout (Anderson & Krathwohl, 2001; Bloom, Englert, Furst, Hill, & Krathwohl, 1956)	
Bloom's Taxonomy discussion	
Bloom's Taxonomy activity	
How do you feel about the session today? – discussion	
Homework instructions	

**Session 3.**

Activity	Initial upon Completion
Turn in last session's "homework"	
PIRATES mnemonic handout (Hughes, Deshler, & Mercer, 2005)	
PIRATES discussion	
Test-Wisness Strategies discussion	
Small groups test-wisness discussions	
Share successful test-wisness strategies	
*Built in time to make up missed information from previous sessions	

**Session 4.**

Activity	Initial upon Completion
Discuss "homework"	
Test-Taking Discussion	
Mock Exam Administration	
Mock Exam Discussion	
Personalized Plan Instructions	
Personalized Plans Completed	

**Session 5.**

Activity	Initial Upon Completion
Diaphragmatic Breathing Handout (Diaphragmatic Breathing, n.d.)	
Diaphragmatic Breathing Practice	
3 Minute Breathing Space Audio (Morgan, 2012)	
3 Minute Breathing Space Practice	
Relaxation Activity	
Desensitization Activity	
Discuss the Activities	
Workshop Satisfaction Survey	
TA I – Posttest	
MSLQ – Posttest	