IMPLEMENTATION OF A MINDFULNESS ACTIVITY
FOR NURSING STUDENTS
WITH TEST ANXIETY

by

ALLISON COLLINS

VIVIAN WRIGHT, COMMITTEE CHAIR
CHARLA HALL
MARGARET RICE
HALEY STRICKLAND
FELECIA WOOD

A DISSERTATION

Submitted in partial fulfillment of the requirements for the degree of Doctor of Education in the Department of Educational Leadership, Policy, and Technology Studies in the Graduate School of The University of Alabama

TUSCALOOSA, ALABAMA

2019
ABSTRACT

Undergraduate nursing students are voicing a high level of test anxiety related to the high stakes testing within their learning environment. Test anxiety has been well documented in nursing education (Bartlett, Taylor, & Nelson, 2016; Duty, Christian, Loftus, & Zappi, 2016; Gibson, 2014). Quinn and Peters (2016) noted that the “presence of high-stakes comprehensive examinations and the consequences of poor performance complicates test anxiety for nursing students” (p. 146). High stakes testing is not a new educational concept, yet test anxiety continues to escalate each year, especially in nursing (Quinn & Peters, 2016). Test anxiety interventions within the curriculum may prove helpful in nursing students’ success.

Within studies pertaining to test anxiety, mindfulness has helped decrease test anxiety (Bamber & Schneider, 2016; Ratanasiripong et al., 2015; Spadaro & Hunker, 2016). Mindfulness is considered a strategy used in the third wave of behavioral change approaches; therefore, systematic desensitization was used in a mindfulness intervention for test anxiety.

The purpose of this quasi-experimental study was to examine the impact a mindfulness intervention, using systematic desensitization, had on community college nursing students’ test anxiety levels and test scores. Data were collected and analyzed using a sample of 107 associate degree nursing students from a community college in Texas. The intervention group listened to a multimedia Confidence Training for Tests between nursing exams. Post-intervention test anxiety scores were significantly lower (p<.001) than in the group who did not participate in the mindfulness intervention. Test performance did not differ significantly (p=.729). Systematic desensitization is a type of mindfulness that nursing students can use to decrease test anxiety.
DEDICATION

This is dedicated to my loving family—thank you and I will always love you. For my Mom, Laura, who loves and dreams BIG; you have always believed in me. To my husband, Shawn, who supported me from the beginning to the very end. To my kids. Logan, Lauren, and Donovan—this is for US and for our future with time well spent TOGETHER.
ACKNOWLEDGMENTS

Above all, I would like to thank God. I could not do anything without Him. I would like to thank my family, especially my sister, Kim. I admire your strength and I love you so much. Thank you to my Dad and stepmom, Jack and Amy, and my father- and mother-in-law, Clay and Barbara. I appreciate your support and prayers. Thank you to my lifelong girlfriends, Brandi, Carrie, Hallie, Marisa, and Missy. What would I have done without our group texts? Thank you for your love and for your prayers.

I would like to thank my co-workers for allowing me to conduct my research in their classes and for being there for me at work. Jamie, I will always remember our trips to Alabama. We shared ideas and memories but most importantly, our friendship grew. Kristy, thank you for listening to me and encouraging me through not only school, but life in general. We are soul sisters. Thank you, Lorinda, for your prayers and love. To my mentor, Dr. Mary Ann Remshardt, you opened the door to nursing education for me. It is so nice to feel such support from someone I admire tremendously. Thank you, Dr. Richard Driscoll, for your eagerness to try out your intervention on nursing students with test anxiety. It worked and I regret you did not live to see the conclusion of this research.

Thank you to my dissertation chair, Dr. Vivian Wright. You were always supportive and guided me through every part of this journey. I appreciate your time and your feedback that shaped this research. Thank you to Dr. Margaret Rice, Dr. Haley Strickland, and Dr. Felecia Wood at UA. I appreciate your time and your support with this endeavor. Thank you to Dr. Charla Hall. I appreciate having someone local with mindfulness experience to help with my
dissertation. Last, but certainly not least, to Cohort 9 in the Nurse Educator program at UA, we spent years together on campus over the weekends and I know each of you listened and encouraged me. Thank you for being amazing classmates and I will miss our times together.
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CHAPTER I
INTRODUCTION

Undergraduate nursing students are voicing a high level of test anxiety related to the high stakes testing within their learning environment. Test anxiety has been well documented in nursing education (Bartlett, Taylor, & Nelson, 2016; Duty, Christian, Loftus, & Zappi, 2016; Gibson, 2014). Beggs, Shields, and Goodin (2011) stated that test anxiety is a phenomenon that can affect 40% of nursing students. In comparison to other health professions, nursing students report especially high stress levels (Bartlett et al., 2016). Quinn and Peters (2016) noted that the “presence of high-stakes comprehensive examinations and the consequences of poor performance complicates test anxiety for nursing students” (p. 146). High stakes testing is not a new educational concept, yet test anxiety continues to escalate each year, especially in nursing (Quinn & Peters, 2016). Many nursing programs will use high stakes testing from the fundamentals level, at the beginning of a nursing program, through the comprehensive National Council Licensure Examination for Registered Nurses (NCLEX-RN), the national exam for the licensing of nurses. Each test must be passed with a satisfactory score to progress, and nursing students must eventually pass the NCLEX-RN to become a Registered Nurse.

Nursing students report that, although they have prepared well and can answer questions before and after an exam, during the exam they feel progressive debilitating anxiety and the inability to perform. Although literature supports valid interventions for test anxiety, nursing education has been hesitant to implement them (Ratanasiripong, Ratanasiripong, & Kathalae,
Test anxiety, specifically the cognitive component, is detrimental to a student’s academic achievement (Cassady & Johnson, 2002). Considering that test anxiety contributes to nursing students’ failure within nursing programs, nurse educators should consider learner support within the high stakes testing environment (Shapiro, 2014). Text anxiety interventions within the curriculum may prove helpful in nursing students’ success.

Within studies pertaining to test anxiety, mindfulness has helped decrease test anxiety (Bamber & Schneider, 2016; Ratanasiripong et al., 2015; Spadaro & Hunker, 2016). Mindfulness is defined as the “awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment” (Kabat-Zinn, 2003, p. 145). Anxiety is future-oriented and training in present-moment awareness is an alternative way of experiencing reality (Sipe & Eisendrath, 2012). Mindfulness encompasses numerous types of specific interventions, but the focus of this study was on systematic desensitization. Systematic desensitization has been used for test anxiety in the past (Egbochuku & Obodo, 2005; Holroyd, 1976; Melnick & Russell, 1976).

Systematic desensitization is an effective therapeutic treatment in the reduction of maladaptive anxiety (Head & Gross, 2008). It is the process by which a person is induced into a deeply relaxed state and is presented with a series of graduated anxiety-evoking situations using imaginal exposure (Head & Gross, 2008). When anxiety is experienced during exposure, the image is terminated, and a relaxed state is induced (Head & Gross, 2008). Although past studies have supported that systematic desensitization decreases test anxiety (Egbochuku & Obodo, 2005; Melnick & Russell, 1976), there were very few studies within nursing using systematic desensitization for test anxiety.
The focus of this study was a mindfulness intervention using systematic desensitization for nursing students who had scored high on a test anxiety questionnaire. The intervention was a multimedia training *Confidence Training for Tests* by Dr. Richard Driscoll, founder of the American Test Anxieties Association. The American Test Anxieties Association is an organization of educators and psychologists dedicated to decreasing student test anxiety. This training led the students through a mindfulness activity that includes thinking of, preparing for, and taking a test, all while using muscle relaxation to reverse test anxiety. This type of modified systematic desensitization in *Confidence Training for Tests* has been found effective for test anxiety in two small studies (Bowman & Driscoll, 2013; Evans, Ramsey, & Driscoll, 2010), but has not been studied in the last 5 years, nor has it been used in a community college nursing program. Nursing education needs support interventions for decreasing test anxiety that faculty can facilitate as learner support. This study researched a mindfulness intervention using systematic desensitization, and how it affected nursing students’ test anxiety and test scores. Therefore, the findings from this study are applicable to nursing students and nursing faculty.

**Statement of the Problem**

There are many studies about test anxiety in nursing education. Mindfulness has been used in numerous research studies (Bamber & Schneider, 2016; Ratanasiripong et al., 2015; Spadaro & Hunker, 2016) as an effective intervention for test anxiety. Nurse educators have a role to play in anxiety management before high stakes exams. Purfeerst (2011) found that the key for faculty is to acknowledge students’ fears and anxiety and use inviting teaching strategies to help improve learning and decrease anxiety in nursing students. Shapiro (2014) agreed that students and nurse educators must work together to decrease the incidence of test anxiety and to promote feelings of empowerment for improved outcomes in the nursing curriculum. Faculty
must find different ways to deal with stress that incorporate the mind-body connection. “Test anxiety will continue to increase as long as the use of high stakes test and rigorous academic progression policies persist” (Quinn & Peters, 2017, p. 150). The test anxiety that nursing students experience emerges from highly structured processes of testing and assessment within nursing programs (Gibson, 2014). With the need for nursing faculty to address test anxiety in nursing students and utilize strategies to decrease test anxiety, effective interventions are needed.

**Statement of Purpose**

Test anxiety is prominent in nursing programs and can affect student success. The purpose of this quasi-experimental study was to examine the impact a mindfulness intervention, using systematic desensitization, had on community college nursing students’ test anxiety levels and test scores. This study examined whether this intervention could help by facilitating a mindfulness activity for nursing students in an effort to decrease their test anxiety, and possibly increase their test scores.

**Significance of the Problem**

The study was important because of its benefits to nursing faculty and nursing students. Literature suggested that nursing faculty study interventions for test anxiety and implement them before high stakes exams (Purfeerst, 2011; Shapiro, 2014). If students can be given a tool to decrease test anxiety, that tool could be used for testing environments and for the high stakes NCLEX-RN exam in nursing. This provides learner support and a retention strategy for nursing faculty to utilize.

Nursing students benefit from experiencing less anxiety, and potentially perform better on nursing exams. This is vital because passing the NCLEX-RN to become a Registered Nurse is mandatory after completion of a nursing program. This quasi-experimental study examined the
impact of a mindfulness treatment using desensitization on test anxiety. It adds to the growing body of literature regarding mindfulness as an intervention for test anxiety. The study also examined if systematic desensitization was an appropriate framework to use for a test anxiety intervention. Last, it adds to nursing education literature to address the growing problem of students experiencing test anxiety.

**Research Questions and Hypotheses**

This study addressed the following research questions and null hypotheses:

1. Do nursing students who receive a mindfulness intervention using systematic desensitization have less test anxiety, as measured on the Westside Test Anxiety Scale, than those students who do not participate?

2. Do nursing students who receive a mindfulness intervention using systematic desensitization have higher exam scores after the intervention?

The null hypotheses for this experimental study were

N1: There is no significant difference in the test anxiety level of nursing students on the Westside Test Anxiety Scale after the mindfulness intervention.

N2: There is no significant difference in the test scores of nursing students after the mindfulness intervention.

**Methods**

A quantitative method was used to determine if a specific treatment influences an outcome (Creswell, 2014). The research strategy was a quasi-experimental study with a pretest/posttest, control group, and experimental group design. The mindfulness intervention was given to the experimental group and was a treatment developed by Dr. Richard Driscoll, founder of the American Test Anxieties Association. The *Confidence Training for Tests* specifically
addresses test anxiety. The intervention was designed to lower anxiety, improve concentration, and raise exam scores (Bowman & Driscoll, 2013; Driscoll, 2006; Evans et al., 2010). The multimedia training applied relaxation protocol to reduce test anxiety (http://amtaa.org/resources/). The training involved participants listening to tense-release muscle relaxation sequences to reduce stress (Driscoll, 2006). The sequences involved the student thinking of, preparing for, and taking a test, all while using muscle relaxation to reverse test anxiety.

This intervention was chosen because the framework for the training is a modified systematic desensitization protocol, and the training had not been tested on community college nursing students. Although a search query on CINAHL, Cochrane Controlled Trials/Systematic Reviews, ERIC, Health Source: Nursing /Academic Edition, MEDLINE, PsycINFO, PsycTESTS, PsycARTICLES, PsycBOOKS, and Pubmed was utilized, no studies using systematic desensitization on community college nursing students’ test anxiety were found.

**Theoretical/Conceptual Framework**

Mindfulness is defined as the “awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment” (Kabat-Zinn, 2003, p. 145). This awareness and attending to mind-body connection is considered a model, not just in theory but in practice as well (Kabat-Zinn, 2003). Mindfulness should not be mechanical, but “a commitment to reside as best one can from moment to moment in awareness with an open heart, a spacious nonjudging, nonreactive mind, and without trying to get anywhere, achieve anything, or reject anything” (Kabat-Zinn, 2003, p. 150). Anxiety is future-oriented and training in present-moment awareness is an alternative way of opposing anxiety (Sipe & Eisendrath, 2012). There was a strong theoretical rationale for applying
mindfulness treatments to test anxiety (Bamber & Schneider, 2016). Not only will nursing students need to learn mindfulness activities as a student, but also as a critically thinking nurse under the high pressure of employment.

There are different meanings of mindfulness within behavioral approaches (Munoz-Martinez, Monroy-Cifuentes & Torres-Sanchez, 2017). Mindfulness used as a strategy can be activities that are selected according to the goal of the researcher, such as guided instructions and personal practice (Munoz-Martinez et al., 2017). Specifically, mindfulness as an intervention is composed of a series of steps in order to generate changes in dependent variables (Munoz-Martinez et al., 2017). Hayes (2004) proposed that “third wave” behavioral therapies represent an extension of traditional behavioral treatment approaches that encourage mindfulness experiences. Concepts such as mindfulness can be incorporated into what would be considered traditional behavioral interventions. This third wave behaviorism uses previous generations of behavioral and cognitive therapy and carries them forward into questions, issues, and domains previously addressed (Hayes, 2004).

A specific classic and well-known behavioral method of dealing with anxiety is the mindfulness activity of systematic desensitization (Wolpe, 1958). Although this method is well established and has been used by counselors and psychologists for many years, it is not one that has typically been used in education or nursing. Wolpe's (1958) systematic desensitization is an effective technique that involves practicing deep muscle relaxation while imagining oneself in a stressful situation. Wolpe’s (1958) procedure of systematic desensitization has not been applied to community college nursing students’ test anxiety. The procedure involves three steps (Wolpe, 1958). The first step is to develop a hierarchy of anxiety-promoting stimuli. The second step is to teach the student to relax so anxiety is reversed. This is done by taking breaths while tightening
and relaxing different muscle groups in the body. The third step is to pair the relaxation response to each stimulus on the anxiety hierarchy. For the study, posttest data collection was only conducted after participants had applied this conceptual framework to the steps leading up to and taking a high stakes exam.

**Figure 1.** Systematic desensitization by Joseph Wolpe (1958).

The rationale for using relaxation in systematic desensitization is “reciprocal inhibition,” meaning that relaxation and anxiety are mutually incompatible and that each acts to suppress its opposite (Wolpe, 1958). This technique is practiced within the *Confidence Training for Tests*, a multimedia protocol that trains students to combat test anxiety. The training applies desensitization to the hierarchy of anxiety-provoking stimuli for the nursing student before an exam. This anxiety desensitization method counters anxiety through muscle stretch-tense, deep breath release-relax, and positive suggestion sequences. While other responses to combat anxiety have been used over the years, Lazarus (1961) noted that deep muscle relaxation is the most common and convenient anxiety inhibitor. This behavioral strategy of counter-conditioning automatically elicits a relaxing alternative to stress.
Assumptions of the Study

Assumptions for the study were that all students in the treatment group would attend the group training *Confidence Training for Tests* to learn how to apply systematic desensitization to their test anxiety. The honesty and cooperation of the participants were necessary assumptions in this study. After the group session, there was an assumption students in the experimental group would individually complete another five sessions of systematic desensitization as a mindfulness training between exam one and two. Another assumption of the study was that the control group would not listen or participate in the mindfulness intervention until all data were collected and the study was over. There must be an assumption that the nursing students and their interactions with each other did not affect the results of the study.

Limitations of the Study

There were several limitations to this study. First, the study was limited to students in Texas at a rural community college. The students were enrolled in an Associate Degree Nursing program with multiple faculty teaching within courses. Faculty teach test-taking strategies at the beginning of the program. The study could not control for other faculty inadvertently giving other test anxiety interventions to individual students in both the experimental and control groups. Another limitation was that students may have had varying levels of general anxiety that could skew results. Past experiences with test performance and test anxiety could also limit or skew findings in the study. A potential limitation included the reliance on self-ratings on the anxiety scale. This could have been influenced by response bias, where objective data could potentially gather more thorough assessment information. Another limitation was the student’s preparation level. It is possible that some students were not prepared for exams, and other
students devoted more time and energy to preparing for an exam. Some students may have also received testing accommodations, such as extended time, during each nursing exam.

**Operational Definition of Terms**

*Anxiety hierarchy.* An anxiety hierarchy was the identification of a series of situations that cause the participant maladaptive levels of anxiety (Head & Gross, 2008). Each situation should be specific and have the ability for the student to visualize the activity along with the behavior.

*High stakes exam.* A high stakes exam was defined as an assessment used to make decisions about student progression or completion of a nursing program (Hunsicker & Chitwood, 2018). For example, if a student fails, they are not allowed to move on to the next level.

*Mindfulness.* The definition of mindfulness was the “awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment” (Kabat-Zinn, 2003, p. 145). For example, blocking out future-oriented test anxiety and attending to a relaxation session is considered mindfulness.

*NCLEX-RN.* The National Council Licensure Examination for Registered Nurses (NCLEX-RN) examinations are developed and administered by the National Council of State Boards of Nursing (NCSBN). The exams are constantly and rigorously evaluated to keep pace with the rapidly evolving health care environment (https://www.ncsbn.org/nclex.htm).

*Systematic desensitization.* Systematic desensitization was a process by which a person is induced into a relaxed state and is presented with a series of graduated anxiety-provoking situations using imaginal exposure (Wolpe, 1958, 1990). When anxiety was experienced during exposure, the image was terminated, and a relaxed state was induced (Head & Gross, 2008).
During this study, as the students thought about preparing for and taking a test, they stretched and relaxed their muscles while thinking positive calming thoughts.

*Test anxiety.* For this study, test anxiety was defined as a psychological condition in which undergraduate students experience extreme distress and anxiety in testing situations. Test anxiety closely aligns with the psychological disorder of social phobia because it causes a person to experience fear of a certain situation due to concerns of poor performance and embarrassment (American Psychiatric Association, 2013).

**Summary**

This chapter addressed the problem of test anxiety and the significance of decreasing test anxiety in students enrolled in nursing education. The purpose of this quasi-experimental study was to examine the impact a mindfulness intervention, using systematic desensitization, had on community college nursing students’ test anxiety levels and test scores. The research questions were stated and mindfulness, specifically systematic desensitization, was explained. An outline of the three steps nursing students would take during this intervention for test anxiety was explained. This chapter closed with assumptions, limitations, and terms that were defined for the study.
CHAPTER II

REVIEW OF RELATED LITERATURE

Test anxiety has been well documented in nursing education (Bartlett et al., 2016; Duty et al., 2016; Gibson, 2014). Moscaritolo (2009) noted that the literature reveals empirical studies dating to the early 1970s that investigated stress and anxiety among undergraduate nursing students. During that time, there were influential research studies on test anxiety in nursing and how mindfulness can be used for mental wellbeing. There were also seminal works on systematic desensitization, but no current literature using desensitization for test anxiety in nursing was identified.

**Test Anxiety in Nursing Students**

Test anxiety is an expected component of any academic endeavor, especially in nursing education where the curriculum endorses frequent high-stakes assessments. It is important to clarify test anxiety in the context of nursing school. Gibson (2014) focused on nursing education and found that “test anxiety usually emerges from the highly structured processes of assessment and testing of student performance across the entire nursing school curriculum” (Gibson, 2014, p. 267). Testing begins before the student enters nursing school through the pre-entrance exam. This begins the long journey of testing for the prelicensure nursing student.

After the pre-entrance standardized exam, admission to a professional nursing program marks the beginning of fulfilling a career goal. However, Chernomas and Shapiro (2013) noted the rigors of professional education can be demanding. Stress, depression, and anxiety can interfere with academic and clinical practice performance (Chernomas & Shapiro, 2013).
Chernomas and Shapiro (2013) conducted a descriptive exploratory study and investigated levels of anxiety among nursing students in a university-based program. Through an online survey, 437 participants from one midwestern Canadian undergraduate nursing program completed the Depression Anxiety Stress Scale and provided data on quality of life indicators and demographic information. Participants also were invited to provide narrative data about their experiences with stress, depression, and anxiety. Themes from the qualitative comments from 251 of the participants were identified and predominant themes represented were perceptions of clinical practice; coping; personal issues; and balancing school, work, and personal life. In this study, coping was the most significant variable in predicting scores on each of the outcome variables (Chernomas & Shapiro, 2013). Implications and recommendations for curriculum design, ensuring students understand program expectations before admission, and enhancing access to mental health/support services were noted. Although this study lacked theoretical underpinnings, the notation that self-care and stress management are warranted within nursing programs is a valuable insight.

A study by Bartlett et al. (2016) obtained volunteers from a prelicensure nursing education program and from the general student population. The researchers recruited 156 undergraduate nursing students (83% female, 15% male, 2% unknown). They also recruited 76 undergraduate students from the general student body population (50% female, 46% male, 4% unknown). The nursing body was less diverse than the general population (Bartlett et al., 2016). Surveys were administered during the middle of the spring semester during a class meeting. The findings indicated that nursing students reported higher stress levels, higher stress levels affecting academics, and more stress-related symptoms, such as anxiety, migraines, and illnesses, than the general student body.
Test Anxiety Affecting Test Performance

As testing has significant consequences, nursing students who experience test anxiety may not demonstrate their knowledge and may display poor academic performance (Prato & Yucha, 2013). A recent research study by Duty et al. (2016) took a convenience sample of undergraduate nursing students from a variety of ages (traditional-nontraditional students) who represented all points in the curriculum from sophomores to seniors. The study compared test scores with levels of reported anxiety in nursing students. Modest, but statistically significant lower examination grade test scores were observed for students with high cognitive test anxiety (CTA) compared with low levels of CTA. High levels of CTA were associated with reduced academic performance (Duty et al., 2016). Interestingly, although CTA and students’ self-reported anxiety were significantly positively correlated ($r = 0.57$, $p < .001$), there was no correlation between self-report of anxiety and these academic performance indicators. The participants were all female from a small private liberal arts college. This was one of the first studies in nursing to examine test scores with test anxiety.

Test anxiety affects performance and well-being of nursing students more as the stakes get higher (Roykenes, Smith, & Lawson, 2014). This Norwegian study examined nursing students who must pass a drug calculation test with complete accuracy to continue in the nursing program. The aim of the study was to investigate the test anxiety experiences of students faced with such a high-stakes test. The researchers used a mixed methods approach, collecting data through a survey questionnaire and a focus group interview. Two hundred three freshman nursing students completed the questionnaire, six of whom also participated in the focus group interview. The survey results indicated that 44.3% of the students reported high mathematics test anxiety in the months before the drug calculation test. Over 12% of the high-anxiety students
reported a low mathematics self-concept. High and medium self-concept students also experienced high test anxiety. Their analysis of the focus group interview data confirmed that the high stakes of the test increased the test anxiety (Roykenes et al., 2014). This research study broke down the relationship between self-concept and test anxiety, but then stated that quantitative and qualitative data confirmed high stakes exams increase test anxiety.

Liu and Xu (2017) used a qualitative approach to better understand American midwestern community college nursing students and their experiences using an extended time and other forms of supportive accommodation to address test anxiety. According to Liu and Xu, there had been quantitative studies done on testing accommodations and interventions but not a qualitative study addressing this student population. The researchers used a phenomenological approach and a small sample (n=8) of nursing students. Liu and Xu posed semi-structured questions to focus groups to collect data. The researchers presented pictures depicting themes and participants selected the pictures that best shared their feelings when taking the test. The students also shared their interpretation of the picture, and the authors did the coding (Liu & Xu, 2017). Six themes were found that included students feeling anxious and overwhelmed, the impact of nursing stress, perceived benefits of accommodation for test anxiety, environmental influences on test anxiety, challenges, and stigmatization for accommodation.

**Mindfulness Interventions for Nursing Students With Test Anxiety**

Mindfulness interventions can decrease stress, as noted in the literature as mindfulness-based stress reduction (MBSR). Bamber and Schneider (2016) have reviewed research that tested the effects of mindfulness meditation on stress and anxiety in college students. A literature search resulted in 57 studies on the effectiveness of mindfulness meditation in reducing stress and anxiety in college students. Researchers examined participants’ anxiety in 40 studies, finding
self-reported stress in 34, physiological stress in 11, and mindfulness in 24. Eighty-seven percent showed significant decreases in anxiety and stress; 91.7% showed an increase in mindfulness. Physiological stress had inconsistent results indicating a need for further research. Overall, mindfulness meditation shows promise in reducing stress and anxiety in nursing students. Additionally, there are many differences in mindfulness interventions, including frequency, duration, instructional method, and the inclusion of different mindfulness activities, that need a quantitative examination to determine which is most effective (Bamber & Schneider, 2016).

**Quantitative Research on MBSR in Nursing Education**

Spadaro and Hunker (2016) explored the effect of an online mindfulness meditation intervention with distance nursing students on stress, mood, and cognition. This was a descriptive exploratory study that lasted 24 weeks with an 8-week online intervention for 27 undergraduate and graduate nursing students. After the intervention was provided online, a week follow up reported decreased stress from nursing students. Using the Perceived Stress Scale (PSS), Hospital Anxiety and Depression Scale (HADS), and Attention Network Test (ANT), the study found mindfulness-based stress reduction to be useful (Spadaro & Hunker, 2016). Stress was significantly reduced ($F(2,24) = 4.163, p = .019$). A decreasing trend for anxiety was noted with a significant difference between time points ($F(1,23) = 6.889, p = .015$). A self-regulating theory was used, and the benefits of online MBSR resources were validated.

Biofeedback with mindfulness has been explored within research studies. One study used mindfulness with biofeedback as an intervention for 89 Thai 2nd-year nursing students with test anxiety (Ratanasiripong et al., 2015). The research was completed at a public university and a pre/posttest design with a control group was used. The Perceived Stress Scale (PSS) and Spielberger’s State-Trait Anxiety Inventory (STAI) were used as instruments. The participants
were randomly assigned to one of three groups: biofeedback group, mindfulness meditation group, or a control group. Specific to mindfulness, meditation was found to decrease anxiety and stress and was useful to nursing students (Ratanasiripong et al., 2015). There was no theoretical framework and all participants were female. A different study in America with biofeedback and mindfulness was conducted to see if the intervention could decrease test anxiety (Prato & Yucha, 2013). This study identified which semester of a baccalaureate nursing program had the most test anxiety, and then determined if relaxation training could decrease test anxiety and control the physiological anxiety response. The researchers used Spielberger’s STAI with 155 students and noted the third semester of nursing school had the most anxious students before a test. The students participated in a 5-week relaxation using biofeedback, while their vital signs were monitored. Although statistically significant changes occurred in vital signs, no significant changes were noted on the STAI.

Sanko, Mckay, and Rogers (2016) discussed the complex, high-stress environment within nursing. The researchers were interested in exploring mindfulness training in prelicensure and postgraduate nurses for ethical decision making. For this study, an 8-week mindfulness program was developed and tailored to nursing. They used a time series, two group intervention design, and students listened to pre-recorded mindfulness sessions posted to the learning management system. After the sessions, students completed the Fridburg Mindfulness Inventory (FMI) and Defining Issues Test of Moral Judgement (DIT-2). The participants also kept journals. The pre-licensure group did not show a statistically significant improvement in their FMI scores from pre- to post-training ($p=0.281$). However, the postgraduate group did ($p=0.004$). Statistically significant pre-post scores were found in the DIT-2. Therefore, mindfulness training improved mindfulness and some aspects of ethical decision making in the groups studied as part of this
project (Sanko, et al., 2016). Several concerns were noted with this research study. There was a small sample size (n=7) due to a high dropout rate. The mindfulness content was 60 minutes with no mention of who validated the contents, or what the contents of the mindfulness session included.

Song and Lindquist (2015) examined the effects of MBSR on depression, anxiety, and stress among South Korean nursing students in a randomized controlled trial. The MBSR group practiced mindfulness 2 hours every week for 8 weeks. The Depression, Anxiety, and Stress Scale (DASS) and the Mindfulness Attention Awareness Scale (MAAS) were used. At baseline, there was no statistically significant difference between the groups, but the MBSR significantly decreased on the DAS scale and increased on the MAAS scale. This study was mostly females and the homework was not monitored to see if it was done.

**Qualitative Research on MBSR in Nursing Education**

Van der Riet, Rossiter, Kirby, Dluzewska, and Harmon (2015) presented a descriptive qualitative design with focus groups that explored the impact of a 7-week stress management and mindfulness course as learning support for nursing and midwifery students. Topics included the benefits of mindfulness and positive impact on sleep, concentration, and clarity of thought, as well as using a thematic content analysis that included three themes in the findings: attending to self, attending to others, and attending to the program. Students reported a positive impact using MBSR. This is a useful source because valuable quotes and feedback from students were noted in relationship to the mindfulness programs. For example, students stated they appreciated when they addressed negative thoughts and acknowledged them. Students noted how they were able to sit and be present as opposed to doing multiple things at once. This qualitative research used semi-structured focus group interviews and thematic analysis. The sample size was small (n=10),
female only, and claimed irregular attendance. Self-care was a major theme that emerged in this research. Another concept brought out in this article is that mindfulness can be considered learner support.

**Mindfulness in Nursing Practice**

Lan, Subramanian, Rahmat, and Kar (2013) conducted a study that evaluated the effectiveness of brief mindfulness for critical care nurses in Malaysia to decrease anxiety and to increase well-being. It was a quasi-experimental single group pre/posttest study with 41 nurses, of which 37 completed the study. The MBSR was 2 hours a week for 5 weeks at the hospital and the Perceived Stress Scale (PSS), Depression, Anxiety, and Stress Scale (DASS), Mindfulness Attention and Awareness Scale (MAAS), and Subjective Happiness Scale (SHS) were used. The study found significant improvement in participants’ well-being outcomes and increasing mindfulness. There was not a control group in this study which could be identified as a limitation (Lan et al., 2013).

**Systematic Desensitization With Test Anxiety**

Systematic desensitization has been used by psychologists in the past as a successful treatment for anxiety and phobia. In regard to test anxiety specifically, it has been used more often than other approaches in the past (Russell, Miller, & June, 1975). Most studies incorporating systematic desensitization with test anxiety had been found successful in reducing anxiety (Algaze, 1995; Gonzalez, 1995; Lent & Russell, 1978; Smith & Nye, 1973; Spielberger & Vagg, 1995) and increasing student performance (Gonzalez, 1995; Meichenbaum, 1972).

Smith and Nye (1973) investigated systematic desensitization with test anxiety in 34 undergraduate math and psychology students at a major American university. All participants qualified for the study after scoring high test anxiety levels on Sarason’s 21-item Test Anxiety
Scale. They were given seven taped recordings of systematic desensitization that were 45 minutes long. The training included muscle relaxation and the typical hierarchy construction of anxiety-provoking thoughts. The students were given Sarason’s Test Anxiety Scale and Spielberger’s State Anxiety Scale. A repeated measures analysis of variance of the Test Anxiety Scale scores yielded significant effects for the students. Systematic desensitization was found to be a superior therapy that decreased test anxiety in both instruments used. The control group showed a slight increase in Test Anxiety Scale scores.

Melnick and Russell (1976) assessed the comparative effectiveness of systematic desensitization and a hypnotic technique in reducing self-reported test anxiety and increasing the academic performance of test-anxious undergraduates. The experimental design was a repeated-measures method involving pretreatment and posttreatment assessment of self-report and academic performance variables. Thirty-six volunteers were assigned randomly to either the hypnosis or systematic desensitization treatment condition or to one of two control groups. All subjects had scored above the 50th percentile on the Sarason Test Anxiety Questionnaire (TAQ) and below the 85th percentile on a midterm exam. Results indicated that only the systematic desensitization treatment significantly reduced TAQ scores (Melnick & Russell, 1976). No significant improvement in academic performance was observed for either treatment condition (Melnick & Russell, 1976). However, it is promising that systematic desensitization was an effective treatment for test anxiety itself.

Egbochuku and Obodo (2005) investigated the effect of systematic desensitization therapy on the reduction of test anxiety on some identified test-anxious students. A 2 x 2 x 2-way factorial design was employed. Systematic desensitization was found effective in the reduction of test anxiety of the students who were test anxious (Egbochuku & Obodo, 2005). The most
significant reduction of test anxiety was seen in students that had a high level of anxiety at the beginning of the study (Egbochuku & Obodo, 2005). Gender had no significant effect on the reduction of test anxiety of students (Egbochuku & Obodo, 2005). Since systematic desensitization has been found to be effective in the reduction of test anxiety among adolescents in Nigerian schools; it is recommended this therapy be considered in the treatment of test anxiety (Egbochuku & Obodo, 2005).

Saravanan and Kingston (2014) studied test anxiety in a randomized experimental study at a private university in Malaysia. Seventy-four medical students exhibited high test anxiety levels on the Westside Test Anxiety Scale (WTAS). The study also used the Kessler perceived distress scale (K-10) and the academic motivation scale (AMS). The participants were offered psychoeducation, progressive muscle relaxation, and systematic desensitization. There was a total of five sessions and the systematic desensitization was Session 3 and consisted of the imagined anxiety hierarchy while using muscle relaxation. The study showed that students in the experimental group exhibited significant reduction in their scores of test anxiety compared with scores of the control group (Saravanan & Kingston, 2014). The participants also increased scores of motivation and reduced scores of psychological distress. The study concluded that systematic desensitization was effective in reducing test anxiety.

A similar study was completed with 1st year pharmacy students (Rajiah & Saravanan, 2014). This randomized experimental study was also at a private university in Malaysia. Forty-two pharmacy students exhibited high test anxiety levels on the Westside Test Anxiety Scale (WTAS). The study also used the Kessler perceived distress scale (K-10) and the academic motivation scale (AMS). The participants were offered psychoeducation, progressive muscle relaxation, and systematic desensitization. There was a total of six sessions and the systematic
desensitization was Session 3 and consisted of the imagined anxiety hierarchy while using muscle relaxation. The study showed that students in the experimental group exhibited significant reduction in their scores of test anxiety compared with scores of the control group (Rajiah & Saravanan, 2014). The participants also had increased scores of motivation and reduced scores of psychological distress. The study concluded that students who received systematic desensitization for test anxiety experienced significant reduction in scores on test anxiety and psychological distress compared to students who did not receive the intervention (Rajiah & Saravanan, 2014).

Evans et al. (2010) researched a program that used systematic desensitization to reduce test anxiety and improve academic performance in highly anxious nursing students. The incoming class of junior nursing students from a highly selective state university were screened using the Westside Test Anxiety Scale and placed in a treatment or control group. Students were then asked to complete the Confidence Training for Tests before they took a comprehensive exit exam for nurses. The treatment group showed a significant 12% test score gain over the control group and a 9% gain over the control group on that semester’s grade point average (Evans et al., 2010). The treatment group received the mindfulness intervention including systematic desensitization using Dr. Driscoll’s Confidence Training for Tests. The training was presented as a group, 1-hour long training session. The students were instructed to complete the training again at least twice.

Bowman and Driscoll (2013) replicated the Evans et al. (2010) study in 1st semester college students. The college students were screened using the Westside Test Anxiety Scale and 25 who identified as having high test anxiety were randomly divided into intervention and control groups. The intervention group reviewed the Confidence Training for Tests twice, while
the control group received an information packet on managing anxiety. The intervention group showed a .59 reduction, compared to the controls, on the anxiety retest (Bowman & Driscoll, 2013). The change was statistically significant (t = 3.4, p < .001), and the effect size was high (1.7 SD) (Bowman & Driscoll, 2013).

Summary

In summary, research revealed test anxiety in nursing students and mindfulness interventions for test anxiety. There is seminal work within the discipline of psychology on a specific type of mindfulness, systematic desensitization, but not any current literature within nursing education. The limited research for systematic desensitization in nursing students dealing with test anxiety, and the success of similar mindfulness interventions, warranted support to utilize this conceptual framework to guide the intervention for test anxiety. Systematic desensitization as a framework guided the procedural components of the proposed mindfulness intervention. The three steps of systematic desensitization suppress anxiety by replacing anxiety with relaxation (Wolpe, 1958). When nursing students use this mindfulness technique, they engage in a present moment awareness, with mind-body connections, that negate worried thoughts of the future.
CHAPTER III

METHODS

The purpose of this quasi-experimental study was to examine the impact a mindfulness intervention, using systematic desensitization, had on community college nursing students’ test anxiety levels and test scores. A quantitative method was used as the researcher sought to determine if a specific treatment influenced an outcome (Creswell, 2014). The research strategy was a quasi-experimental study with a pretest/posttest, experimental/control group design. Quasi-experimental is often used when samples are naturally formed groups in a classroom setting (Creswell, 2014). This chapter includes descriptions of the research design, setting, sampling, procedures for implementation and instruments, data collection, and analysis.

Setting

After obtaining Institutional Review Board (IRB) approval from The University of Alabama and the community college site (see Appendix A), the research study took place at an Associate Degree Nursing (ADN) program at a community college in Texas. The program was chosen for convenience purposes, along with an increasing number of students reporting test anxiety during nursing exams. The nursing program maintains full accreditation status by the Accreditation Commission of Education in Nursing. It requires prerequisites including basic science, math, and psychology courses. The program has 4 semesters of nursing courses. The program utilizes an integrated curriculum with theoretical, lab, and clinical courses taken simultaneously. The exams are placed in the theoretical course that meets within the classroom
environment. The exams cover fundamental nursing concepts, as well as disease processes through the life span.

There are between 60 and 70 students enrolled each nursing semester. Each semester has a small team of four-five faculty, with one faculty member in the team leader role. The unit exams are formatted similarly and follow one testing policy (Institution ADN Faculty Handbook, see Appendix B). Before an exam, faculty and students have access to a test blueprint (Testing Blueprint, see Appendix C). Each unit exam has 60-65 questions that are multiple choice. Tests are constructed using a testing software program. The length of time for testing is based on the number of test items; for example, nursing students in each semester will get 1.5 minutes per question.

The testing environment maintains consistency throughout each semester. Faculty follow the test policy to simulate the NCLEX-RN testing environment (Institution ADN Faculty Handbook). Faculty assign seating and proctor the exams, as per departmental policy. The nursing department utilizes ExamSoft ® Exam Management Services to provide computerized testing. Upon completion of each test, students are allowed 30 minutes to review all items, including the answers and rationales. The time after the test, where students can review items, is considered their test review time. During this time the student may provide written feedback for the faculty to address during faculty test review. Initial grading is performed as soon as the test is completed by each student. Raw scores (prior to faculty review) may be immediately released to students at the completion of the test. Within 24 hours after faculty test review, the student’s percentage score and semester average are posted in the learning management system grade center. Exam scores are calculated and posted using two decimal places.
Each faculty team reviews the test questions before and after each unit exam. The nurse faculty team meets before each exam and shares cumulative statistical data from previous semesters, and testing category labels. After each exam, faculty meet for new current statistics and test review. Item analysis of all theory exams is evaluated by several criteria. Test item analysis consists of discrimination index, level of difficulty, and response distribution. Test reliability is measured using K-R 20 statistical analysis. If, after review, the faculty team agrees that the test item statistics are unacceptable, the test item is nullified (Institution ADN Program Faculty Handbook). The course grading policy is the same for each semester in the nursing program.

**Research Positionality**

Qualifications of the researcher include Master of Science in Nursing with 10 years of nursing education experience, the Certified Nurse Educator certification, and 22 years of nursing experience including current psychiatric nursing practice in an acute care setting. The investigator is employed by the community college as a full-time faculty member for theory courses, labs, and medical surgical clinical.

**Participants**

The researcher recruited a purposeful sample in the 1st week of nursing classes during a break of instruction in each of the three theoretical courses. The last semester was excluded from the study, as Nursing 4 students have less time between the first and second exam. Nursing 4 students start clinical and preceptorships that interfere with the scheduling of tests. Nursing 1, 2, and 3 each have a similar exam structure and frequency. The time frame in between the 1st week, the first exam, and the second exam were examined with the same amount of days in between the first and second exam. After the second exam, clinicals start for all 3 semesters.
The researcher was given permission to come into each classroom during a break in instruction on the 1st day of class. The researcher read the recruitment letter and written informed consent was obtained. It was stressed that participation was voluntary. The total number of participants who gave informed consent was 130 students. Of those students, 16 students did not qualify with the test anxiety screening tool. Those students were notified via email that the results of their test anxiety screening were low and they would not qualify for the research study on test anxiety.

The participants were screened for test anxiety by completing the Westside Test Anxiety Scale (Driscoll, 2007). The criteria for the participants were nursing students over 18 who scored 2.5 or above on the Westside Test Anxiety Scale (high test anxiety and above). The G*Power a priori power analysis was calculated with an effect size of 0.25, a power of 0.80, and significance level of 0.05 resulting in needing a sample of 86 students, with 43 students in the experimental group and 43 students in the control group. The needed sample size was exceeded. There were 114 participants initially recruited from the three nursing courses, and each consented to participate in the study. One student emailed and withdrew from the study 3 days later. Another student failed the pharmacology exam and was removed from the nursing program and taken out of the research study. Two other students were removed after consenting and qualifying for the study because they did not attend the group mindfulness session and they were in the experimental group. Therefore, 110 participants remained in the study. The 1st semester had 21 participants, the 2nd semester had 34 participants, and the 3rd semester had 55 participants.

As evidenced by Table 1, a variety of demographic variables were collected to provide data for the research study. These data were collected during a break in instruction of the 1st day of class, after the participants had signed consent.
Table 1

Demographic Information of Participants (n=107)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control (n=54)</th>
<th>Intervention (n=53)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>48 (89%, 89%)</td>
<td>47 (89%, 89%)</td>
</tr>
<tr>
<td>Male</td>
<td>6 (11%, 100%)</td>
<td>6 (11%, 100%)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19-25</td>
<td>23 (43%, 43%)</td>
<td>24 (45%, 45%)</td>
</tr>
<tr>
<td>26-29</td>
<td>12 (22%, 65%)</td>
<td>9 (17%, 62%)</td>
</tr>
<tr>
<td>30-39</td>
<td>10 (19%, 83%)</td>
<td>8 (15%, 77%)</td>
</tr>
<tr>
<td>40-49</td>
<td>7 (13%, 96%)</td>
<td>8 (15%, 92%)</td>
</tr>
<tr>
<td>50-59</td>
<td>2 (4%, 100%)</td>
<td>3 (6%, 98%)</td>
</tr>
<tr>
<td>60 or older</td>
<td>0 (0%, 100%)</td>
<td>1 (2%, 100%)</td>
</tr>
<tr>
<td>Highest degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some college but no degree</td>
<td>28 (52%, 52%)</td>
<td>32 (60%, 60%)</td>
</tr>
<tr>
<td>Associate Degree</td>
<td>22 (41%, 93%)</td>
<td>17 (32%, 92%)</td>
</tr>
<tr>
<td>Bachelor Degree</td>
<td>4 (7%, 100%)</td>
<td>3 (6%, 98%)</td>
</tr>
<tr>
<td>Graduate Degree</td>
<td>0 (0%, 100%)</td>
<td>1 (2%, 100%)</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not employed and not looking</td>
<td>11 (20%, 20%)</td>
<td>15 (28%, 28%)</td>
</tr>
<tr>
<td>Not employed and looking for work</td>
<td>2 (4%, 24%)</td>
<td>1 (2%, 30%)</td>
</tr>
<tr>
<td>Employed and working 1-39 hours per week</td>
<td>38 (70%, 94%)</td>
<td>33 (62%, 92%)</td>
</tr>
<tr>
<td>Employed and working more than 40 hours a week</td>
<td>3 (6%, 100%)</td>
<td>4 (8%, 100%)</td>
</tr>
<tr>
<td>Children</td>
<td>None</td>
<td>One</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td>22 (41%, 41%)</td>
<td>12 (22%, 63%)</td>
</tr>
<tr>
<td></td>
<td>24 (45%, 45%)</td>
<td>15 (28%, 74%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Language</th>
<th>Other</th>
<th>English</th>
<th>Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 (6%, 6%)</td>
<td>48 (89%, 94%)</td>
<td>3 (6%, 100%)</td>
</tr>
<tr>
<td></td>
<td>7 (13%, 13%)</td>
<td>44 (83%, 96%)</td>
<td>2 (4%, 100%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Self-rates high test anxiety</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50 (93%, 93%)</td>
<td>4 (7%, 100%)</td>
</tr>
<tr>
<td></td>
<td>52 (98%, 98%)</td>
<td>1 (2%, 100%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Previous treatment for test anxiety</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>48 (89%, 89%)</td>
<td>6 (11%, 100%)</td>
</tr>
<tr>
<td></td>
<td>46 (87%, 87%)</td>
<td>7 (13%, 100%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Practiced mindfulness</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>46 (85%, 85%)</td>
<td>8 (15%, 100%)</td>
</tr>
<tr>
<td></td>
<td>46 (87%, 87%)</td>
<td>7 (13%, 100%)</td>
</tr>
</tbody>
</table>

*Note:* Frequency (Percentage of Observations, Cumulative Percentage of Observations); Due to rounding errors, column wise percentages may not equal 100%.
Although the groups were randomly assigned, it is noted that both the control and the intervention groups were balanced throughout the demographics. This demonstrates that both groups were similar regarding their demographic data.

**Participant Consent**

The researcher did respect the rights and privacy of the participants. The participants were advised in writing of the voluntary nature of this research. The researcher taught in the 1st semester of nursing, so the nursing program director who had been given IRB training read the recruiting script to avoid any potential coercion. The researcher stressed the students could withdraw at any time and decline to answer any question. A written consent form was signed by each participant (see Appendix D). The consent informed the participants of data collection methods and privacy of information. The copy of the consent remained with the students giving the researcher’s name and instructions for participation. Within the informed signed consent, it was noted that the researcher would collect their grades after the first and second unit exam. For additional student participation, a flyer was posted in the health science center for recruitment purposes (see Appendix E). The researcher received no additional emails from any student to participate in the research study.

There was no financial risk for students to participate. The students were told they might not benefit directly from participating in this study; however, benefits were expected. Students were told they could feel psychological discomfort from the mindfulness activity and feel more anxious as an unintended side effect of discussing test anxiety. The students were told they would be given an electronic download of the multimedia intervention free of charge for participating in the study. Students were also told that if they participated in all six sessions of
the test anxiety intervention, they would be entered into a drawing for a $100.00 Amazon gift card.

**Procedures**

The initial contact with students was face-to-face on an instructional break during the 1st week of classes. After potential participants were provided with a recruitment letter and informed consent document to sign, they completed the demographics questionnaire on paper. See Appendix F for the demographic questionnaire. They were also given the Westside Test Anxiety Scale (WTAS) in paper format to complete for the first data point and screening tool. After recruitment and screening, the researcher removed a total of 16 WTAS that had a score of 2.5 or less, indicating that student only had normal or comfortably low-test anxiety and would not qualify for the study.

Next, randomization into the control and experimental group took place. The researcher separated each semester into the following levels of test anxiety; 2.5-2.9, 3-3.4, 3.5-3.9, 4-4.4, 4.5-4.9, and 5 to make sure that each group had a range of scores in each random group. The researcher randomly made each group, moving the same number of participants into each section. The researcher completed simple randomization and coded each student with a number as their ID. The students were coded by semester and whether they were in the experimental or control group. For example, if the students were randomly assigned to the intervention group and they were a Nursing 1 student, the student would be labeled N1E1. When the next students in that semester were randomly assigned to the control group, they were N1C1. This continued through the number of participants who were included in the study. All 3 semesters were labeled accordingly. All 3 semesters were recorded in an Excel spreadsheet and kept by the researcher in a secure cloud storage to ensure the list was under password protection.
All nursing students were already enrolled in a course within the learning management system named “Student Success.” They were not evaluated within this course but given tips in files and video formats to ensure their success. After consent, the researcher confirmed all students who qualified for the study were enrolled within the course. Only one participant was not enrolled within the Student Success course. The student was emailed and enrolled within the course. The researcher then formed groups to communicate with students via email. The groups were Nursing 1 experimental group, Nursing 1 control group, Nursing 2 experimental group, Nursing 2 control group, Nursing 3 experimental group, and Nursing 3 control group. The researcher also made a group with all participants. The researcher set up assignment links to report completing the intervention independently after the first test would be given.

The researcher emailed each participant in the control group and gave specific instructions to complete the WTAS after the first and second exam. The control group was also instructed not to listen to the mindfulness intervention until after exam two. The researcher emailed each participant in the experimental group and gave specific instructions to complete the WTAS after each exam. They were also to attend a group session to learn about the mindfulness intervention and listen independently five additional times. There were multiple dates and times sent out for the participants in the experimental group to plan the first group meeting. The group session dates were planned frequently in private classrooms around campus. The sessions were before class, during lunch, and after class so that the students could conveniently attend. Each student was emailed and told to attend one session.

Before the first exam, the researcher noted that 5 of the 110 participants were testing in the testing center. The researcher walked the five WTAS to the testing center the day before each exam. The WTAS was given to each student to complete directly after test review, before
leaving the testing center. For the other participants, the researcher hand delivered each semester’s WTAS 15 minutes before the first exam in presence of other faculty. Instructions were given to complete the WTAS after their test review and turn into faculty before leaving the testing area. The researcher did count each WTAS and cross reference after each exam against the master list of names for test security purposes. Each paper document was kept inside a locked office in a locked filing cabinet.

After the first exam, every participant completed the WTAS. The researcher was given exam scores from the first exam by that semester’s team leader. The team leader placed the grades on a spreadsheet with names, which was matched up with their ID and placed within the UA Box spreadsheet that was password protected. The exam scores were kept to the second decimal point and recorded. After the first exam, the experimental group began the test anxiety intervention. The first session was via group in a nursing classroom. The remaining five sessions were independently completed by the student before the second exam. After the second exam, every participant completed the WTAS again and test scores were obtained from each semester’s team leader.

The mindfulness intervention was a multimedia training *Confidence Training for Tests* by Dr. Richard Driscoll, founder of the American Test Anxieties Association. This training leads the student through a mindfulness activity that includes thinking of, preparing for, and taking a test, all while using muscle relaxation to reverse test anxiety. This training utilizes the systematic desensitization protocol. It builds a hierarchy of anxiety arousing stimuli, trains the student in muscle relaxation, and works through the hierarchy while using relaxation techniques. Systematic desensitization training can be implemented either in a group setting with a facilitator, or individually without a facilitator (Lazarus, 1961; Wolpe, 1990). The intervention
was first presented to the treatment group in a group setting in a classroom at the school, outside of normal class time hours. Each time, the lights were dimmed, and students were asked to sit comfortably for the session. These each took 40 minutes and the researcher remained present. The researcher demonstrated the training alongside each participant going through the stretch and muscle relaxation sequence, although no prior training was required (Driscoll, 2018). The group training ensured participants understood the requirements for the mindfulness activity, and the student could download the mindfulness intervention directly onto their personal device of choice after the demonstration.

After this initial group face-to-face training, students were told to independently listen to the training on their own time at school or at home. The students were asked to review the training five more times before the next exam. This gave the students a total of six sessions of desensitization. Much of the literature on systematic desensitization reported five-eight sessions with statistical success (Harris & Johnson, 1980; Holroyd, 1976; Rajiah & Saravanan, 2014; Saravanan & Kingston, 2014; Smith & Nye, 1973); however, Saravanan and Kingston (2014) suggested a brief intervention was best. Saravanan and Kingston (2014) reported that students were more likely to use anxiety management techniques if it was a brief time and it was easy to understand. Once the initial face-to-face was over, the Confidence Training for Tests took the student 22 minutes to complete, because the student could omit the beginning 3 minutes of initial explanation of the product. See Appendix G for details of the multimedia training.

Although mindfulness techniques tend to get more positive results the longer they are implemented, mindfulness literature also suggested starting with shorter timelines. Within mindfulness literature, a high dropout rate was reported as a limitation to previewed studies (Malinski & Todaro-Franceschi, 2011; Sanko et al., 2016). Zeidan, Martucci, Kraft, McHaffie,
and Coghill (2014) conducted an experimental study in the medical community comparing the effects of mindfulness on anxiety by evaluating imaging data along with anxiety and mindfulness inventories. Mindfulness significantly reduced ($p < 0.05$) anxiety in the 4 days of sessions with decreases ranging from 15-22% (Zeidan et al., 2014). The researchers concluded that the benefits of mindfulness are evident after even a brief training, and subjects may be more inclined to continue the practice (Zeidan et al., 2014). Slatyer, Craigie, Heritage, Davis, and Rees (2018) also concluded that brief mindfulness-based interventions were effective at decreasing nurse stress and burnout. This study noted that the traditional 8-week MBSR is highly effective but challenging to recruit and retain busy participants (Slatyer et al., 2018). Furthermore, the curriculum within this study’s setting required a brief intervention to obtain the number of participants needed without introducing bias. The timeframe between the first and second exam is typically 1.5-2 weeks for each nursing semester. Clinicals start after the second exam at varying levels. Some semesters may have a block of clinicals for 1 month before the next exam. Therefore, the time between the first and second exam is similar for each participant in all 3 semesters, approximately 8-9 days.

The students were sent reminder emails between the first and second exam. The experimental groups were reminded to listen five additional times, and the control groups were reminded to not listen and to also complete the WTAS during the second exam. The control group had to be reminded because students in the control group were showing up to the group sessions, and in one case a married couple randomly were assigned one in the experimental and one in the control. The students in the experimental group submitted the times they listened through their Canvas learning management system on an assignment link.
**Instrumentation**

The Westside Test Anxiety Scale (Driscoll, 2007) is a brief, 10-item instrument designed to identify students’ levels of test anxiety. It takes 5-8 minutes to administer and covers anxiety impairment and cognitions which can impair test performance (Driscoll, 2007). The scale measures test anxiety as comfortably low test anxiety (1-1.9) to high (2.5-2.9) and ends with extremely high (4-5). The Westside Scale is found to be a valid measure, based on solid correlations between anxiety reduction as measured by the test anxiety scale and improvements in test performance (Driscoll, 2007). In an additional study by Rajiah and Saravanan (2014), the WTAS alpha reliability scale was 0.89.

In a study with test-anxious college students and test-anxious fifth graders, anxiety reduction correlated to test gains $r = 44$, on average, indicating that changes in the Westside scale could account for 20% of changes in the objective tests (Driscoll, 2007). The scale is free to schools and is publicly accessible. This scale best matched the proposed study because it focuses strongly on performance impairments, with 6 of 10 items specifically about performance problems (Driscoll, 2007). The Westside Test Anxiety Scale changes are found to be closely related to grade changes, suggesting that the scale is a sensitive register of anxiety impairments (Driscoll, 2007). See Appendix H for a copy of the Westside Test Anxiety Scale.

**Research Questions**

This study addressed the following research questions:

1. Do nursing students who receive a mindfulness intervention using systematic desensitization have less test anxiety, as measured on the Westside Test Anxiety Scale, than those students who do not participate?
2. Do nursing students who receive a mindfulness intervention using systematic desensitization have higher exam scores after the intervention?

The null hypotheses for this experimental study were

N1: There is no significant difference in the test anxiety level of nursing students on the Westside Test Anxiety Scale after the mindfulness intervention.

N2: There is no significant difference in the test scores of nursing students after the mindfulness intervention.

Data Collection

The data collection took place at the school of nursing and the participants were emailed communication within Canvas, the learning management system used within the nursing program. Data collection on student test anxiety was accomplished by using three time points: at the beginning of the semester as a screening tool, pre-intervention, and post-intervention. The Westside Test Anxiety Scale (Driscoll, 2007) was administered each time via paper format. The first data collection point also included a demographic survey.

Test scores were documented during the first test without the intervention, and after the second test with the intervention. The independent variable in this study was a mindfulness intervention using systematic desensitization and the dependent variables were the level of test anxiety and test scores. GPA was accounted for through the requirement of 3.2 for participation in the nursing program. Confounding variables could have been an attitude toward mindfulness, cognitive ability, history of general anxiety, coping mechanisms, and learning styles. Once the quantitative data were collected by the researcher, they were stored in a locked office and in a locked filing cabinet. These data points were collected via paper and entered on an Excel spreadsheet. The spreadsheet was kept under password protection within UA Box.
Data collection steps were

Recruitment letter and informed consent the 1st week of class

Demographics and WTAS obtained and documented

Groups randomly assigned and emailed through Student Success Canvas course

First exam given pre intervention—WTAS and exam scores were documented

Group intervention session and students downloaded multimedia training and listened

five more times in the next 8-9 days

Second exam given post intervention—WTAS and exam scores were documented

*Figure 2. Data collection.*

Data collection was completed over a 4-week period and student response rates were high. One hundred seven of the 110 participants completed all three test anxiety scales. Three students did not complete either the second or third WTAS, although they did attend the group session and submitted their assignments that they listened to the intervention. These participants were removed for statistical purposes.

**Data Analysis**

Statistical software was used to conduct the analysis of the quantitative data collected from the study. A mixed method analysis of variance (ANOVA) was used to analyze the
statistical data. Data analysis included a table describing participant demographic information, pre- and posttest instrument scores for each test (differences in outcome), and pre- and posttest exam scores for each group (differences in outcome). Pretest and posttest scores for each group were compared. The statistical significance was set at p < .05.

**Summary**

In summary, this section discussed the research design, and the setting, participants, instrumentation, data collection, and data analysis of the research study. Systematic desensitization was embedded in the intervention of this proposed study as a tool to engage nursing students in mindfulness. Chapter IV will report the findings after statistical analysis, and chapter V will interpret results and discuss implications for nursing education.
CHAPTER IV
RESULTS

The purpose of this research study was to examine the impact a mindfulness intervention, using systematic desensitization, had on community college nursing students’ test anxiety levels and test scores. A quantitative method was used, and the research strategy was a quasi-experimental study with a pretest/posttest, experimental/control group design. The results of this data analysis will address the following research questions:

1. Do nursing students who receive a mindfulness intervention using systematic desensitization have less test anxiety, as measured on the Westside Test Anxiety Scale, than those students who do not participate?

2. Do nursing students who receive a mindfulness intervention using systematic desensitization have higher exam scores after the intervention?

Intervention Fidelity

The mindfulness intervention was administered as planned. There was a sign-in sheet at each group session to ensure each experimental group member attended. There were a few challenges, but they did not prevent the planned intervention. There were technology issues with the students’ personal devices during the group sessions. The community college technology department assisted the researcher in making a continuous MP3 file for those students who had purchased the product but were having trouble downloading the separate files. Two students fell
asleep during the group session. The researcher did have to remove several students from the experimental group session because they were in the control group.

**Preliminary Data Management**

A total of 110 participants remained in the research study. However, preliminary data management required the removal of three additional participants who did not complete one of the three test anxiety scales. A total of 107 participants with complete data were included in the final dataset. The final dataset was then used for statistical analysis. The demographic data were analyzed through descriptive statistics, as seen in Table 1. Prior to addressing the research questions, the two groups were compared on demographic variables and pretest measures of the dependent variables to assure similarity within the random assignment.

**Reliability**

The Westside Test Anxiety Scale (Driscoll, 2007) was used at three different data collection points. A Cronbach alpha coefficient was calculated each time. The Cronbach's alpha coefficient was evaluated using the guidelines suggested by George and Mallery (2016) where > .9 excellent, > .8 good, > .7 acceptable, > .6 questionable, > .5 poor, and ≤ .5 unacceptable. The items for the first anxiety scale had a Cronbach's alpha coefficient of .85, indicating good reliability. The items for the second anxiety scale had a Cronbach's alpha coefficient of .87, also indicating good reliability. Finally, the items for the third anxiety scale had a Cronbach's alpha coefficient of .94, indicating excellent reliability. Table 2 presents the results of the reliability analysis.
Table 2

Reliability Table for Anxiety Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>No. of Items</th>
<th>α</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety 1</td>
<td>10</td>
<td>.85</td>
<td>0.81</td>
<td>0.89</td>
</tr>
<tr>
<td>Anxiety 2</td>
<td>10</td>
<td>.87</td>
<td>0.84</td>
<td>0.91</td>
</tr>
<tr>
<td>Anxiety 3</td>
<td>10</td>
<td>.94</td>
<td>0.92</td>
<td>0.95</td>
</tr>
</tbody>
</table>

*Note.* The lower and upper bounds of Cronbach’s α were calculated using a 95.00% confidence interval.

Statistical Analysis

**Mixed Model ANOVA**

To answer the first research question, if there was a decrease in test anxiety in the experimental group that received the mindfulness intervention, a variety of quantitative analyses were conducted via SPSS software. A mixed model analysis of variance (ANOVA) with one within-subjects factor and one between-subjects factor was conducted to determine whether significant differences existed among the baseline test anxiety score, the pre-intervention test anxiety score, and the post-intervention test anxiety score between the control and experimental group.

The mixed model ANOVA’s assumptions were assessed during the statistical analysis. Normality, the assumption that each of the groups will follow the normal distribution, was assessed by plotting the quantiles of the model residuals against the quantiles of a Chi-square distribution, also called a Q-Q scatterplot (DeCarlo, 1997). For the assumption of normality to be met, the quantiles of the residuals must not strongly deviate from the theoretical quantiles. Strong deviations could indicate that the parameter estimates are unreliable. In this statistical analysis, there was only a slight deviation from normality at one of the tails. However, the sample size of
107 participants prevents cause of concern based on this minor deviation (Field, 2013). Figure 3 presents a Q-Q scatterplot of model residuals.

Figure 3. Q-Q scatterplot for normality of the residuals for the regression model.

Homoscedasticity, the assumption that the variances of each group are equal, was assessed by plotting the residuals against the predicted values (Field, 2013). The assumption of homoscedasticity is met if the points appear randomly distributed with a mean of zero and no apparent curvature. Therefore, in the statistical analysis for this research study, homoscedasticity is met. Figure 4 presents a scatterplot of predicted values and model residuals.
Mauchly’s test was used to assess the assumption of sphericity (Field, 2013; Mauchly, 1940). The results showed that the variances of difference scores between repeated measurements were significantly different from one another based on an alpha of 0.05, \( p < .001 \), indicating the sphericity assumption was violated. Based on the evidence against sphericity, the \( p \)-values for the within-subjects factor and the interaction between group placement the time were calculated using the Greenhouse-Geisser correction. According to Greenhouse and Geisser (1959), this is the appropriate way to adjust for violations of the sphericity assumption.

The statistical results for the mixed model ANOVA were examined based on an alpha of 0.05. The main effect for the groups was significant \( F(1, 105) = 5.16, p = .025 \), indicating that there were significant differences between the experimental and control groups. The main effect for the within-subjects factor was significant \( F(2, 210) = 22.37, p < .001 \), indicating there were significant differences between the values of the baseline test anxiety scale, the pre-intervention
test anxiety scale, and the post-intervention test anxiety scale. The interaction effect between the within-subjects factor and groups placement was significant $F(2, 210) = 45.51, p < .001$, indicating that the two groups had significantly different trends in their changes over time. Table 3 presents the ANOVA results.

Table 3

<table>
<thead>
<tr>
<th>Mixed Model ANOVA Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
</tr>
<tr>
<td>----------------------------</td>
</tr>
<tr>
<td>Between-Subjects</td>
</tr>
<tr>
<td>Group</td>
</tr>
<tr>
<td>Residuals</td>
</tr>
<tr>
<td>Within-Subjects</td>
</tr>
<tr>
<td>Within Factor</td>
</tr>
<tr>
<td>Interaction</td>
</tr>
<tr>
<td>Residuals</td>
</tr>
</tbody>
</table>

The significant interaction effect suggested that changes in the anxiety scores differed between the control and intervention groups. To understand the trends in anxiety for both groups, post hoc contrasts were formulated. The mean contrasts utilized Tukey comparisons based on an alpha of 0.05 and were used to test the differences in the estimated marginal means for each change from baseline to pre to post for both groups. No differences in anxiety were detected throughout the three time periods for the control group. For the intervention group, the baseline test anxiety scores were significantly lower than the pre-intervention test anxiety scores, $t(105) = -2.72, p = .021$, but were significantly greater than the post-intervention anxiety scores, $t(105) = \ldots$
Further, the pre-intervention test anxiety score was significantly greater than the post-intervention test anxiety score, \( t(105) = 10.66, p < .001 \). No other significant differences were found for the group. Table 4 presents the marginal means contrasts for the Mixed Model ANOVA.

### Table 4

*The Marginal Means Contrasts for Each Combination of Within-Subject Variables for the Mixed Model ANOVA*

<table>
<thead>
<tr>
<th>Contrast</th>
<th>Difference</th>
<th>SE</th>
<th>df</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline test anxiety—Pre-intervention test anxiety</td>
<td>-0.10</td>
<td>0.06</td>
<td>105</td>
<td>-1.60</td>
<td>.252</td>
</tr>
<tr>
<td>Baseline test anxiety—Post-intervention test anxiety</td>
<td>-0.21</td>
<td>0.09</td>
<td>105</td>
<td>-2.28</td>
<td>.064</td>
</tr>
<tr>
<td>Pre-intervention test anxiety—Post-intervention test anxiety</td>
<td>-0.11</td>
<td>0.08</td>
<td>105</td>
<td>-1.38</td>
<td>.353</td>
</tr>
<tr>
<td>Group</td>
<td>Intervention</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline test anxiety—Pre-intervention test anxiety</td>
<td>-0.17</td>
<td>0.06</td>
<td>105</td>
<td>-2.72</td>
<td>.021</td>
</tr>
<tr>
<td>Baseline test anxiety—Post-intervention test anxiety</td>
<td>0.68</td>
<td>0.09</td>
<td>105</td>
<td>7.30</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Pre-intervention test anxiety—Post-intervention test anxiety</td>
<td>0.85</td>
<td>0.08</td>
<td>105</td>
<td>10.66</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>

*Note.* Tukey Comparisons were used to test the differences in estimated marginal means.

Summary statistics were calculated for the baseline test anxiety score, the pre- and post-intervention test anxiety scores split by group. For the control group, the observations of the baseline test anxiety score had an average of 3.89 (\( SD = 0.66 \), Min = 2.50, Max = 4.80). For the
intervention group, the observations of the baseline test anxiety score had an average of 3.89 ($SD = 0.64$, Min = 2.60, Max = 5). For the control group, the observations of the pre-intervention test anxiety score had an average of 3.99 ($SD = 0.71$, Min = 2.20, Max = 5). For the intervention group, the observations of the pre-intervention test anxiety score had an average of 4.06 ($SD = 0.61$, Min = 2.50, Max = 5). For the control group, the observations of the post-intervention test anxiety score had an average of 4.10 ($SD = 0.83$, Min = 2, Max = 5). For the intervention group, the observations of the post-intervention test anxiety score had an average of 3.21 ($SD = 0.72$, Min = 1.50, Max = 4.70). The summary statistics can be found in Table 5, and Figure 5, which includes a profile plot of test anxiety scores separated by group.

Table 5

*Summary Statistics Table for Interval and Ratio Variables by Group*

<table>
<thead>
<tr>
<th>Variable</th>
<th>$M$</th>
<th>$SD$</th>
<th>$n$</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline test anxiety</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>3.89</td>
<td>0.66</td>
<td>54</td>
<td>2.50</td>
<td>4.80</td>
</tr>
<tr>
<td>Intervention</td>
<td>3.89</td>
<td>0.64</td>
<td>53</td>
<td>2.60</td>
<td>5.00</td>
</tr>
<tr>
<td><strong>Pre-intervention test anxiety</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>3.99</td>
<td>0.71</td>
<td>54</td>
<td>2.20</td>
<td>5.00</td>
</tr>
<tr>
<td>Intervention</td>
<td>4.06</td>
<td>0.61</td>
<td>53</td>
<td>2.50</td>
<td>5.00</td>
</tr>
<tr>
<td><strong>Post-intervention test anxiety</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>4.10</td>
<td>0.83</td>
<td>54</td>
<td>2.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Intervention</td>
<td>3.21</td>
<td>0.72</td>
<td>53</td>
<td>1.50</td>
<td>4.70</td>
</tr>
</tbody>
</table>
To answer the second research question, if there was an increase in exam scores for the experimental group that received the mindfulness intervention, a variety of quantitative analyses were conducted via SPSS software. A mixed model ANOVA with one within-subjects factor and one between-subjects factor was conducted to determine whether significant differences exist among the first and second exam.

The assumption of normality was assessed by plotting the residuals in a Q-Q scatterplot (DeCarlo, 1997). The assumption of normality was met for the mixed model ANOVA of exam scores. Homoscedasticity was evaluated by plotting the residuals against the predicted values (Field, 2013), and this assumption was also met. Figure 6 presents a Q-Q scatterplot of model residuals, while Figure 7 presents a scatterplot of predicted values and model residuals.
Figure 6. Q-Q scatterplot for normality of the residuals for the regression model.
The usual sphericity assumption does not apply when there are only two repeated measurements, such as the first and second exam scores, and was not tested. The results were examined based on an alpha of 0.05. The main effect group was not significant $F(1, 105) = 1.64$, $p = .203$, indicating the exam scores were not significantly different between the two groups. The main effect for the within-subjects factor was significant $F(1, 105) = 7.37$, $p = .008$, indicating there were significant differences in exam scores between the first and second exam. However, the interaction effect between the within-subjects factor and groups was not significant $F(1, 105) = 0.12$, $p = .729$, indicating that changes in exam score from pre- to post-intervention did not differ between the intervention and control groups. Both groups exhibited a statistically similar decrease in exam score. Table 6 presents the ANOVA results.
Table 6

*Mixed Model ANOVA Results*

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between-Subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>128.14</td>
<td>128.14</td>
<td>1.64</td>
<td>.203</td>
<td>0.02</td>
</tr>
<tr>
<td>Residuals</td>
<td>105</td>
<td>8196.21</td>
<td>78.06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Within-Subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Factor</td>
<td>1</td>
<td>315.62</td>
<td>315.62</td>
<td>7.37</td>
<td>.008</td>
<td>0.07</td>
</tr>
<tr>
<td>Interaction</td>
<td>1</td>
<td>5.17</td>
<td>5.17</td>
<td>0.12</td>
<td>.729</td>
<td>0.00</td>
</tr>
<tr>
<td>Residuals</td>
<td>105</td>
<td>4498.15</td>
<td>42.84</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To better understand the differences over time detected based on the within-effect, post-hoc analyses were conducted for either group individually. The mean contrasts utilized Tukey comparisons based on an alpha of 0.05. For the control group, the first exam’s mean score was significantly greater than the mean score for the second exam, $t(105) = 2.18$, $p = .032$. No other significant differences were detected, and the intervention group was not found to have a significant decrease in exam score. Though both groups exhibited a decrease in exam score, there was no evidence to suggest that the intervention group’s scores were consistently lower, and the decrease could have been a trait of the randomness of the data. Table 7 presents the marginal means contrasts for the Mixed Model ANOVA, and Figure 8 includes the profile plot of exam scores plotted by group.
Table 7

*The Marginal Means Contrasts for Each Combination of Within-Subject Variables for the Mixed Model ANOVA*

<table>
<thead>
<tr>
<th>Contrast</th>
<th>Difference</th>
<th>SE</th>
<th>df</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>Control</td>
<td>EXAM1 - EXAM_2</td>
<td>2.74</td>
<td>1.26</td>
<td>105</td>
</tr>
<tr>
<td>Group</td>
<td>Intervention</td>
<td>EXAM1 - EXAM_2</td>
<td>2.12</td>
<td>1.27</td>
<td>105</td>
</tr>
</tbody>
</table>

*Note.* Tukey Comparisons were used to test the differences in estimated marginal means.

*Figure 8.* Line plot for control and intervention exam scores at pre- and post-intervention.

Summary statistics were calculated for the first and second exam and were split by the groups. For the control group, the observations of the first exam had an average of 80.49 (SD = 7.19, Min = 67.14, Max = 95.59). For the intervention group, the observations of the first exam had an average of 81.73 (SD = 8.36, Min = 65.71, Max = 97.06). For the control group, the observations of second exam had an average of 77.75 (SD = 8.45, Min = 55.88, Max = 95). For
the intervention group, the observations of the second exam had an average of 79.61 ($SD = 6.98$, $Min = 60$, $Max = 95$). The summary statistics can be found in Table 8.

Table 8

*Summary Statistics Table for Interval and Ratio Variables by Group*

<table>
<thead>
<tr>
<th>Variable</th>
<th>$M$</th>
<th>$SD$</th>
<th>$n$</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXAM1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>80.49</td>
<td>7.19</td>
<td>54</td>
<td>67.14</td>
<td>95.59</td>
</tr>
<tr>
<td>Intervention</td>
<td>81.73</td>
<td>8.36</td>
<td>53</td>
<td>65.71</td>
<td>97.06</td>
</tr>
<tr>
<td>EXAM_2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>77.75</td>
<td>8.45</td>
<td>54</td>
<td>55.88</td>
<td>95.00</td>
</tr>
<tr>
<td>Intervention</td>
<td>79.61</td>
<td>6.98</td>
<td>53</td>
<td>60.00</td>
<td>95.00</td>
</tr>
</tbody>
</table>

**Summary**

In summary, the Westside Test Anxiety Scale was found reliable. The two research questions were answered through quantitative data analyses. Assumptions were evaluated and a mixed method ANOVA was used to answer either question. The experimental group did have a statistically significant decrease in test anxiety scores after the mindfulness intervention. The control group did not have this change. Both groups had decreased exam scores between the first and second exam; however, the intervention group did not exhibit a significant decrease in exam score, while the control group’s score significantly decreased.
CHAPTER V
DISCUSSION AND RECOMMENDATIONS

Undergraduate nursing students have a high level of test anxiety related to the high stakes testing within their learning environment. The focus of this study was a mindfulness intervention using systematic desensitization for nursing students who had scored high on a test anxiety questionnaire. The intervention was a multimedia training *Confidence Training for Tests* by Dr. Richard Driscoll, founder of the American Test Anxieties Association. Nursing education needs interventions for decreasing test anxiety that faculty can facilitate as learner support. This study examined a mindfulness intervention using systematic desensitization, and how it affected nursing students’ test anxiety and test scores. The findings from this study are applicable to nursing students and nursing faculty. This chapter presents a summary of the findings of the data presented in Chapter IV along with a summary of how the results fit within the conceptual framework, limitations of the study, implications for nursing education, and recommendations for further research.

**Summary of the Findings**

The test anxiety scale was given to all participants the 1st day of class, giving a baseline anxiety scale score. It was given again after exam one and exam two. The most impactful finding was a statistically significant difference in the pre- and post-intervention test anxiety scores within the experimental group (p<.001) (see Table 6). Therefore, the null hypothesis that the experimental group would not have decreased test anxiety scores can be rejected. The control group did not have any significant changes in the baseline, exam one, or exam two test anxiety scores.
scores. There was a numerical increase in the anxiety score between exam one and exam two, but it was not statistically significant. However, the experimental group had significant changes at each data collection point. From baseline to exam one, their test anxiety scores significantly increased (p=0.021). From exam one to exam two, their test anxiety scores significantly decreased (p<.001). Examining within both groups between the first and second exam remains the most telling about the strength of the relationship between the mindfulness intervention and students’ test anxiety. As noted, the statistical significance within groups from pre- and post-intervention remained pronounced (p<.001).

Dr. Driscoll’s Westside Test Anxiety Scale had the following ratings: 1.0-1.9 Comfortably low test anxiety, 2.0-2.5 Normal or average test anxiety, 2.5-2.9 High normal test anxiety, 3.0-3.4 Moderately high (some items rated 4=high), 3.5-3.9 High test anxiety (half or more of the items rated 4=high), and 4.0-5.0 Extremely high anxiety (items rated 4=high and 5=extreme). Looking at the actual test anxiety scores, the mean of both the control and experimental group were exactly 3.89. Before the first exam, the mean of the control group was 3.99 and the mean of the experimental group was 4.06. After the intervention and exam two, the mean score of the control group was 4.10 and the mean of the experimental group was 3.21.

The test scores between exam one and exam two did not increase. Therefore, the students using the mindfulness intervention did not increase their test scores and the researcher failed to reject the null hypothesis. There was no statistical significance between the groups when test scores were compared (p=0.729). Both the control group and the experimental group did see a decline on their exam scores. However, the control group saw a more measurable decline in exam scores. Within the control group, there was a statistically significant decrease (p=.032) in contrast to the experimental group (p=.099).
Interpretation of Findings

The review of literature indicated there were influential research studies (Bamber & Schneider, 2016; Ratanasiripong et al., 2015; Spadaro & Hunker, 2016) on test anxiety in nursing and how mindfulness can be used to decrease anxiety. There were also seminal works on systematic desensitization (Algaze, 1995; Gonzalez, 1995; Lent & Russell, 1978; Meichenbaum, 1972; Melnick & Russell, 1976; Smith & Nye, 1973; Spielberger & Vagg, 1995), but no current literature using desensitization for test anxiety in nursing. In this current study, when a mixed modal ANOVA was performed to determine if a mindfulness intervention using this conceptual framework would decrease test anxiety, the results did indicate the intervention was successful. The control group’s anxiety scores did not change significantly from baseline to exam one and past exam two. The intervention group’s anxiety scores were significantly different at each of the comparisons; baseline, pre-, and post-intervention. Test performance did not differ significantly. Everyone seemed to decrease in score, but on more specific inspection, there was only enough evidence to show that the control group’s scores significantly decreased. It was noted that the control group had a more significant drop in test scores than the experimental group.

This study confirmed what the review of literature (Bamber & Schneider, 2016; Ratanasiripong et al., 2015; Spadaro & Hunker, 2016) supported; that mindfulness is a successful intervention for test anxiety. The review of literature also found a gap in which systematic desensitization had not been utilized within nursing education, as no research studies were found. Considering the statistical significance of this current study, systematic desensitization is a type of mindfulness that nursing students can use to decrease test anxiety.
Limitations of the Study

Generalizations of the results could be limited in this study as the participants were within one community college in Texas. Other limitations should be considered in this research study. Faculty team teach each semester and it is hard to control what each team and each faculty member did with each student as it pertains to test anxiety. Another limitation is that students may have varying levels of general anxiety which can skew results. The demographic survey asked if the students had past treatment for test anxiety and if they had past experience with mindfulness; however, these variables were not controlled statistically. A potential limitation included the reliance on self-ratings on the anxiety scale. It was noted that several students who said they had test anxiety on the demographic form did not qualify for the research study because their test anxiety scale was below the moderate anxiety level. Another limitation when looking at an impact with the students’ exam scores was the students’ preparation level. It is possible that some students were not prepared for exams, and other students devoted more time and energy to preparing for an exam. Five students took their testing in a testing center with ADA accommodations. They did not get more time, just a private and quiet environment as compared to the classroom.

The content in each semester’s first and second exam could have impacted the study. Most students get a calendar over the summer of the first few weeks’ readings and they can study ahead. This could make the first exam scores higher. For example, in the second semester of the nursing program, the first test is specialty content for obstetrics (OB). They not only study ahead during the summer, but many students may find specialty areas such as OB a “favorite” or exciting field in which they see themselves working. The second exam had more difficult concepts like hypertension, fluid balance, and diabetes. This exam could have been considered
harder by the student thus influencing grades on the second exam. Also, different instructors teach for each exam, using different teaching styles and methods. Those instructors are responsible for writing the test questions. This could have had an impact on the differences between exam one and exam two, not just the students’ anxiety levels. Each nursing semester also has a different percentage of cognitive leveling (see test blueprints, Appendix C). Therefore, Nursing 3 has harder test questions than Nursing 1.

The design of the research project could have impacted the study. The timing of the WTAS delivery was of particular importance, but the times were limited in this setting due to test security and preference to not interfere with the students’ time and attention prior to taking a nursing test. This had the students answering the WTAS directly after they received their raw score of the test. After taking a lengthy difficult test and receiving a raw score that the student may be disappointed in, the data collection time frame could have affected the WTAS.

**Implications for Nursing Education**

“Test anxiety will continue to increase as long as the use of high stakes test and rigorous academic progression policies persist” (Quinn & Peters, 2017, p. 150). The test anxiety that nursing students experience emerges from highly structured processes of testing and assessment within nursing programs (Gibson, 2014). The literature supported nurse educators needing additional support services and interventions for test anxiety. There was no body of knowledge in current nursing education regarding using systematic desensitization for test anxiety. It was a framework in past decades that was found effective. This researcher finds it concerning that such a successful treatment in the past has not been carried into this next generation. As the third wave of behaviorism is going back and embracing behavioral approaches such as mindfulness, it is evident that interventions that have worked in the past do not need to be forgotten. Nursing has
also had a historical pattern of applying theories from other social sciences with our own nursing theories. Nursing should continue to use this interdisciplinary approach for addressing the problem of test anxiety. Using systematic desensitization appears to be an excellent approach to add to our toolbox for student support.

This study will give nurse educators valuable information to facilitate student success and provide learner support. Implementing retention strategies is an important part of the nurse educator role. Nurse educators provide test counseling and remediation. An intervention that can affect a nursing student’s test anxiety level before and during the test is valuable. As test anxiety is increasing within nursing programs, the curriculum should include supportive topics to provide relief. The student will also find value in an instructional tool that can be used independently. The graduate nurse who is preparing for the NCLEX-RN, and entry into the profession of nursing, also needs this type of support for high stakes testing. Students and graduate nurses who struggle with test anxiety can apply mindfulness activities to decrease their test anxiety.

**Recommendations for Future Research**

Although the statistical analysis was complete and reliable, a follow-up period to monitor the student’s cumulative effect of mindfulness would be useful. A qualitative component would have been beneficial. Qualitative research for test anxiety in nursing is limited (Shapiro, 2014), therefore this design would bring new insight into this concern. After the quantitative data analysis, many students continued to offer feedback that their anxiety was better controlled, and their stress level was lower during the test. The students stated it was calming and they felt more confident going into the test. Focus groups after the quantitative data was obtained could add to
the richness of data collected. The participants seemed eager to not only try the intervention, but to approach and discuss the positive effects it was having in study time and testing.

Additional quantitative research with systematic desensitization interventions is needed. This approach could be used within current nursing curricula as a student retention solution. Additional quantitative research with other mindfulness interventions is also needed in nursing education. Randomized experimental studies that incorporate a control group could add to the wealth of literature that mindfulness can aid students with test anxiety.

**Conclusion**

High stakes testing can make or break a dream. Tests are a door that can open so the student can walk into the future or a door that can be slammed shut when a student fails. Test anxiety can be a dream stealer in high stakes testing and has been well documented in nursing education (Bartlett et al., 2016; Duty et al., 2016; Gibson, 2014). The purpose of this quasi-experimental study was to examine the impact a mindfulness intervention, using systematic desensitization, had on community college nursing students’ test anxiety levels and test scores. This study examined if this intervention could help by facilitating a mindfulness activity for nursing students in an effort to decrease their test anxiety and increase their test scores. This study confirmed what the review of literature supports; that mindfulness is a successful intervention for test anxiety. Considering the statistical significance of this current study, systematic desensitization is a type of mindfulness activity that nursing students can use to decrease test anxiety. Therefore, nurse educators need to be aware of this supportive intervention to aid in our student’s success.
REFERENCES


APPENDIX A

IRB APPROVAL LETTERS
July 16, 2019

Allison Collins
College of Education
Department of ELPTS
Box 870302

Re: IRB # EX-19-CM-141: "Implementation of a Mindfulness Activity for Nursing Students with Test Anxiety"

Dear Ms. Collins,

The University of Alabama Institutional Review Board has granted approval for your proposed research. Your application has been given exempt approval according to 45 CFR part 46. Approval has been given under exempt review category 3(i) as outlined below:

(3)(i) Research involving benign behavioral interventions in conjunction with the collection of information from an adult subject through verbal or written responses (including data entry) or audiovisual recording if the subject prospectively agrees to the intervention and information collection and: (C) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by §46.111(a)(7).

The approval for your application will lapse on July 15, 2020. If your research will continue beyond this date, please submit the annual report to the IRB as required by University policy before the lapse. Please note, any modifications made in research design, methodology, or procedures must be submitted to and approved by the IRB before implementation. Please submit a final report form when the study is complete.

Please use reproductions of the IRB-approved informed consent form to obtain consent from your participants.

Sincerely,

[Redacted]

Director & Research Compliance Officer

cc: Dr. Vivian Wright
June 20, 2019

Ms. Allison Collins
1113 Weatherby Way
Durant, OK 74701

Dear Ms. Collins:

RE: IRB Application #2019.01

I am pleased to inform you that your study, Implementation of a Mindfulness Activity for Nursing Students with Test Anxiety, has been reviewed and approved by the Grayson College Institutional Review Board (IRB).

Your study appears to meet the requirements set forth for the protection of human subjects and individual rights. Your approval is valid for three years, and will expire June 20, 2022. Any modifications to this study must be submitted for review and approval prior to implementation. Additionally, you must notify the IRB Committee immediately of any unanticipated incidents. At the conclusion of your study, please submit a copy of the signed consent forms and your final report to the Grayson College IRB.

Congratulations! We look forward to hearing from you and to receiving your final report.

Sincerely,

[Signature]

Institutional Review Board
APPENDIX B

COLLEGE TESTING POLICY

(excerpt from faculty handbook)
**Test Construction**
(Revised 01/2019)

1. Tests are prepared according to a test blueprint.

2. Tests are constructed by the faculty using the testing software program.

3. Unit exams in Nursing 1, 2, 3 and 4 will include 3-5 questions per lecture hour of material covered on the exam. Final exams in Nursing 1, 2, 3, 4 and TE courses will be comprehensive.

4. The Transitional Entry unit exams and final will be based on a blueprint provided by the instructor prior to each exam. The blueprint will identify the content that is covered on the exam and how many questions per content area.

5. Nursing 1, 2, and 3 exams may include two (2) pharmacological math questions, and Nursing 4 exams may include up to four (4) pharmacological math questions on each exam. Nursing 3 and Nursing 4 exams will also include EKG interpretation questions and leadership/delegation questions on all exams following content presentation. Rounding instructions will be included in the stem of each math question. Labeling of math calculations with the appropriate unit of measure will not be required on computerized math exams. Instructions should remind students to label when appropriate. Alternate testing format items (identified in the NCLEX®-RN candidate bulletin) should be included to help prepare students for these type questions on the NCLEX® exam.

6. On exams given in RNSG2404, 2414, and 2435, a minimum of 5 questions will be comprehensive concepts will be based upon identified areas of weaknesses in the end-of-program student learning outcomes.

7. Faculty should strive to use terms on exams that are understandable to all cultures. Students should also be encouraged to let faculty know when a term or phrase is being used on an exam or lecture that might be frequently misunderstood.

8. Test questions on all exams will be randomized.

**Testing Time**
(Reviewed 11/2018)

Length of time for testing is based on the number of test items on the exam. A maximum of 1.5 minutes per question will be allowed on theory tests including final HESI exams but excluding math exams. Notices/Instructions presented at the beginning of each exam should include the number of test items on the exam, and the length of time available to complete the exam.
Students will be allowed 5 minutes prior to the start of every exam to write notes on the provided piece of scratch paper. When the 5 minutes have expired, students must then begin the exam, and the exam will end at the designated time. If a student arrives late to an exam, the student will forfeit this time and must begin the exam immediately.

**Cognitive Leveling**  
(Reviewed 12/2017)

The goal of ADN instructional teams is to achieve the following percentages of cognitive leveling on exams across the curriculum.

<table>
<thead>
<tr>
<th>Cognitive Level</th>
<th>Nursing 1</th>
<th>Nursing 2</th>
<th>Nursing 3</th>
<th>Nursing 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge &amp; Comprehension</td>
<td>25%</td>
<td>15%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Application</td>
<td>60%</td>
<td>55%</td>
<td>50%</td>
<td>40%</td>
</tr>
<tr>
<td>Analysis, Synthesis &amp; Evaluation</td>
<td>15%</td>
<td>30%</td>
<td>50%</td>
<td>60%</td>
</tr>
</tbody>
</table>

**Exam Guidelines**  
(Revised 11/2018)

1. Dates of all scheduled examinations are posted. The scheduled test material is based on course and syllabus learning objectives.

2. All tests must be completed and submitted within the designated time frame.
   a. All tests will start at the scheduled time and students will be instructed when they may begin the test. These students will be allowed to use the full time per the guidelines listed below. Should a student arrive late to the test, the instructor will give the student two options. The student may take the test but will not have an extension of the ending time. Should the student decide to take the exam after arriving late, faculty will stop the test at the stated ending time. The student will also be given the option to take a make-up test (if the student has not missed any other tests). Make-up exams will be given according to the class calendar.
   b. Students may miss only one unit exam per semester due to an emergency or serious illness.
   c. Make-ups for unit exams will be given at the end of the semester, prior to the final exam.
   d. Missed make-up exams will not be rescheduled.
   e. Final exams are comprehensive and **must** be taken at the designated time. No make-up final exams will be given.
In order to simulate a NCLEX-RN testing environment all papers, books, electronic devices (unless an approved device for testing), watches, hats/caps, hooded sweatshirts, coats, scarfs, and personal writing tools will not be allowed. Cellular phones must be turned off and placed in the front of the room. Exceptions may be made on an individual basis. Faculty will provide students with writing tools. Purses and backpacks are to be left in the front or back of the classroom during testing. All cell phones must be turned off. *(No vibrate mode allowed).*

No food or drinks are allowed during the exam.

Faculty may assign seating for each test. If assigned seating is being utilized, students may not change their assigned seat.

Students testing in Examsoft will use calculators provided by the ExamSoft program.

The ExamSoft program logs/tracks student activity while the exam is in progress. Student responses are backed up and saved automatically throughout the exam.

In an effort to emulate the NCLEX examination process, questions on the test will be presented one time and once submitted the student will not be able to go back to any question. However, navigating backwards to questions will be allowed on pharmacological math exams only.

Students will not be given assistance with any question regarding terminology during exams. Students are encouraged to let faculty know when a term or phrase is being used on an exam or lecture that might be frequently misunderstood.

ExamSoft notifies each student when five minutes remain on the exam.

The student is responsible for being familiar with the testing software and any instructions provided by ExamSoft on its website prior to the start of every exam.

The student is responsible for maintaining and operating any personal electronic device. Please allow sufficient time to become proficient with a personal electronic device prior to use on exams.

In the event of a computer problem with a student’s personal computer, a faculty member will accompany the student to a computer lab for test completion. No exam will be delayed due to a problem with a personal device.

The college’s Information Technology department is not responsible for the maintenance or repair of a student’s personal device.
15. Any attempt to disable or tamper with testing security features will be considered a violation of the College Student Conduct policy and will be subject to discipline, including suspension.

16. Prior to exiting the room, students must show the instructors confirmation of their exam upload.

17. Any student in violation of these guidelines may result in a deduction of 10 points from the exam grade. Repeated offenses may result in further disciplinary action. If evidence of academic dishonesty is discovered, then the students will be subject to the policies of the College regarding academic dishonesty.

**Accepted Answers**
(Revised 03/2018)

On all exams the only accepted answer will be the answer that is designated in testing software. Answers written on any other source will not be accepted and/or counted in the grade of the exam.

**Nullified Questions on Exams**
(New 05/2017)

If the faculty team decides an item will be nullified on an exam, then all exam-takers will receive credit for that test item. A nullified question will not change the overall number of items on that exam.

**Test Review**
(Reviewed 12/2017)

Upon completion of each test, students are allowed thirty (30) minutes to review all items, including the answers and rationales. During this time the student may provide written feedback for the faculty to address during faculty test review.

**Test Counseling**
(Reviewed 03/2018)

A student who fails an exam with a grade below 74.5% will be required to complete a *Test Counseling Form*. After completing the form, the student will take it to the clinical professor or appropriate team coordinator for test counseling prior to the next test. The faculty member and
student will discuss and plan remediation as deemed necessary based on information on the Test Counseling Form and that provided by the student.

Test counseling is available for all students by appointment only. For all test counseling sessions, only one test will be reviewed at a time.

**Grading Policies**

**Course Grading Policy**
(Revised 12/2017)

The grading policy for the ADN program follows that of the college for the letter grading system and grade point determination. This policy is found in the College Catalog. ADN course grades are assigned as follows:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Interpretation</th>
<th>Numerical Grade</th>
<th>Grade Points/ Semester Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Excellent</td>
<td>89.50-100</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>Good</td>
<td>79.50-89.49</td>
<td>3</td>
</tr>
<tr>
<td>C</td>
<td>Satisfactory</td>
<td>74.50-79.49</td>
<td>2</td>
</tr>
<tr>
<td>D</td>
<td>Failing</td>
<td>64.50-74.49</td>
<td>1</td>
</tr>
<tr>
<td>F</td>
<td>Failing</td>
<td>64.49 - and below</td>
<td>0</td>
</tr>
</tbody>
</table>

According to college policy a letter grade of “D” is considered unsatisfactory in a student’s major field of study and generally does not transfer. Therefore, a grade of “C” or better is necessary in the theory course, and a grade of “S” (satisfactory, which is equal to a “Pass” on transcripts) in the lab, and clinical courses for satisfactory completion of each level and progression to the next nursing course.

**ExamSoft Testing**
(Reviewed 5/2017)

The nursing department utilizes ExamSoft Exam Management Services to provide computerized testing. ExamSoft uses an online application called Examplify to securely deliver tests to personal computers, laptops or tablets. Tests are password protected and ExamSoft provides 256 bit encryption security. Exams are downloaded by the student prior to test time. When the testing starts each computer is locked down preventing navigation to the internet or any resident computer application or information.

Each student is responsible for registering on-line and paying the required fee at the beginning of each semester. Registration must be completed at least one week prior to the first test of the semester.

To assist students with learning how to utilize and navigate the Examplify program, practice exams may be provided by each Nursing Team. Accessing and completing the practice exam(s)
is/are mandatory prior to the first unit exam or by a designated date set by the nursing instructors. The practice exam(s) is/are not included in the student’s test scores for the semester.

**Exam Grading Policy**  
(Reviewed 12/2017)

Exams are graded electronically using ExamSoft’s computerized scoring system. The ExamSoft software will be set to the “default” weighting option for grading. For each exam, the computer counts the total number of items correct, which is the raw score, and also calculates a percent score (number of correct items divided by total number of questions). Initial grading is performed as soon as the test is completed by each student. Raw scores (prior to faculty review) may be immediately released to students at the completion of the test. Within twenty-four hours after faculty test review, the student’s percentage score and semester average will be posted in the Learning Management System Grade Center. Exam scores will be calculated and posted using two decimal places.

**Changes to Exams Following Initial Test Review**  
(Reviewed 11/2018)

If a potential error or discrepancy on an exam is discovered or brought to the attention of the faculty following the initial post exam test review during the current semester, the instructional team must meet, discuss the issue and vote to determine what actions will take place. A summary of the discussion and team decision must be documented in team meeting minutes.

**Test Item Analysis**  
(Reviewed 05/2017)

Item analysis on all theory exams is evaluated by several criteria. Test item analysis consists of: discrimination index, level of difficulty, and response distribution. Test reliability will be measured using K-R 20 statistical analysis. K-R values of less than .70 reflect test items with low discrimination.

Faculty test items analysis will include:

1. All test items will be reviewed for difficulty and discrimination.

2. Team members will review all test items with:
   - Difficulty of 95% or above
   - Difficulty of 60% or less
   - Discrimination of .09% or less

3. Test items will be reviewed prior to re-use if:
   - Difficulty is 95 – 100% (Excluding essential knowledge items)
   - Difficulty is 35% or below
   - Distractors are present that are ineffective (selected by very few students)

Revisions will be made based on Team discussion and statistical analysis.
4. Interpretation of Discrimination values (point biserial correlation coefficient):

<table>
<thead>
<tr>
<th>Correlation Coefficient</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.30 and above</td>
<td>Very good item</td>
</tr>
<tr>
<td>0.20 - 0.29</td>
<td>Reasonably good item</td>
</tr>
<tr>
<td>0.09 - 0.19</td>
<td>Marginally acceptable item</td>
</tr>
<tr>
<td>0.09 and below</td>
<td>Poor item: Requires careful review</td>
</tr>
</tbody>
</table>

If, after review, the faculty team agrees that the test item statistics are unacceptable, the test item will be nullified. Verbal and written comments/feedback concerning test items submitted by students during test review are to be reviewed by faculty team members. Following test item analysis and review, test items may be nullified or multiple answers accepted if faculty consensus is that a test item did not address course objectives, was too difficult, was misleading, and/or was open to multiple interpretations.
APPENDIX C

TEST BLUEPRINT
## RNSG1423 Test 1  Total Questions= 64

**Test 1: Sept. 5, 2019**

<table>
<thead>
<tr>
<th>Topic</th>
<th># of items</th>
<th># Kn/Co</th>
<th># App</th>
<th># An/Syn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Thinking/Test Taking (2)</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Hygiene (1)</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Professionalism (3)</td>
<td>12</td>
<td>3</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Assess/Interview (2)</td>
<td>8</td>
<td>2</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Communication &amp; Caring (3)</td>
<td>10</td>
<td>2</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Vital Signs (5)</td>
<td>18</td>
<td>4</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>Resp Assessment (1.5)</td>
<td>8</td>
<td>2</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

## RNSG1423 Test 2  Total Questions= 60

**Test 2- Sept. 13**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Number of items</th>
<th># Kn/Co</th>
<th># App</th>
<th># An/Syn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular Assessment (2.5)</td>
<td>11</td>
<td>2</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Endo/Integ Assessment (2)</td>
<td>8</td>
<td>2</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Isolation/Infection Control (2)</td>
<td>12</td>
<td>3</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>GI Assessment (3)</td>
<td>12</td>
<td>3</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Fluid Balance (2)</td>
<td>8</td>
<td>2</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>MS assess (1.5)</td>
<td>6</td>
<td>1</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Math</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Cognitive Level

<table>
<thead>
<tr>
<th>Cognitive Level</th>
<th>Nursing 1</th>
<th>Nursing 2</th>
<th>Nursing 3</th>
<th>Nursing 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge &amp; Comprehension</td>
<td>25%</td>
<td>15%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Application</td>
<td>60%</td>
<td>55%</td>
<td>50%</td>
<td>40%</td>
</tr>
<tr>
<td>Analysis, Synthesis &amp; Evaluation</td>
<td>15%</td>
<td>30%</td>
<td>50%</td>
<td>60%</td>
</tr>
</tbody>
</table>
# RNSG 2404  Test 1 Fall 2019

To be used by faculty for assigning test questions related to test generation.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Number of items</th>
<th># Kn/Co</th>
<th># App</th>
<th># An/Syn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundations of OB</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Antepartum</td>
<td>10</td>
<td>1</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Intrapartum</td>
<td>13</td>
<td>2</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Fetal Monitoring</td>
<td>9</td>
<td>1</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Newborn Assessment</td>
<td>8</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Postpartum</td>
<td>8</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Newborn Care</td>
<td>8</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Fundamentals questions</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Math</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Questions</td>
<td>67</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

# RNSG 2404  Test 2 Fall 2019

To be used by faculty for assigning test questions related to test generation.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Number of items</th>
<th># Kn/Co</th>
<th># App</th>
<th># An/Syn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre/Intra Op/ PACU/Post Op</td>
<td>10</td>
<td>1</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Therapeutic Communication</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>IV Fluids and Electrolytes</td>
<td>14</td>
<td>2</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Shock</td>
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<td>55%</td>
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Associate Degree Nursing  
Test assignment/blueprint form  
RNSG 2404  Test 1 Fall 2019

Test 1

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<td>Psych Therapies</td>
<td>8-10</td>
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<tr>
<td>Anxiety/Crisis</td>
<td>8-10</td>
</tr>
<tr>
<td>Abuse/Neglect</td>
<td>8-10</td>
</tr>
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<td>Schizophrenia/</td>
<td>8-10</td>
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<td>Addictive Behaviors</td>
<td>10-12</td>
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<td>Mood Disorders</td>
<td>10-12</td>
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<td>Psychiatric Medications</td>
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<td>Previous questions</td>
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Test 2

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<td>Blood Administration</td>
<td>8-10</td>
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<tr>
<td>CAD</td>
<td>10-12</td>
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<td>Heart Failure</td>
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<td>Dysrhythmias</td>
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<tr>
<td>Application</td>
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<tr>
<td>Analysis, Synthesis &amp; Evaluation</td>
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</table>
Please read this informed consent carefully before you decide to participate in the study.

Consent Form Key Information:

- Take a screening for test anxiety and complete a demographics study
- Randomly assigned to control group and intervention group if screening moderate to high test anxiety
- Listen to a mindfulness multimedia intervention six times (22 minutes long) between Exam 1 and 2 - the first session will be face to face and the others on your own
- Control group will wait to listen after exam 2 but will receive the same group sessions and multimedia intervention after exam 2
- Potential for the surveys to make you think about test anxiety
- Potential for the study to decease test anxiety and increase test scores

Purpose of the research study: Test anxiety is prominent in nursing programs and can affect student success. The purpose of this study is to examine the impact a mindfulness intervention has on community college nursing students’ test anxiety levels and test scores. You are being asked to join because you identified as having test anxiety.

What you will do in the study: When you participate, you will be asked questions about your background. You will be asked to answer stress and anxiety questions before taking a nursing test. If you qualify for the study, you will be randomly selected to be in the intervention group or the control group. If you are in the intervention group, you will listen six times to a 22-minute session to help you think of test situations and practice relaxing. One of the sessions will be in a nursing classroom, and the other five will be on your own time. This will take place between the first and second tests of the semester. If you are in the control group, you will be given a session after the second exam, along with the multimedia training downloaded to any personal device. After you take your second exam, all students will answer the stress and anxiety questions again. You may skip any question that makes you uncomfortable. The anxiety questions and exam scores will be viewed and compared to see if this intervention increases test scores or decreases test anxiety.

Time required: The study will require about 3 hours of your time if you are in the intervention group. If you are in the control group, it will require about 1 hour of your time. For both groups, 15 minutes will be needed to complete demographics and a test anxiety scale on three different occasions. The intervention group will attend a group session for 45 minutes and then listen to their mindfulness activity on their own time the remaining two hours.

Risks: There are no anticipated physical or financial risks for you to participate. There may be emotional discomfort when thinking about test anxiety.

Benefits: There are no direct benefits to you for participating in this research study. The study may help us examine an intervention that helps with test anxiety. If this intervention is successfully, it would help nursing students and faculty have a tool to use for test anxiety. It would also add to the body of scientific literature that examines mindfulness as an intervention for test anxiety.
Confidentiality: The information that you give in the study will be handled confidentially. Your information will be assigned a code number. The list connecting your name to this code will be kept in a locked file. When the study is completed, and the data have been analyzed, this list will be destroyed. Your name will not be used in any report. The information from the research may be presented or published for educational purposes; however, your identity will not be given out.

Voluntary participation: Your participation in the study is completely voluntary. Your decision whether or not to participate will not affect your relationship with Allison Collins or the College and other nursing faculty. If you decide to participate, you can stop at any time.

Right to withdraw from the study: You have the right to withdraw from the study at any time without penalty.

How to withdraw from the study: If you want to withdraw from the study, let Ms. Collins know and you can withdraw your complete test anxiety scales. There is no penalty for withdrawing.

Compensation/Reimbursement: You will be given the product for free to download on your own device. You will be placed in a drawing for a $100.00 gift card if you complete all three test anxiety questionnaires that are needed for the study.

If you have questions about the study or need to report a study related issue please contact, contact:
Name of Principal Investigator: Allison Collins MS, RN, CNE
Title: EdD candidate
Department Name: Educational Leadership, Policy, and Technology Studies
Telephone: (580) 775-7170
Email address: alcollins8@crimson.ua.edu

Faculty Advisor’s Name: Dr. Vivian Wright
Department Name: Educational Leadership, Policy, and Technology Studies
Email address: vwright@ua.edu

If you have questions about your rights as a participant in a research study, would like to make suggestions or file complaints and concerns about the research study, please contact: Ms. Tanta Myles, the University of Alabama Research Compliance Officer at (205)-348-8461 or toll-free at 1-877-820-3066. You may also ask questions, make suggestions, or file complaints and concerns through the IRB Outreach Website at http://ovpred.ua.edu/research-compliance/prco/. You may email the Office for Research Compliance at rscompliance@research.ua.edu.

Agreement:
I agree to participate in the research study described above.
I do **not** agree to participate in the research study described above.

<table>
<thead>
<tr>
<th>Signature of Research Participant</th>
<th>Date</th>
</tr>
</thead>
</table>

**Print Name** of Research Participant

<table>
<thead>
<tr>
<th>Signature of Investigator or other Person Obtaining Consent</th>
<th>Date</th>
</tr>
</thead>
</table>

**Print Name of Investigator or other Person Obtaining Consent**
APPENDIX E

RECRUITMENT FLYER
VOLUNTEERS NEEDED FOR RESEARCH ON TEST ANXIETY

I am looking for volunteers to participate in a research study on test anxiety. If you are in Nursing 1, 2, or 3, and have test anxiety, you are qualified for the study. If you decide to participate, you will be asked stress and anxiety questions before the first test and after the second test this semester. Between the tests, you will get a free multimedia *Confidence Training for Tests*, that you will listen to with a group in a nursing classroom, and then five times on your own. It will take 22 minutes each time. This research project will look at test anxiety and test scores before and after the intervention. If you are in the control group, you will be given the intervention after your second exam. If you fill out the test anxiety scale all three times, you will be entered into a drawing for a 100$ amazon gift card.

If you are interested, please stay during the first day of class for more information or email alcollins8@crimson.ua.edu

DEADLINE to sign up: August 23 at 3pm

Thank you! Ms. Allison Collins
Demographics Survey

1. What is your gender?
   - Female
   - Male
   - Other (specify)

2. Which category below includes your age?
   - 19-25
   - 26-29
   - 30-39
   - 40-49
   - 50-59
   - 60 or older

3. What is the highest level of school you have completed or the highest degree you have received?
   - Some college but no degree
   - Associate degree
   - Bachelor’s degree
   - Graduate degree

4. Which of the following categories best describes your employment status?
   - Employed, working 40 or more hours per week
   - Employed, working 1-39 hours per week
   - Not employed, looking for work
   - Not employed, NOT looking for work
   - Disabled, not able to work

9. How many children age 18 or younger live in your household?
   - None
   - 1
   - 2
   - 3
   - 4
   - More than 4

10. What language do you mainly speak at home?
    - English
    - Spanish
    - Some other language

11. Would you self-report that you experience test anxiety?
    - Yes
    - No

12. Have you received counseling or treatment for test anxiety?
    - Yes
    - No
    If yes, please describe

12. Have you practiced mindfulness?
    - Yes
    - No
    If yes, please describe

14. What semester of Nursing are you currently enrolled in?
    - 1
    - 2
    - 3
    - 4
APPENDIX G

CONTENT OF CONFIDENCE TRAINING FOR TESTS
Content of *Confidence Training for Tests*

1. Intro 2.08 minutes: Explains training that incorporates an interest in the subject, and muscle relaxation during desensitization with the hierarchy of taking a test.

2. Into the Zone 5.34 minutes: Training on muscle relaxation that includes head, shoulders, back, stomach, buttocks, legs, and feet.

3. Brief review 3.43: Shorter version of above. Begin training here if the student has already listened to track 1 and 2.

4. Pleasant Activity 2.09 minutes: Imagine scenes or an activity that is interesting and invites curiosity.

5. Preparation 1.09 minutes: Discusses the study and testing scenes in which you have an interest in the subject. Prompts the student to stretch arms and breathe to relax. Discusses reversing anxiety in each of the specific scenarios that follow.

6. In a class 1.45 minutes: Prompts students to be interested and have the desire to understand material. Prompts to see the importance of the material. Has student stretch arms and use muscle relaxation and relax.

7. Interested 1.57 minutes: Imagine reviewing material while studying and being interested, while breathing and using progressive muscle relaxation.

8. Studying 1:36 minutes: Imagine night before the test looking over material and understanding. Discusses readiness and preparedness with muscle relaxation.

9. To the Test 1.51 minutes: Imagine being ready to take the test. Imagine walking in with control of the material and confidence. Breathing and relaxation.

10. Easy Questions First 1.39 minutes: Imagine “unloading information” and answering questions properly. Muscle relaxation with relaxation.
11. Harder Items 2.19 minutes: Breathing and stretching while answering harder test items.

12. It is Over 1.37 minutes: Test is over- discussing worry and stating you did the best you could.

Discussed activity student would enjoy for comfort.

13. Finish 1.22 minutes: Hands over head with stretching, Legs stretched with breathing and relaxation. Discusses student remaining calm and interested.
APPENDIX H

WESTSIDE TEST ANXIETY SCALE
Circle how true each of the following is of you, using the 5-point scale:

extremely always true (5), highly usually true (4), moderately sometimes true (3)

slightly seldom true (2), not at all never true (1)

__ 1) The closer I am to a major exam, the harder it is for me to concentrate on the material.

5 4 3 2 1

__ 2) When I study, I worry that I will not remember the material on the exam.

5 4 3 2 1

__ 3) During important exams, I think that I am doing awful or that I may fail.

5 4 3 2 1

__ 4) I lose focus on important exams, and I cannot remember material that I knew before the exam.

5 4 3 2 1

__ 5) I finally remember the answer to exam questions after the exam is already over.

5 4 3 2 1

__ 6) I worry so much before a major exam that I am too worn out to do my best on the exam.

5 4 3 2 1

__ 7) I feel out of sorts or not really myself when I take important exams.

5 4 3 2 1

__ 8) I find that my mind sometimes wanders when I am taking important exams.

5 4 3 2 1

__ 9) After an exam, I worry about whether I did well enough.

5 4 3 2 1

__ 10) I feel that whatever I do will not be good enough.

5 4 3 2 1

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Please include author and web address: http://TestAnxietyControl.com/schools/TstAnxMeasure.pdf
(Only researcher had this section)

_____ Sum of the 10 questions

<_____> Divide the sum by 10. This is your Test Anxiety score.

What does your test anxiety score mean? 1.0—1.9 Comfortably low test anxiety 2.0—2.5 Normal or average test anxiety 2.5—2.9 High normal test anxiety 3.0—3.4 Moderately high (some items rated 4=high) 3.5—3.9 High test anxiety (half or more of the items rated 4=high) 4.0—5.0 Extremely high anxiety (items rated 4=high and 5=extreme)