

REDUCING NOVICE BACCALAUREATE NURSING STUDENT TEST
ANXIETY AND IMPROVING TEST PERFORMANCE THROUGH A TEST-
TAKING INTERVENTION: A PILOT STUDY

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DEDICATION

To my Lord and Savior, Jesus, who ignited a passion inside me to serve others as a nurse, to empower others with the education and clinical training needed to join such a wonderful profession, and for blessing me along this journey. I am deeply grateful for Your never ending grace and limitless love.

In memory of my parents Walter and Bettie Kyle who worked their entire lives to help me better mine. My father only had an eighth grade education; yet, knowing the value worked two jobs consistently so his two girls would have better. To my mother, who was my best friend and biggest supporter, I still strive to be as selfless as you were with your family, friends, community, and church. Thank you for teaching me that with hard work and determination I could overcome my speech impediment and learning disabilities.

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ABSTRACT

PATRICIA KYLE SCHRADER

REDUCING NOVICE BACCALAUREATE NURSING STUDENT TEST ANXIETY AND IMPROVING TEST PERFORMANCE THROUGH A TEST- TAKING INTERVENTION: A PILOT STUDY

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The purpose of this experimental posttest only study was to examine the effectiveness of a three hour test-taking program, when compared to a presentation on professional nursing roles program, on test anxiety levels and test performance of junior undergraduate nursing students enrolled in a baccalaureate college of nursing. The Transactional Model of Test Anxiety by Zeidner (1998) guided the literature review and development a cognitive intervention to modify an individual's personal variable of study skills in hopes of reducing test anxiety and improving test accuracy. The presentation was followed by 14-weeks of online activities to reinforce concepts and application of a systematic approach to answer test questions. The pilot study included a diverse sample of 57 subjects, from 20 to 47 years of age, who were randomized into either the intervention or control groups. The test anxiety scores, measured by the Test Anxiety Inventory by Spielberger et al. (1980), included total test anxiety (TAI-T), worry (TAI-W), and emotionality (TAI-E), were gathered

immediately prior to the final exam. The final exam, accounted for 15% of the course grade was the HESI® fundamental specialty exam, served as the academic performance measurement. The results revealed first semester junior nursing students have a moderate (64.9%) to high (15.8%) propensity of test anxiety. A one tailed independent *t*-test was used to reject all four directional hypotheses. This educational intervention followed with 14 weeks of application activities did not decrease total test anxiety scores compared to the attention control group ($p = 0.44$). Nor did the test anxiety subscales of worry ($p = 0.48$) and emotionality ($p = 0.37$) differ significantly between groups. The slight improvement in the HESI® fundamental specialty exam mean score of 32.9 points in the intervention group was not statistically significant ($p = 0.21$). The effect size for this particular educational intervention was very small. A power analysis revealed larger sample sizes are needed for future research. Test anxiety is a complex construct which will require a much more robust holistic intervention to modify more than a few personal variables in order to improve academic performance.

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CHAPTER I

INTRODUCTION

With an aging population and increasing numbers of Americans having health insurance coverage, the need for qualified nurses continues to grow, particularly since many older nurses will be retiring from the profession (Auerbauch, Buerhaus, & Staiger, 2011). However, admission to nursing programs remains challenging because nursing programs turned away more than 50,000 qualified applicants in 2016 due to lack of faculty, space, and financial support within nursing programs (American Association of Colleges of Nursing, 2017). Because space is at a premium, nursing programs strive to accept the most well-rounded, diverse, knowledgeable candidates to meet the demands of the nursing workforce.

Although programs focus on accepting the most qualified applicants, a major issue is program attrition. Nursing program attrition rates markedly vary with ranges from a low of 10% (Davidhizar, & Shearer, 2005; Newton, & Moore, 2009; Uyehara, Magnussen, Itano, & Zhang, 2007) to as high as 50% for culturally diverse student populations (Brown & Marshall, 2008). To further compound the problem, attrition is underestimated because it is tracked differently among programs. Buchan (2006) noted that attrition rates of 20% and higher are a concern to the nursing profession. Not only does attrition take a toll on the number of students successfully completing nursing programs, but it also generates emotional and financial concerns (Urwin et al., 2009). Attrition also has an emotional impact on program faculty and continuing students (Jeffreys, 2007; O'Donnell,

2009). Finally, nursing program attrition limits the numbers of graduates available to healthcare entities searching for personnel (Mulholland, Anionwu, Atkins, Tapperns, & Franks, 2008).

Several factors influence nursing program attrition. The rigors of nursing curricula leave little time for activities other than school and eventual passage of the licensure examination. Research on attrition has shed little light on the cognitive factors such as students' abilities to process information, problem solve and/or demonstrate clinical reasoning (Pitt, Powis, Levett-Jones, & Hunter, 2012). Furthermore, high stakes testing, examinations administered throughout and at the end of nursing programs, play a role in attrition (Pitt et. al., 2012). Often, nursing student success and progression in the program are largely dependent upon performance on these exams (Benner, Sutphen, Leonard, & Day, 2010). The ongoing nature of high stakes examinations (Sullivan, 2014) is stressful for all nursing students; yet, for students who experience test anxiety (TA) the frequent exposure to psychological fear may be overwhelming.

TA is a complex construct consisting of physiological and behavioral changes (Ergene, 2003). Characteristics of TA include worry about negative consequences prior to the evaluative situation that detracts from the student's ability to study and physiologic symptoms ranging from insomnia, fidgeting, decreased blood flow to the brain, and stress responses such as diarrhea, dry mouth, and inability to concentrate or recall from short term memory (Zeidner, 2007). Students with TA will often self-report a history of poor performance on standardized exams when faced with repetitive low scores (Zeidner,

2007). While TA is a problem among college students, with prevalence rates of 15% to 20% for college students in general (Zeidner, 1998), the rate of nursing students experiencing TA exceeds that of the general college student with rates of moderate and high test anxiety reported at 26% to 30% (Brewer, 2002; Sharif & Armitage, 2004; Waltman, 1997; Driscoll, Evans, Ramsey, & Wheeler, 2009).

While the presence of TA among nursing students may not seem unusual to seasoned nursing faculty, high anxiety levels should motivate nurse educators to seek evidence-based strategies to overcome fear of evaluative situations in order to obtain the most accurate estimate of a student's true ability. Furthermore, TA is an influencing variable worthy of study since skewed evaluations can result in missed opportunities for candidates to join the nursing profession.

Problem of Study

Systematic intervention has the potential to reduce test anxiety, including the worry, regarding test taking and improve overall test performance. However, the majority of the intervention studies in nursing have historically concentrated on improving performance in the last semester or immediately following graduation prior to the NCLEX-RN® examination (McDowell, 2008; Mohler, 2013; Poorman, Mastorovich, Libertor, & Gerwick, 2010; Sheil & Meisenheimer, 1992). TA is a state anxiety with behavioral attributes requiring time to change behaviors. Thus, it would prove more fruitful to intervene for TA early within the nursing curriculum since TA is reported at higher levels in the first year of nursing rather than in the senior year (Brewer, 2002). Plus, success

with junior level nursing courses such as pathophysiology and fundamentals have been predictive of success on high stakes exams such as the NCLEX-RN® (Uyehara et al., 2007). The purpose of this study was to examine the effectiveness of a test-taking program, when compared to a presentation on professional nursing roles program, on TA levels and test performance of junior undergraduate nursing students enrolled in a baccalaureate college of nursing.

The decision to study TA in the junior level student addresses the fact that the majority of attrition in nursing school occurs during the first two semesters of the nursing curriculum (Robinson & Niemer, 2010) or when students have excessive responsibilities or are not certain of their career choice (Benda, 1991). This was especially true for students from diverse cultural and ethnic backgrounds (Crawford, 1988). Therefore, earlier intervention to address TA and behavioral change would likely produce changes in mediators to student performance and facilitate student progression. Improved matriculation would allow a greater number of nursing students to graduate, successfully pass NCLEX-RN®, and enter a profession looking to better serve future needs.

Exploring the relationship during the first nursing semester would promote early self-identification of high TA and would occur in a semester noted to be among the top two semesters where nursing student attrition most frequently occurred (Robinson & Niemer, 2010).

Rationale for Study

Despite the recent growth in numbers of younger nurses over the last decade (Auerbach et al., 2011), the need for nurses was projected to continue as the senior population expands. The backlog of qualified applicants awaiting acceptance into nursing programs continues (American Association of College of Nursing, 2017), and failure of students to matriculate to practice impacts the supply of nurses. The call for transformation of nursing education emphasized the increasing rigor of curricula and the fact that many programs have incorporated high stakes testing (Benner et al., 2010). Nursing programs strive to increase enrollment and reduce attrition to meet the future needs of a diverse patient population while remaining cognizant of the first-time pass rates on NCLEX-RN®.

According to Gardner (2005), 80% of the students lost to attrition from academic failure were minority students. Such findings hinder nursing's ability to secure the diverse workforce needed to reflect the cultural diversity of patients served. Despite the competitive nature of baccalaureate nursing programs and growing demand for more nurses, nursing students find matriculation a challenge contingent upon their ability to succeed in nursing school in the face of robust curricula and challenging evaluative situations (exams, skills check-off, and clinical assignments). Little was known or shared about nursing students leaving nursing programs since most programs did not require exit interviews inquiring about specific factors leading up to or causing students to withdraw. Insight into attrition was gleaned through studying retention success. Although different studies explored retention and attrition differently, two themes remained constant: nursing school is

stressful, and it is academically challenging. Unfortunately, this translated into academic failure for baccalaureate nursing students (BSN) in the early nursing courses which have high attrition (Newton, Smith, Moore, & Magnan, 2007). Failure on one major exam could have negative consequences on nursing student confidence and ability to concentrate, which in turn alters future performance on exams. A qualitative study performed by Williams (2010), revealed that one bad exam score resulted in catastrophic thinking, thinking “one is not good enough to succeed in what is viewed as a hard major” (p. 364). The consequences of catastrophic thinking may lead to the cyclic nature of lowered self-confidence and increased perception of being a poor test taker and higher TA.

The negative physiological and psychological impacts of TA reported by nursing students are serious and justify the attention of nurse researchers. O’Donnell (2009) found in a qualitative study that students who withdrew from a large school of nursing did so because the rigor of school resulted in excessive academic demands that generated “negative effects on their health and well-being” (p. 747). Psychological impacts of leaving nursing school resulted in students reporting feelings of embarrassment, shame, and a sense of personal failure to the extent that one student described the distress regarding the decision as similar to experiencing “death” (O’Donnell, 2009, p. 752).

The emotional impact of withdrawal occurred even when students are counseled to withdraw from programs early in the semester to prevent course failure. For example, nursing schools could have a two-course failure policy that prohibits matriculation; therefore, students withdrew from the program prior to the time required to report the failing grades.

While this option allowed students a future opportunity to return to the program, students reported strong emotions such as shame and distress to the extreme that one student expressed his or her inability to communicate with others, especially his or her family members (O'Donnell, 2009).

The negative psychological impacts of untreated state anxiety could lead to a personal sense of failure that could progress to depression if not addressed (Beck, 1976). The negativity and depth associated with fear of failing nursing school were often magnified when one also felt she was being blocked from achieving a professional goal which further impacted one's self-esteem. A lack of confidence and high TA could be linked with the higher than desired attrition rates seen in nursing programs. The aim of this study was to promote early self-identification of moderate and high TA, determine the effectiveness of a test-taking education intervention on lowering TA and improving test performance; which, could result in improved student progression, reduced attrition, and increased supply of graduating nurses.

Conceptual Framework

The Transactional Model of Test Anxiety by Zeidner (1998) guided this study. This model, depicted in Figure 1, reveals the dynamic and complex nature of test anxiety and denotes that an individual's perceptions and cognitions along with his or her ability to process and retrieve information are influenced by state trait anxiety (test anxiety including worry and emotionality). This type of state trait anxiety has a negative impact on the individual's performance when present at moderate or high levels. Personal

variables such as study skills and test wiseness, along with the individual's perception of the test as a threat, result in physiological, psychological, and behavioral responses that negatively impact the individual's ability to concentrate on the exam.

The key was to identify personal variables that could be modified and strengthened to improve the student's total test anxiety score and worry component. Improvements on these two scores were likely to result in improved outcomes that were adaptable such as task-related thinking and improved accuracy of performance. In this experimental posttest-only study, a 3-hour intervention of a test-taking program followed by weekly online activities was structured to modify personal variables to reduce TA and improve test scores.

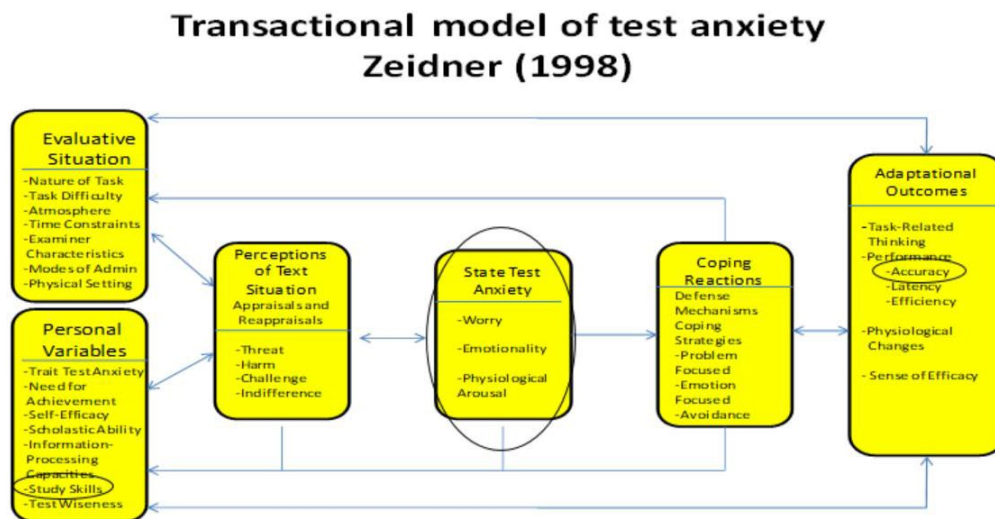


Figure 1. Transactional model of test anxiety (Zeidner, 1998).

Assumptions

The assumptions for this study included the following:

1. Students having a propensity toward TA had TA prior to the Elsevier HESI® specialty fundamental exam. Timing the completion of the Test Anxiety Inventory (TAI) immediately prior to the Elsevier HESI® specialty fundamental exam provided the greatest possibility of measuring TA.
2. Students completing the TAI scale prior to their final exam took the time to read survey statements and answer to the best of their ability.
3. Nursing students with high TA achieved higher scores when aware of the negative effect of TA on performance.

Hypotheses

Based upon a review of the literature, the following directional hypotheses were examined using an experimental two-group posttest only design. The hypotheses included:

- H₁: Baccalaureate nursing students completing the intervention, a live 3-hour test-taking program followed by online activities using social networking media for weekly sessions consisting of three questions for 14 weeks following orientation, have lower TA total scores before an Elsevier HESI® specialty fundamental exam than comparable nursing students completing an attention control activity, a live 3-hour presentation on multiple roles of the professional nurse followed by

online activities using social networking media for 14 weeks following orientation;

H₂: Baccalaureate nursing students completing the intervention, a live 3-hour test-taking program followed by online activities using social networking media for weekly sessions for 14 weeks, have lower worry scores before an Elsevier HESI® specialty fundamental exam than comparable nursing students completing an attention control activity, a live 3-hour presentation on multiple roles of the professional nurse followed by online activities using social networking media for weekly sessions of 14 weeks;

H₃: Baccalaureate nursing students completing the intervention, a live 3-hour test-taking program followed by online activities using social networking media for weekly sessions of 14 weeks, have lower emotionality scores before an Elsevier HESI® specialty fundamental exam than comparable nursing students completing an attention control activity, a live 3-hour presentation on multiple roles of the professional nurse followed by online activities using social networking media for weekly sessions of 14 weeks;

H₄: Baccalaureate nursing students completing the intervention, a live 3-hour test-taking program followed by online activities using social networking media for weekly sessions of 14 weeks, have higher test scores on the Elsevier HESI® specialty fundamental exam than comparable nursing students completing an attention control activity, a

live 3-hour presentation on multiple roles of the professional nurse followed by online activities using social networking media for weekly sessions of 14 weeks.

Definition of Terms

Dependent variables for this study were conceptually and operationally defined as follows:

1. *Test anxiety* was conceptually defined as a situation-specific personality trait (Liebert & Morris, 1967; Spielberger, Anton, & Bedell, 1976) triggered by an individual's perception of an examination as a stressor. This situation-specific personality trait combined with the effects of examination stress altered an individual's internal emotional and cognitive processes, result in adverse effects of worry and emotionality on one's information processing and academic achievement (Sarason, 1972; Spielberger et al., 1976). Test anxiety was operationally measured as a calculated score on the TAI based upon responses to questionnaire numbers 1 through 20 and inverse scoring of Question Number 1 (Spielberger, et al., 1980; see Appendix A). A mean TAI-T was calculated for each group to allow for comparison.
2. *Worry* was conceptually defined as cognitive concerns about failure and its consequences. Worry interrupts student preparation for an exam with thoughts of failure (Liebert & Morris, 1967). This subcomponent of test anxiety was operationally measured as TAI-W based upon responses to

questionnaire numbers 3, 4, 5, 6, 7, 14, 17, and 20 to TAI (Spielberger et al., 1980) (see Appendix A). A mean TAI-W was calculated for each group to allow for comparison.

3. *Emotionality* was the physiologic response to emotional distress created by the body's autonomic nervous system response triggered by the examination stress and included tension, nausea, tachycardia, frequency, and diarrhea (Barnes, 1987). This subcomponent of test anxiety was operationally measured as TAI-E based upon responses to questionnaire numbers 2, 8, 9, 10, 11, 15, 16, and 18 on the TAI (Spielberger et al., 1980) (see Appendix A). A mean TAI-E was calculated for each group to allow for comparison.
4. *Test performance* was defined as student performance on a standardized comprehensive exam covering concepts learned over the semester. Test performance was operationally measured as student performance on the Elsevier HESI® specialty fundamental exam. The mean score was calculated for each group to allow for comparison.

Limitations

Limitations of this study included the limited generalizability beyond this single study from a single geographic location of homogenous sample. Yet, the benefit to the subjects included early identification of self-reported propensity to TA in first semester baccalaureate nursing students. The posttest only control group design was fitting for this educational study since the students were together as a group when recruitment occurred and

when the survey instrument was completed immediately prior to an exam, which lent itself to administering one set of instructions to the entire group of students (intervention and attention control). Plus, this design allowed an individual to address the central question of whether such a test-taking intervention affected TA in this population (Campbell & Stanley, 1963). The inability to generalize the findings of the pilot study existed with the selected design; however, the information gained from this study was useful in identifying whether the test-taking intervention had an effect on TA and/or test performance. The results contributed to a basis of nursing knowledge regarding a 3-hour live presentation followed by 14 weeks of online activities and provided empirical data regarding the effect. Additional data gained from this study included a power analysis on effect size. Such information assisted in determining feasibility of further study and/or possibility of future inclusion of such an educational intervention regularly with this level of student.

Summary

This experimental posttest only study measured test anxiety, worry, emotionality, and test performance in first semester junior level baccalaureate nursing students randomly assigned into a 3-hour live presentation followed by weekly sessions of 14 weeks of online activities using Facebook© private groups to boost the live presentation content prior to taking the Elsevier HESI® specialty fundamental exam as the final exam for the Concepts course. The Transactional Model of Zeidner (1998) depicts a fluid relationship existed between study skills, test wiseness, test anxiety, and its subcomponents worry and emotionality, and test performance. Little empirical evidence existed to guide educators in strategies to assist nursing students with moderate to high

levels of test anxiety; yet, evidence-based interventions are needed to reduce test anxiety, improve academic performance, and decrease attrition. The homogeneity of this sample limited generalizability; however, the study findings provided a basis to guide further research in test anxiety among nursing students.

CHAPTER II

REVIEW OF THE LITERATURE

TA is a longstanding topic of concern, producing voluminous literature (Putwain, 2008) and having seminal research dating back to the early 1950s (Mandler & Sarason, 1952). A literature search was conducted using online searches of electronic databases including CINAHL, EBSCOhost Health Source, Education Research Complete, ERIC, MEDLINE, ProQuest Nursing and Allied Health, PsychARTICLES, PsycInfo, and Scopus. Parameters for the search included literature published from 1950 to 2017, with a combination of the following key terms used in the searches: evaluative anxiety; test anxiety, and exam anxiety with student and college student. Ancestry searching proved fruitful, as did searching journals separately noted to have high volume of articles with aforementioned key terms. Articles were eliminated if they did not meet the following criteria: English written and including anxiety specific to a testing situation. This chapter provides a review of the literature related to the major variables for this study including: the history and development of test anxiety, as a total and the subcomponents of emotionality, worry and behavior; test performance as it relates to TA; intervention studies used to treat TA; test-taking strategies, and empirical findings within nursing education. The Transactional Model served as the conceptual framework (Zeidner, 1998) and guided the review of the literature in regard to efficacy of TA interventions for the purposes of this study.

History and Development of Test Anxiety

TA is a type of state anxiety provoked by a situational evaluative threat such as an examination and presents as unexplained discomfort or distress to a testing situation that produces negative cognitive thoughts and lowers test performance (Spielberger, Gonzalez, Taylor, Algaze, & Anton, 1978). Although TA presents as a “contextualized form of trait anxiety” (Zeidner & Matthews, 2005), it was best measured as state anxiety since it is situation specific and has demonstrated differences from generalized trait anxiety (Spielberger et al., 1978).

Test anxiety generates both positive and negative responses with differing levels of intensity within individuals in testing situations. In 1952, Mandler and Sarason developed the Mandler-Sarason Test Anxiety Scale (TAS), noting that anxiety was not a direct result of aptitude and the perceptions and degree of anxiety varied among and within individuals based upon situations. Mandler and Sarason noted the importance of developing an instrument that focused on a specific test situation in an academic environment that dealt with specific attitudes and experiences. Their seminal research discovered evaluative anxiety results in two types of responses or drives. The task drive was a learned response that prompted the individual to complete a task; whereas, the learned anxiety drive resulted in an anxiety reaction learned from previous evaluations. Mandler and Sarason (1952) also noted some anxiety responses, related to the task, would decrease once the task was completed but other anxiety responses, not related to the task, would remain. The resultant anxieties were expressed as feelings of inadequacies, decreased self-worth, fear, and heightened somatic reactions. The authors

postulated task drives were relevant anxiety drives that facilitated task performance while task irrelevant anxiety drives inhibited task performance.

The debilitating and facilitating concept was explored by Alpert and Haber (1960) who developed an Achievement Anxiety Test (AAT), a 28-item instrument to measure debilitating and facilitating factors of TA. The debilitating scale measured the degree of anxiety interference with test performance while the facilitating scale measured the degree of anxiety assistance with test performance. The AAT instrument identified both factors, noting facilitating factors prompting one to prepare for the test and debilitating factors resulting in distraction and avoidance. The debilitating scale of the AAT was noted to add significance to the prediction of the grade point average (GPA); whereas, the Mandler-Sarason TAS added significance to the prediction of final examination grade but not for GPA (Alpert & Haber, 1960, p. 211). This study supported the justification that test anxiety needed an instrument specific to the situation to measure the construct and strengthened the relationship between TA and academic performance.

The TA construct was later described as possessing two distinct components by Liebert and Morris (1967), who modified the Test Anxiety Questionnaire (TAQ) to include both cognitive and affective components, measured by the Worry-Emotionality Scale. The cognitive component was labeled worry, while, the affective component, generated by autonomic nervous system arousal, was labeled emotionality. Emotionality represented the individual's perception of the physiological factors of anxiety such as

nervousness and fidgeting, whereas, worry represented the cognitive factors associated with the anxiety experience and manifested as negative thoughts of self and the impact of negative consequences. Liebert and Morris examined the subcomponents of TA in a group of undergraduate students prior to a psychology exam and found the two components varied in relationship to examination and class performance. A significant inverse relationship ($p < .005$) was identified between worry and performance expectancy, whereas, emotionality did not have a relationship with performance expectancy (Liebert & Morris, 1967). Interestingly, Liebert and Morris also noted worry scores were constant across time, whereas the emotionality scores peaked immediately before an exam and dropped immediately after the exam; thus, timing of measurement is critical.

The effects of TA on performance were studied by Holroyd, Westbrook, Wolf, and Badhorn (1978) among 72 female undergraduates who were divided into two-groups of 36 depending on their TAS score as high or low TA. The study used block randomization to assign subjects into one of three treatment conditions. Subjects were asked to complete two tasks, the Stroop Color-Word Task and eight anagrams, which were reported to be difficult, while being exposed to differing levels of evaluative anxiety (p. 444). The subjects' emotionality component was monitored by heart rate and skin resistance during task completion. The worry component was measured using a self-report instrument. The findings noted subjects with high TA took longer to solve the anagrams and worried more than subjects with low TA. The high TA subjects also

evaluated their performance more negatively, but their evaluations were not related to the actual anagram score. The results revealed a significant relationship between self-evaluations and anagram scores for low TA subjects. There was no significance found between the group's monitored autonomic responses. Therefore, Holroyd et al. (1978) suggested TA was best conceptualized as a cognitive and attentional concept rather than an emotionality concept. Interestingly, the findings noted that persons with high TA were not accurate in estimating their actual task performance but were hypercritical.

TA was considered a universal phenomenon across people of different ages, genders, and cultures (Zeidner & Matthews, 2005). Seipp and Schwarzer (1996) found TA to be common and fairly homogenous across cultures. Women reported higher levels of evaluative anxiety (Spielberger et al., 1980; Zeidner, 1998), specifically math test (Betz, 1978; Dew, Galassi, & Galassi, 1984) and computer anxiety (Bozionelos, 2001), whereas, men had lower TA ranges. The differences are suggested to be related to men seeing the evaluation as a personal challenge rather than a threat to self (Cassady & Johnson, 2002). If an individual perceived a situation as a threat to personhood, this created anxiety and stressed the person (Lazarus, 1999). When an individual perceived anxiety related to the test as a threat to self, this discomfort was known as TA, and when experienced at high levels resulted in poor performance due to the negative consequences of anxiety (Zeidner, 1998). Thus, TA was among the top reasons cited for unfavorable academic outcomes such as performance below expectations on standardized tests, poor cognitive performance and physiological distress, and illness (Hembree, 1988; Zeidner, 1990; Zeidner & Matthews, 2005).

Test Anxiety Manifest in Emotionality, Worry, and Behaviors

The manifestations of TA were described in terms as emotionality, worry, and behaviors and led to additional studies and findings. Hollandsworth, Glazeski, Kirkland, Jones, and Van Norman (1979) examined the effects of TA to cognitive, behavioral, and physiological effects in undergraduate introductory psychology students. A total of 239 volunteers were tested for TA and general anxiety, and only six subjects were selected based upon their high or low TA scores, all six were female. Three subjects were categorized as experiencing high TA and three subjects were categorized as having low TA. The study explored the three components and manifestations of TA following a regimented procedure to induce stress prior to testing the subjects. Subjects were videotaped while completing the test and were asked to record anecdotal comments, these comments and notes were used as self-statement measures to determine facilitative statements or debilitating statements. The experimental task involved completion of the Otis-Lennon Mental Ability Test (OLMAT). Performance measures included student GPA, American College Testing Program (ACT) scores, and OLMAT scores. Self-report measures included Cognitive Interference Questionnaire, (CIQ, by Sarason 1976), State-Trait Anxiety Inventory Test (STAI, by Spielberger, Gorsuch, & Lushene, 1970), and AAT by Alpert and Haber (1960). Physiological measures included skin resistance response (SRR), heart rate and respiratory rate.

This seminal research revealed low TA subjects reported higher levels of facilitative anxiety than the high TA group and reported a higher percentage of facilitative statements than the high TA subjects. The high TA subjects made off-task

statements which demonstrated difficulty concentrating on the test. The low TA subjects had better academic performance as evidenced by GPA and ACT scores as well as scores on the experimental task on the OLMAT than the high TA group (Hollandsworth et al., 1979). Although no statistically significant difference was found in cognitive interference between the groups, subjects with lower anxiety reported less interference in thoughts than the high anxious subjects; yet, the authors noted this could be due to small sample size of three in both the high and low TA groups. Ironically low TA subjects had more alterations in physiological measures than high TA subjects, which supported the tendency to discount emotionality when observing measures to reduce TA.

Morris, Davis, and Hutchings (1981) further explored the subcomponents of emotionality and worry among undergraduate psychology students in an attempt to develop a better scale to measure worry and emotionality. The students were divided into three groups with each group being given different number of item questions drawn from three questionnaires: Liebert and Morris' 1967 questionnaire; Osterhouse's inventory, and Spielberger et al.'s (1970) State Anxiety Scale. The elements of emotionality selected by subjects were physiological and somatic responses. The researchers noted emotionality may be a learned response that varied based upon environmental cues and conditioning history. However, the elements selected by the subjects related to worry involved more complex cognitive processes that focused on negative expectations for oneself, concern about poor performance, and fear of potential outcomes from the threatening situation. The researchers noted the degree of worry, specifically negative self-evaluation and negative expectations, varied based upon an individual's past

experiences with success or failure. Plus the individual's cognitive interpretation of past experiences was based "upon feedback from others and self when facing a similar situation" (Morris, Davis, & Hutchings, 1981, p. 552). In general, the findings solidified clusters among the two subcomponents of TA and the authors noted the two components were qualitatively different and manifested separately or together in individuals. The authors suggested that the inverse relationship between TA and performance was linked to the cognitive worry component.

Galassi, Frierson, and Sharer (1981) studied the behavior of high, moderate, and low TA students during an actual examination to better understand the relationship between TA and test performance. The study included 231 undergraduate history students who were assigned randomly into three groups based upon three different time periods. The time periods had been identified by students with high TA as times of highest anxiety. The first-time period occurred once the instructions were read by the students at the beginning of the test. The second-time period occurred in the middle of the test. The third-time period occurred about 10 minutes before the test was finished. The study used a factorial design to study eight dependent variables: (a) positive thought; (b) negative thoughts; (c) evaluation; (d) potency; (d) activity semantic differentials; (f) history test grade; (g) bodily sensations, and (h) Subjective Units of Disturbance Scale (SUDS) by score. Levels of TA were based on TAS scores. The authors reported the "level of TA had a significant effect on each dependent variable" (p. 51).

The results suggested students with low TA had more positive thoughts and noted a linear relationship between higher levels of TA with negative thoughts. Students with

high GPA performed better on the test and reported more bodily sensation than low GPA students. The timing of negative thoughts varied between high and low GPA performers. Higher performers experienced more negative thoughts at the beginning of the exam; whereas, low performers with high TA noted more negative thoughts occurred near the end of the exam. The thoughts of the students were indeed predictive of their performance on the exam. Students with high TA revealed more negative or critical evaluation of the test. The low TA students achieved higher test scores and had lower SUDS levels and fewer bodily sensations. The authors noted past performance explained “five times the amount of variation (15% vs. 3%) in test grade than TA suggest that interventions designed exclusively to modify anxiety are unlikely to produce increases in test performance” (p. 60). The authors further explained the need to focus on “Meichenbaum and Butler’s fourth class of relevant variables” such as study skills, study time, organization of content, and ability to eliminate distractors in multiple choice questions to reduce distress of test-taking experience and improve academic performance (p. 60).

The differences seen in behaviors before, during, and after the test, as well as performance on tests could be related to overlapping categories of subject responses to high TA and lowered perceptions of self-worth. Zeidner and Matthews (2005, pp.145-146) further developed the typology of students’ behaviors grouped by Zeidner (1998) noting that individuals with high TA responded differently and could fall into more than one of the categories listed below:

1. Students with deficient study habits and test-taking skills.
These students performed poorly on tests because they lack skills in studying and taking tests (Naveh-Benjamin, 1991). Problems included deficits in gaining, organizing, applying, and retrieving information needed for test success.
2. Students with blockage and retrieval problems due to anxiety.
These students had adequate study skills but could not recall information needed (Covington, 1992) during the exam because of high anxiety.
3. Students demonstrating failure-acceptance. These students accepted and labeled themselves as poor performers based upon repeated past failures and accepted themselves as failures (Elliot, 1999) so they exhibited apathy and a sense of defeat, also referred to as learned helplessness.
4. Students demonstrating failure-avoidance. These students were driven to achieve and to protect themselves from negative self-beliefs (Elliot, 1999). These students were meticulous with preparation and expended high efforts. Yet, the return on their effort was low, which further increased their anxiety.
5. Students become self-handicappers. These students avoided test or reduced their effort with absences or being late.

This tactic provided an excuse for their low score and provided the student with an escape from responsibility temporarily.

6. Students become perfectionist over-strivers. These students set high standards and exaggerated expectations for themselves (Covington, 1992). No amount of effort was enough and they sought approval and acceptance, trying to avoid failure through over-striving which often resulted in self defeat because there was little gain despite their driven performance (Zeidner & Matthews, 2005, pp. 145-146).

The above listing by Zeidner and Matthews (2005) expanded the concept analysis of TA to include typology and aided this educator's understanding of why performance differed among students with moderate to high TA. A better understanding of the categories could facilitate researchers in identifying maladaptive behaviors early on and preparing more holistic interventions to address TA.

Emotionality – Autonomic Nervous System Response

Emotionality is the affective component of TA that was defined as nervous feelings and sensations related to the test. This component was identified among a variety of students including those possessing low levels of TA (Tyron, 1980), who presented with the same physiological symptoms as those with high levels of TA. Friedman and Bendas-Jacob (1997) noted individuals with TA became emotionally reactive to the situation perceived as a personal threat because of the anticipation of damage to self-esteem. A fear generated response to stress resulted in nervousness due to

activation of the autonomic nervous system. Such a stressor caused physiological responses such as rapid, shallow breathing, increased heart rate, nausea, vomiting, diarrhea, sweating, and other somatic symptoms (Lazarus, 1999; Whitaker-Sena, Lowe, & Lee, 2007).

As noted above, emotionality was triggered by different cues than worry (Hembree, 1988; Spielberger et al., 1976) and although the response resulted in physiological changes, it did not significantly influence performance. Emotionality often presented with highest levels when the test was imminent and was reduced significantly mid-test (Alsina-Jurnet, Carvallo-Beciu, & Gutierrez-Maldonado, 2007). Although emotionality was reported to distract from the student's ability to concentrate during a test it was not shown to negatively impact test performance (Tyron, 1980). The distinction between emotionality and worry on their role in influencing student performance propelled the more recent research to focus on the cognitive component (Zeidner & Matthews, 2005).

Worry – Cognitive Interference and Processing Deficits

Worry was the cognitive component of TA (Liebert & Morris, 1967) shown to cause cognitive interference and processing deficits (Zeidner, 1998). Cognitive interference of TA was reported to cause high TA students to get distracted by task irrelevant behaviors; whereas, students low in TA focused on task during the evaluation (Wine, 1971). The irrelevant behaviors caused the high TA students to focus on self-evaluation and self-depreciating thoughts (Wine, 1971). The division of focus in high TA students was purported to result in attentional deficits since the student failed to focus

solely on the task performance (Wine, 1971). Plus, students with high TA had difficulty retrieving information in test situations (Benjamin, McKeachie, Lin, & Holinger, 1981). The ability to process information and operate working memory during a task or test was negatively impacted by high TA. Lee (1999) noted TA affected information processing of verbal analogy task requiring memory. Higher TA was associated with lower ability to process verbal analogies. The higher TA participants responded slightly faster; however, their performance was negatively impacted (Lee, 1999). The negative impact on performance was further supported by Whitaker-Sena et al. (2007) who noted blocked cognitive processes interrupted students thinking and altered completion and performance of task. Distractions during the task performance resulted in cognitive interference during an evaluation; unfortunately, such interference was not limited to a test situation but extended to learning (Wine, 1971).

Tobias (1985) explained the negative impact of TA on learning using a limited cognitive capacity process model, noting anxiety inhibited learning during the information processing phases of input, processing and output. According to Tobias (1979), input began when information was introduced to students, while processing involved the encoding, organizing and storing of new information. Output was the process of retrieving information when needed for testing or application (Tobias, 1979). Unfortunately, anxiety limits cognitive capacity during all three phases, so less learning occurred in general and less information was encoded to store and retrieve when needed for evaluation (Tobias, 1979). Later, Tobias (1985) further explained that TA further inhibited cognitive capacity during a test because it surpassed cognitive supply.

Students experiencing high worry reported preoccupation with fear of failure, which distracted their attention away from studying for the test to concerns about self-performance (Sarason, 1984). The stress of possible failure, whether real or perceived, interfered with cognitive function and was situational in nature (Sarason, 1984). Worry about test performance and possible failure could become chronic and destroy one's self-confidence and self-esteem (Friedman & Bendas-Jacob, 1997). The negative effect on self-esteem progressed to an insult to the individual's social image and status within the learning environment resulting in a bigger threat to self (Friedman & Bendas-Jacob, 1997). The chronic cognitive nature of worry and the perceived threat to self propels individuals to expect failure based upon previous experiences and accept defeat and display apathy (Covington, 1992; Shaha, 1984).

The negative impact of the cognitive interference and processing interruption became cyclic in nature and became imbedded as a maladaptive mode of self-regulation over time (Zeidner & Matthews, 2005). Students with high TA reported distracting thoughts interfered with their ability to concentrate and learn new information which decreased self-efficacy (Bembenutty, 2009). The research findings were consistent, individuals experiencing high worry had deficits in test performance which resulted in a low academic self-confidence (Sansgiry, Bhosle, & Sail, 2006). Erosion in self-confidence was associated with students reporting an inability to influence or control their outcomes (Sansgiry, Bhosle, & Sail, 2006).

Clearly, worry had a negative impact on test preparation, test performance, self-confidence, self-efficacy, and learning. It was important to realize that TA was not an

isolated event in the life of a college student because of the emphasis placed on testing. Rather, TA became an ongoing battle that affected student performance and inflicted serious danger to self-worth (Meijer & Oostdam, 2007). The chronic nature and psychological effects of worry could cause harmful effects if left untreated (Kieffer & Reese, 2009; Beck, 1976). The research showed students displayed maladaptive behaviors (Covington, 1992), catastrophic thinking (Williams, 2010), used of chemicals to help them cope (Kieffer & Reese, 2009) and experienced distress to the point of equating it to “death” (O’Donnell, 2009, p. 752) and physical illness and depression (Beck, 1976).

Behaviors and Negative Consequences Associated with High Test Anxiety

Many of the resultant behaviors seen in students with high TA and lowered self-worth were previously described by Zeidner and Matthew’s (2005) typology, but negative behaviors were further reviewed in the research. Behaviors associated with high TA ranged from student apathy to hysteria, leading faculty to dread the administration of tests, especially if the test was considered high-stakes by the students (Gregor, 2005). The emotionality component presented with students requiring proctors to chaperone students to the restrooms for gastrointestinal or urinary issues. All while remaining students huffed, frowned, and rolled their eyes because the noise and movement interrupted students’ concentration on exam questions. The cognitive component leads to attentional bias, which prompted students to request interpretation of test options to the student, which could not be answered. Simultaneously, faculty are concerned about cheating due to the prevalence reported currently and the desperation of some students to pass.

Further, students made poor choices to dull the effects of TA. Kieffer, Cronin, and Gawet (2006) explored coping patterns in students with high TA. The authors reported college students with high emotionality and worry components were prone to drink alcohol to reduce tension prior to exams. Female students were higher in both components and reported their use of alcohol was to reduce stress. This maladaptive coping strategy among male students using alcohol for mood enhancement and to reduce tension was statistically significant. Negative behaviors and poor choices could be detrimental to students' health and future, which further motivated this educator to address the ongoing problem.

Test Anxiety and Academic Performance

The empirical findings are clear that high TA was negatively correlated with test performance (Alpert & Haber, 1960; Wine, 1971; Sarason, 1972; Ergene, 2003; Chapell et al., 2005; Dodeen, 2009) and overall academic performance (Hollandsworth et al., 1979). Kirkland and Hollandsworth (1980) purported that only 25% to 35% of college achievement was explained by academic aptitude measures. A meta-analysis, involving 126 studies explored the relationship between anxiety and academic performance, found differences based upon the kind of anxiety and the components of anxiety (Seipp, 1991). Seipp reported data regarding the worry concept was "very heterogeneous" and the cognitive component was more specific to TA and was more closely associated with academic performance. Seipp noted a consistent inverse relationship between high worry and poor academic performance.

Students possessing high TA consistently scored lower than their peers with low TA (Deffenbacher, 1980). Lower performance was also noted on intellectual aptitude test and reading comprehension scores among high TA individuals than low TA individuals (Mandler & Sarason, 1952; Sarason, 1984). The negative exam performance extended to grade point average and was noted to be a cause of college attrition. Spielberger (1966) compared attrition rates among a group of students and found it to be 20% among high TA students and 6% among low TA students.

Repeatedly, the studies have shown performance was not affected solely by high emotionality component. Students experiencing physical symptoms resulting from stimulation to the autonomic nervous system did not see declines in performance unless they also had a high total TA and worry component. In fact, students with high physiologic arousal had low TA that facilitated test performance (Hollandsworth et al., 1979). This pointed to the need for actual testing of students to determine their TA level, as neither students nor faculty can reliably determine high TA based upon the presence of physiologic symptoms (Holroyd et al., 1978). The high correlation between total TA and the cognitive component of worry with poor performance significantly influenced the direction of research to address worry (Zeidner, 1998).

Attributing factors to poor performance reported in the literature included inability to concentrate, lack of motivation, decreased problem-solving ability, and inadequate study skills and test-taking skills. In addition to finding cognitive interference, Wine (1971) noted that students with high TA divided their concentration between task cues (completing the task – test) and internal cues (inadequacy of self- ability). Sarason

(1972) echoed this inward focus and noted the disruptive role it played in failing test and resultant loss of self-esteem in testing situations. Spielberger et al. (1980) reported that some level of anxiety was normal and could facilitate performance; however, elevated TA decreased the ability to function in evaluative situations and frequently disrupted academic progression. Mueller (1980) proposed that deficits were related to interferences in memory, similar to reported findings of Covington (1992) noting blockage of important information or inability to retrieve facts during exams. Benjamin et al. (1981) suggested deficits in information processing were related to problems encoding information and inability to retrieve information. Gross (1990) attributed poor performance to state anxiety being so elevated that the anxious person's higher order thinking skills were impaired.

Lee (1999) suggested the neural network, responsible for worry and emotionality, played a role in the autonomic response and fueled maladaptive behaviors like altered information processing and higher memory load demand. Cognitive obstruction was another potential attributing factor identified by Whitaker-Sena et al. (2007) because the disruption caused by TA decreased a person's ability to complete tasks and interrupted the ability to think. Dodeen (2009) noted the reason high TA adversely impacted academic performance was due to decreased concentration, interruption of thoughts, inability to problem solve, and decreased ability to understand test questions.

TA reached a peak immediately before the test and could be related to the significance of the test and the potential perception of threat the test could have on the student. Alsina-Jurnet, et al. (2007) reported students with high TA have higher levels

when the exam was imminent. According to Deffenbacher (1980), the more meaningful or threatening an exam was perceived, the more likely it would generate higher state anxiety and interfere with performance. Some research revealed the instructor, instructions, and the environment also played a role in how students perceived the stress of an evaluative situation (Mealey & Host, 1992).

There was a cyclic nature to high TA and poor performance that some researchers related to problems with confidence and self-esteem (Friedman & Bendas-Jacob, 1997). Shaha (1984) noted the role of past failures on test with inability to succeed academically. The resultant poor performance lowered self-concept and self-worth (Meijer & Oostdam, 2007) and dampened motivation, which further impaired test performance. Wine (1971) proposed that cognitive interference and divided attention led to decreased ability to learn which further increased TA. Hollandsworth et al. (1979) noted poor performance led to further increases in TA, which interfered with future learning and performance. Elliot (1999) found repeated poor performance resulted in loss of intrinsic motivation and avoidance patterns so much so that students gave up on goals and demonstrated apathy. The avoidance extended beyond tests to study habits and learning in general.

Skills deficit including study habits and test-taking skills have been conceptualized as an attribute contributing to poor test performance (Benjamin et al., 1981; Kirkland & Hollandsworth, 1980; Naveh-Benjamin, 1991). Mealey and Host (1992) suggested training to improve study skills and test-taking skills would facilitate encoding, recall and decoding of information. Culler and Holahan (1980) supported the

relationship between inadequate study skills and test-taking behaviors with poor performance. The authors even suggested poor performance with TA was the result of deficits in study habits and inadequate test-taking abilities. Carraway's (1987) findings also supported this finding and suggested TA problems could best be addressed with a test-taking intervention to reduce TA and related behaviors. In summary, the correlation of TA with poor academic performance was not a new concept, and the seriousness should not be underestimated. TA continued to be associated with poor academic performance, college attrition, and limiting career options (Enright, Baldo, & Wykes, 2000; Spielberger et al., 1980). The negative effect on student progression and lower grade point average was not limited to undergraduate students but continued in graduate students as well (Chapell et al., 2005)

Test Anxiety Interventions

A review of the literature uncovered a vast array of intervention studies dating back to the 1950s (Mandler & Sarason, 1952). The subject's ages ranged from 9 years of age to 67 years. The settings ranged from elementary schools to professional settings with participants seeking continuing education credits. The types of interventions included behavioral, cognitive, both cognitive and behavioral, skills training, complementary approaches, cooperative learning, and a combination of types. Additionally, a meta-analysis was performed (Ergene, 2003). The research was conducted globally and was reported in a wide array of journals spanning education, psychology, and healthcare.

Examples of behavioral interventions included relaxation, biofeedback, meditation, systematic sensitization, anxiety reduction programs, guided imagery, and

hypnotherapy. The cognitive interventions included cognitive reprocessing, cognitive restructuring, rational emotive therapy, bibliotherapy “self-help” materials (Register, Beckham, May, & Gustafson, 1991), cooperative learning, and addressing skill deficits. Skill deficit approaches included active learning, teaching study skills, test-taking strategies, reading comprehension, and time management. Based upon a meta-analysis performed by Ergene (2003), the best approaches, creating the largest effect size, were interventions with a combination approach and a group plus an individual component. Three examples of combination therapy found to be beneficial included eye movement desensitization and reprocessing (EMDR) by Enright et al. (2000), acceptance-based behavior therapy and cognitive therapy (Brown et al., 2010) and autogenic training with stretch-tense-deep breath and release relaxation and suggestion sequences (STARS) by Evans, Ramsey, and Driscoll (2010). The ideal length of time for an intervention was difficult to extract from the literature, but Ergene (2003) noted an intervention lasting 201-350 minutes appeared to be most effective; yet, one study with an intervention lasting less than 60 minutes with a large group was found to be statistically valid.

Interestingly, the mode of delivery varied from individual or group therapy and computer rather than face to face delivery. Buglione, Devito, and Mulloy (1990) compared the effectiveness of systematic desensitization using traditional group versus computer administration for test anxiety. The intervention consisted of a single session group delivery versus computer delivery. The reduction in test anxiety was essentially equal between groups. Buglione et al. (1990) suggested computer delivery was a potential avenue to deliver behavioral interventions since students were difficult to access.

Cognitive interventions focusing on study skills have been effective in treating TA and addressed some of the typology characteristics brought forth by Zeidner and Matthews (2005). Such interventions built upon the repeated studies that identified ineffective study skills and/or test-taking strategies in subjects with high TA and poor academic performance (Bruch, Juster & Kaflowitz, 1983; Kirkland & Hollandsworth, 1980). In 1991, Naveh-Benjamin designed a study to assess TA and study skills based upon the assumption that some student's poor performance was due to problems with studying while others panicked from anxiety. The students were divided into two-groups based upon their score on the Worry Emotionality Questionnaire (WEQ; Morris et al., 1981) and Survey of Study Habits and Attitudes (Brown & Holtzman, 1967). Students high in anxiety were taught relaxation skills and students with poor study habits were taught study skills. Results were statistically significant for reducing test anxiety, but there was not a significant improvement in grade point average from the prior semester.

Another type of cognitive intervention, focused on test-taking strategies, had variable effects on improving academic performance on either a test or course grade. In 1987, Crocker and Schmitt demonstrated a test-taking intervention improved multiple-choice test performance but only in students presenting with low TA scores on Mandler-Sarason's TAS. Students with mid-range TA scores showed no difference in performance following the intervention; whereas, the students with high TA scores showed decreases in test performance. The intervention involved teaching students to use response generation when answering multiple choice questions and was offered on the first week of class. The test and assessment measures were performed 3 weeks later. Crocker and

Schmitt noted that response generation may not be appropriate for all examinees and should be reserved for individuals with low TA.

The seminal work performed by Sapp (1996) found preferences and effectiveness of interventions varied from undergraduate to graduate students. Sapp's (1996) interventions were cognitive behavior hypnosis, relaxation therapy, and support counseling in two different groups of student based upon level of study. Relaxation therapy was more effective for graduate students and supportive counseling was more effective for undergraduate students. Based upon these findings, Sapp (1996) purposed a new potential developmental aspect to TA.

Supportive counseling was further explored as one component within cooperative learning. Students identified group study, peer tutoring, and forecasting potential test items as helpful interventions (Mealey & Host, 1992). Others items identified by students to decrease TA included non-threatening testing environment. Examples of a non-threatening environment included no interruptions during a test, not reading over student's shoulder, and positive reassurance. It was also reported that students appreciated test reviews held by teachers prior to exams (Mealey & Host, 1992).

Test Anxiety Research Specific to Nursing

The articles included in this review were identified by online searches for the time period of 1950 to 2017, using the following databases: CINAHL, EBSCOhost Health Source, Education Research Complete, ERIC; MEDLINE, ProQuest Nursing and Allied Health, PsychARTICLES, PsycInfo, and Scopus. Combinations of the following key terms were used in the searches: evaluative anxiety, test anxiety, exam anxiety, and exam

stress with nurse and nursing students. A second search was conducted using test performance, attrition, NCLEX-RN®, study strategies, and test-taking with nursing students. Further references were identified from research article reference lists and searching journals separately noted to have high volume of articles with aforementioned key terms. The articles were sifted using the following criteria: English written and including nursing participants with anxiety specific to a testing situation. Articles were excluded if they were not qualitative or quantitative studies. The review started with non-interventions studies and ended with intervention studies.

The non-intervention studies focused on attributes, predictors, reasons for not seeking treatment for TA, a systematic review, and concept analysis for TA. This section began with the seminal work of Beck and Srivastava (1991) who explored perceived level and sources of stress in baccalaureate nursing students. The study was a descriptive correlational design including 94 students in various semesters. Data were collected prior to mid-term and included General Health Questionnaire (GHQ), Stress Inventory, and demographic information. The results revealed the nursing students' stress were twice as high as medical students. The students rank ordered items considered stressful and exams (85%) were noted to be second only to long hours of study (92%). One interesting fact emphasized by the authors was the uncertainty of the career choice, and this was attributed to the high levels of stress caused by nursing school.

Barnes (1987) explored correlations to test anxiety among master level nursing students in a state school in the US. Once the students completed the Test Anxiety Questionnaire (TAQ; Sarason) to determine TA, 30 students completed the

comprehensive exam. Prior to taking the exam, the students completed the Pre Examination Questionnaire (PEQ; Morris et al., 1981) to provide pretest anxiety level. The students completed the Cognitive Interference Questionnaire (CIQ) immediately following the exam. These data elements were collected for 2 years. Findings revealed the pre-test anxiety (PTA) two-component distinction, worry and emotionality, did not correlate positively or negatively with general test anxiety (GTA). When the two-group's data were combined, it revealed significant correlations between GTA and PTA. Secondly, the students perceived the test outcomes interfered with their thoughts while taking the exam; however, significant correlations were not found between GTA and cognitive interference (CI). Third, significant correlations were found between students' PTA responses and their CI responses while taking the exam and the first groups were higher than the second groups. Fourth, significant correlations in the combined groups were noted between PTA emotionality responses before the exam correlated significantly with those of interfering thoughts during the exam. The extent of concern about exam outcome increased the CI during the exam, which correlated significantly with PTA worry and emotionality. Worry before the exam also correlated with CI during the exam. Interestingly, there was not a correlation between students' CI during the exam and their performance rankings on the exam (high, medium, and low).

Poorman (1988) performed a prospective correlational study to determine if nursing licensure examination (NCLEX-RN®) performance was influenced by test anxiety, cognition and general academic performance. The study included 102 senior-level baccalaureate nursing students from two universities in western Pennsylvania. Prior

to graduation the subjects were interviewed and completed the TAI and Cognitive Assessment Tool (CAT; Beck, 1976). The subjects' academic aptitude was evaluated using university grade point average and scholastic aptitude test scores. The NCLEX-RN® scores were gathered 3 months following graduation, and the data were analyzed using Pearson's product moment correlation, Chi-square statistics, and multiple regression. Poorman (1988) noted the pass rate for NCLEX-RN® was negatively correlated to TA and positively related to academic aptitude. The Chi-square analysis revealed significance among subjects who passed the NCLEX-RN® who perceived themselves as good test-takers and reported having facilitative cognitive thoughts during the NCLEX-RN® than subjects who failed the NCLEX-RN®. Poorman (1998) reported that subjects who failed the NCLEX-RN® did not possess problem-solving cognitions.

Waltman (1997), using Meichenbaum and Butler's model, examined the relationship between TA and four variables of the model including academic self-concept, study and test-taking skills, cognitive interference, and grade point average (GPA) among traditional and nontraditional nursing students. The study included 63 traditional and 47 nontraditional junior level baccalaureate nursing students with data points collected during the semester following a class and later in the semester after a course exam. The results revealed a significant relationship between the components of Meichenbaum and Butler's model and TA.

Analysis with multiple linear regression noted cognitive interference, study skills, and academic self-concept contributed significantly to the prediction of TA. The behavioral outcome, measured by grade point average, did not contribute to the prediction

of TA. The nontraditional students scored higher on effective test-taking behaviors; yet, no significant differences were found between the groups in regard to TA. Waltman noted the highest correlations were found between total TA and cognitive interference with increased TA interfering thoughts also increased. A high correlation was found between worry and cognitive interference questionnaire (CIQ). Worry also was found to have a significant negative correlation with Effective Study Test (TSE), the subscales of Reality Orientation (SRO), and Examination Behavior (SEB). These negative correlations supported concerns that performance and failure consequences were related to lower performance in selected study and test-taking skills. Another inverse correlation purported was increasing TA resulted in decreased academic self-concept. The author suggested treatment for TA should be multidimensional due to significant relationship between TA and the multiple variables found to have significance within the Meichenbaum and Butler model. Waltman (1997) noted no significant differences in total TA, or the emotionality and worry subcomponents between the traditional and non-traditional groups of students.

Brewer (2002) conducted a descriptive study comparing freshman non-nursing college students with senior level nursing students taking a psychiatric course to compare the amount of debilitating anxiety on the Achievement Anxiety Test (AAT). A convenience sample of 94 nursing students and 131 general university students in eastern US was used. The findings revealed nursing students did not have higher debilitating anxiety than the general student population. However, both groups revealed higher values than the norm. The students shared they “froze” and did not perform their best so they

believed evaluative situations were not a true indication of deficiencies.

Yost (2003) studied academic performance in nursing students in an Associate Degree Nursing Program using the Motivated Strategies for Learning Questionnaire (MSLQ). In this study, Yost (2003) noted that students with high TA within the MSLQ TA subscale that used the learning strategies of rehearsal and critical thinking revealed a higher correlation with academic performance. Yost (2003) also found a positive relationship between TA and peer learning among students with higher TA that correlated with higher academic performance. These serendipitous findings were supported by Carpenter's (2010) dissertation research that noted the odds of passing NCLEX-RN® decreased as the MSLQ test anxiety score increased. This study found students with a test anxiety subscale score of 5.0 or higher (scale 1-7) was also predictive of failure on the ATI Comprehensive Predictor Exam and NCLEX-RN®. Based upon Yost's findings, cognitive strategies might prove beneficial in improving performance on high stakes exams and lowering TA.

Sharif and Armitage (2004) performed a quasi-experimental study with 100 nursing students with random assignment into treatment group ($n = 50$) versus control group ($n = 50$). The intervention group received 2 hours of training for 12 weeks to learn stress reduction techniques. Data collection occurred pre-intervention, post-intervention, and follow-up. The intervention group was taught a variety of stress reduction techniques for 2 hours per week for 12 weeks. The results revealed that self-esteem improved with each measurement; whereas, the control group experienced the opposite. Unfortunately, no improvement was seen in anxiety reduction post intervention, but a significant

decrease was seen at follow-up after the semester (Sharif & Armitage, 2004).

Edelman and Ficarelli (2005) conducted a phenomenological qualitative study exploring the lived experiences of the nursing student who experienced TA. Purposive sampling was done and consisted of eight nursing students ranging from 19 to 36 years of age. The data were analyzed using Colazzi's method, and three themes were revealed. The first was the reality of an anxiety episode, second was the academic implications, and third was effective measures of dealing with anxiety. One student shared "I thought I was going crazy. I felt so alone, as if I was the only one experiencing these feelings, and so I was afraid to discuss this with anyone else" (p. 57). Another commented "I feel as if I coming out of my skin as the instructor is handing out the exams. I can feel my face getting hot and I wonder what I must look like" (p. 57). Such comments highlighted the TA experience as unique and "solitary experience." Physical signs frequently reported included headaches, sweaty palms, knots in stomach, and an inability to concentrate. Student fears focused on failure, loss of career option, low self-worth, and shame. However, students noted persistence, self-control and stress management measures were required to deal with TA. The academic consequence of TA and fear of failure weighed heavily on the students (Edelman & Ficarelli, 2005).

Similar findings were revealed by Higginson (2006) when he explored the fears, worries, and experiences of first year pre-registration nursing students in the United Kingdom. Higgins utilized grounded theory to identify factors causing fear, worry and anxiety in nursing students. The study included five students who identified the most common fears including: death; worries about exposure to body fluids; examinations;

financial worries; concerns over role conflict, and socialization worries. All five of the participants expressed worries over exams and voiced concerns about failing. Students voiced concerns about lack of time due to courses and clinical hours. McGann and Thompson (2008) conducted a mixed methods descriptive study to explore factors influencing academic success for at-risk nursing students. The study included 16 senior students who had failed to meet progression standards. The intervention included enrollment of each student into a 1-hour nursing course where students were mentored by nursing faculty, journaled, completed tutorials and self-directed student activities (McGann & Thompson, 2008). Topics covered during the course were learning barriers, learning styles, reading strategies, test-taking strategies, time and stress management, improvement plans and content review. In addition to the weekly class meetings subjects met with their faculty mentor. Qualitative data provided in the subjects' journal revealed major themes that TA was among the reasons why students did not meet the progression criteria. Major themes identified by subjects on test-taking issues were "changing answers, over-thinking answers, not reading carefully and TA" (p. 7). The majority of these at-risk students reported a long-standing history with TA. McGann and Thompson (2008) noted that subjects relayed the stress of test-taking to "quicksand" meaning once they felt they missed a question, they would become anxious and then miss successive questions until they felt like they were over their head and could not get themselves out" (p. 8). This 1-hour course credit intervention was effective in changing the subjects approach to test preparation (81%) and their test-taking approach (69%). These improvements resulted in 87% of the subjects passing NCLEX-RN® on their first attempt (McGann & Thompson, 2008).

O'Donnell's (2009) qualitative study found that 15 students who withdrew from a large School of Nursing and Midwifery voluntarily from 2004-2007 noted "the demands, especially academic demands, of pre-registration nursing programs was excessive for these students and this clearly was having negative effects on their health and well-being" (p. 747). Students voluntarily leaving the nursing program also shared feelings of embarrassment, shame, and a sense of personal failure with one student relaying how distressing the decision was that she related the experience to death, "I felt that I was grieving, it felt like my own death, it was horrible, I went downstairs and I panicked and I went into the computer room and I was waiting for the computer screen to go blank. I then went out and I ran up the road and I ran home and I cried, it was awful" (p. 752).

These students who voluntarily left nursing school shared ways in which they slowly disengaged while delaying the decision to leave the course such as absences, failing to attend tutorials and slacking. Three students' responses to a question of how they coped while making the decision to leave included, "crying in the mornings on the way to school," "I hated going to the university, I just hated it ... I attended less and less frequently," and "really, really hated coming in" (O'Donnell, 2009, p. 753). The students' responses provided rich data into their distress and how they experienced changes in emotions, changes in personality, changes in ability to communicate with others including family members. Two students noted that they tried to continue but failed because they could not cope with the demands. Remaining student colleagues also experienced vulnerability and became demoralized and also considered leaving. One student shared how his fellow student offered to do a paper assignment in hopes of

persuading the student to stay. O'Donnell's findings are supported by Williams' qualitative study (2010) where discussions with successful nursing students revealed that one bad exam score resulted in catastrophic thinking for some, thoughts "one is not good enough to succeed in what is viewed as a hard major" (p. 364). These findings exemplified the negativity and depth associated with the fear of failing nursing school that may trigger TA.

Markman, Balik, Braunstein-Bercovitz, and Ehrenfeld (2011) found students with high TA frequently failed to seek professional resources for treatment. Using the Health Belief Model (HBM), Markman et al. (2011) found significant positive correlations between attitude toward seeking professional help and the following attitudes: (a) perceived effectiveness of treatment for TA ($r = 0.659, p < 0.01$); (b) motivation for test success ($r = 0.617, p < 0.01$); (c) probability of suffering test anxiety ($r = 0.417, p < 0.01$), and (d) amount of damage test anxiety would cause ($r = 0.349, p < 0.01$). A significant negative correlation was found between these attitudes and the perception of obstacles to seeking treatment for TA ($r = -0.717, p < 0.01$). Markman et al. further examined the "contribution of each of the five components of the HBM in predicting attitudes to seeking professional help ($F[5, 82] = 58.266, p < 0.001$). The five components taken together accounted for 74.9% of the variation in attitudes toward seeking professional help" (Markman et al., 2011). This study found that only 15% (13/87) of nursing students who scored high on TA were willing to enroll in a program to reduce TA. Reasons noted for not enrolling in treatment were: (a) place and time of meeting (46%); (b) feelings of ease (23%); (c) other (12%); (d) cost (11%), and (e) no

confidence in treatment (8%). Two of the other comments revealed by the authors were “I do not want others to know my problems” and “group therapy frightens me” (Markman et al., 2011, p. 251). The decisions not to attend treatment were unfortunate and luckily the authors delved into the reasons. The reason of “no confidence in treatment” was unfounded based upon the literature review.

Røykenes, Smith, and Larsen (2014) explored the experiences of nursing students facing a high-stakes drug calculation test using a qualitative component with a focus group after completing the quantitative components. Norwegian nursing students were required to pass a drug calculation exam with 100% accuracy. Roykenes et al. used a mixed methods approach to study 203 freshman nursing students. Almost half (44.3%) of the students reported high math test anxiety prior to the exam and were highly anxious. The students with high math TA were low in math self-concept. The study suggested high- stakes exams dramatically increased the TA associated with the exam and lowered self- confidence.

Alizadeh et al. (2014) used a descriptive analytical study to evaluate the relationship between TA and academic performances in nursing and midwifery student in two cities of Iran. The Sarason Anxiety Inventory, demographic data and average scores of midterm and final exams were used to determine the relationship between TA and academic performance measures. The sample included 216 Iranian nursing and midwifery students in 2011- 2012. The TA scores revealed 30.6% had mild anxiety, 43.1 had moderate anxiety and 26.4% had severe TA. There was a significant relationship between mild anxiety and academic performance ($p = 0.001$). Alizadeh et al. noted that

the inverse relationship between TA and academic performance supported programs to decrease TA such as preventive programs to treat anxiety, empower students to address anxiety, and offer consulting services on study skills.

Khalaila (2015) used a descriptive correlational study to examine both direct and indirect influences of academic self-concept on academic achievement and explored whether intrinsic motivation moderated the negative effect of TA on academic success among 170 undergraduate baccalaureate nursing students in northern Israel. Using Pearson correlation between study variables, Khalaila (2015) found academic achievement was positively correlated with academic self-concept and with intrinsic academic motivation; whereas, TA negatively correlated with all three aforementioned variables. Using a multiple mediation model, Khalaila noted TA and intrinsic motivation were mediating variables that explained 62% of the relationship between academic self-concept and academic achievement. Khalaila found the interaction between intrinsic motivation and TA had a negative relationship to academic achievement in students with low intrinsic motivation and less negative impact on students with medium intrinsic motivation and high TA. Thus, it was important to note that intrinsic motivation moderated the effects of medium and high TA on academic achievement.

Gibson (2014) developed a concept analysis of TA. The attributes identified for TA were negative feelings, test situation, behavioral aspects, physical signs, and cognitive aspects. These findings supported the use of the TAI in conjunction with administration of a test. The systematic review revealed the need to assess TA in nursing students and to develop research-based interventions to treat TA. Gibson's findings

emphasized the cognitive intervention approach to realizing improvements in both TA scores and performance scores.

Augner (2015) recently explored the degree and predictors of TA among 112 sophomore, junior, and senior year Austrian nursing students. Using a German version of the standardized Test Anxiety Questionnaire, Augner found 10.7% of the students were highly test anxious. Furthermore, 22.3% of this convenience sample revealed they were chronically high stressed based upon self-report using a short version of the Trier Chronic Stress Inventory (TCSI). Augner noted these values to be in the 95th percentile compared to the reference sample. Data analysis revealed a significant correlation ($p < 0.01$) between TA and chronic stress, depression, emotional instability, and long work hours per week (Augner, 2015, p. 293). There was also a significant relationship ($p < 0.05$) between TA and grade point mean (GPM), pathological eating, 10 illness symptoms (headache, backache), and coping disengagement (Augner, 2015, p. 293).

Although each of these variables had a significant association with TA, chronic stress was the strongest predictor of TA and explained almost half of the variance. Exploration of the cause-and-effect relationship revealed GPM was significantly correlated with depression ($r = 0.31, p < 0.01$) rather than chronic stress ($r = 0.19, p < 0.06$). Yet, chronic stress was highly correlated to depression ($r = 0.72, p < 0.01$). Using an exploratory path analysis, Augner (2015) demonstrated the link between GPM and TA was mediated by depression and chronic stress. The high degree of TA and chronic stress found among nursing students along with depressive thinking placed nursing students at

risk for burnout. Past experience with failure and fear of failure on future exams in combination with depressive thinking fueled the chronic stress.

Duty, Christian, Loftus, and Zappi (2016) reported high levels of cognitive test anxiety (CTA) correlated with lower academic performance. This study used a cross-sectional survey design with prospective data collection from academic records including GPA, nursing test (T) scores, TA, cognitive test anxiety (CTA), and verbal and math Scholastic Aptitude Test (SAT) scores. The convenience sample ($N = 183$) included traditional, accelerated and pre-licensure second-degree graduate nursing students enrolled in sophomore to senior level nursing courses in a northeastern university during the fall of 2013. The ages ranged from 18 to 54 years with the majority of students reporting they were white females (99.5%). The CTA scores were divided into low, average, and high groups. Then the exam scores for three exams and one final were used and were reported by CTA level. Duty et al. (2016) noted a modest but statistically significant ($p = .02$) difference in test scores when comparing the T score means between students with high and low CTA scores. The mean average for exams was noted to be 4 to 5- points higher on three of the four exams given among the low CTA group when compared to the high CTA group. Although the improvements are small the findings further support the mounting evidence that high TA lowers academic performance in nursing school (Chapell et al., 2005; Khalaila, 2015).

Recently, TA and salivary cortisol levels were examined among baccalaureate nursing students in a Midwestern U. S. university (Clutter, Potter, Alarbi, & Caruso, 2017). The sample included 15 junior students ranging in age from 19 to 41-years with a

mean age of 22.9; while the senior sample included 24 participants ranging in age from 21 to 35 years of age with a mean age of 23.54. The majority of both groups was white, non-Hispanic females. Using salivary cortisol, a biomarker of stress, to operationally measure TA levels were obtained prior to three examinations and prior to one didactic class. Levels were compared between junior and senior level nursing students in the spring of 2013.

Salivary cortisol levels were collected a total of four times with one prior to dosage calculation and conversion exam, during a regular class time, during an exam and a final exam. The salivary cortisol level increased at each sampling time in the junior group with the highest increase at the time of the final exam. The highest cortisol level in the senior group was for the second exam which was the NCLEX® Predictor exam. The findings revealed that cortisol, operationally defined as TA, was higher for the senior group for the first three events measured. The most stressful event measured for the junior group was the comprehensive final exam; whereas, the most stressful event measured for the senior group was taking the NCLEX-RN® Predictor exam. The cortisol levels were higher in the junior group on the comprehensive final exam (cortisol just under 1.0) than that seen in the senior group when taking the NCLEX® Predictor exam (cortisol just under 0.8). Unfortunately, no statistical data was reported regarding the difference nor about these high-stakes exam scores.

Liu and Xu (2017) explored perceptions of American community college nursing students in the use of extended time and supportive accommodation to address TA. The community college is located in a mid-western state. This phenomenological study used

an interpretivist worldview to gain understanding from American community college nursing students on the use of extended time and supportive accommodations to address TA. Eight students were selected from focus group interviews to participate in the research. The sample included six females and two males, five sophomores and three freshmen with diverse ethnicity. Themes were developed using Moustakes' approach to data analysis. Six themes identified by the authors when "nursing students described their experiences and feelings toward test accommodations were: (a) students' feeling of being anxious and overwhelmed; (b) the impact of nursing school stress; (c) the perceived benefits of using test accommodations; (d) environmental influences; (e) challenges and supportive structures for securing accommodations, and (f) metaperception of stigmatization" (Liu & Xu, 2017, p. 6). The feeling of being anxious and overwhelmed were common and included feedback such as "people with anxiety go, 'oh my gosh, why did I go into nursing school? I'm the dumbest person here', like you have... (uses hand to make circular gesture around head like a recording playing)... and you just can't move past it..." (p. 6). Perceptions of nursing school stress revealed comments such as a hostile environment described as "When you're in nursing school, I think we can all agree, it's a hostile environment anyways. It's very rigorous, it's very tough. You have something to do every day" (p.7). When shown an extremely busy train station one male student related to nursing school stress "everybody's on the same train to either passing or failing... people are going to be hurt in this entire situation is more likely because of how much stress is surround and just hanging on by a thread and that would be me" (p. 7).

The benefits of accommodations were all positive with one female student noting "the

extra time was game changing for me” (p. 8). Environmental influences focused on perceived stress when surrounded by other nursing students. One female student commented “I could do the test in the same time as everybody I just can’t... for some reason I can’t be in the same room with everybody. I just don’t... I don’t thrive well” (p. 8). The theme of securing accommodations focused on negative comments overhead from peers and positive support from nursing faculty. The requirement of a diagnosis of anxiety from a qualified professional was challenging. One student revealed “You hear about all these people going to the doctor just to get on meds and abusing the thing, so you kind of think they’re gonna go like, ‘that chick’s crazy” (p.9). The final theme metaperception of stigmatization described how students perceived they were judged or criticized by peers not receiving accommodations. The comments were hurtful and stressful. In summary the students perceived the accommodation as helpful in reducing their stress but were concerned about the stigmatization verbalized for seeking accommodation from their peers not receiving accommodations.

Test Anxiety Intervention Studies within Nursing

Intervention studies examining TA among nursing students were divided based upon the type of study starting with an integrative review, then single type interventions and ending with multicomponent interventions. Brodersen (2017) reported on an integrative review using Matrix Method was conducted to evaluate interventions for TA in undergraduate nursing students. The review included among peer reviewed articles from 1973 to 2014, excluding gray literature. The review included studies on collaborative testing even though they did not use a standard report instrument to

measure the TA outcome variable. The review found 33 publications with three including program improvement reports, one case study, nine descriptive studies, ten quasi-experimental studies and ten experimental studies.

Only one study included multisite data (Stephens, 1992). Demographic reporting varied with regard to student demographics and the majority of the studies were conducted within the US. Only 23 of the studies included an evaluation of TA interventions in conjunction with course exams and only six reported the exam format. Significant variation existed in the way anxiety around testing was operationalized and measured. According to Brodersen (2017) “test anxiety is specified as a type of trait anxiety related specifically to test taking, was measured with one or more self-report instruments in 13 studies” (p. 132). Brodersen categorized the studies as either intra-test interventions or peri-test interventions. The 18 intra-test interventions focused mainly on collaborative testing interventions (12 studies), crib sheets (1 study), humorous exam items (1 study), aromatherapy (2 studies) and music therapy (2 studies). Ten of the 18 studies were descriptive studies and two were performance improvement projects. Brodersen noted 16/18 were “effective,” many of which are the collaborative test that did not include a self-report measure to study TA.

The peri-test interventions were categorized by Brodersen (2017) into cognitive behavioral interventions which included: hypnotherapy (2 studies), rational state-directed hypnotherapy (2 studies), relaxation training (progressive/deep muscle relaxation) with 3 studies, systematic desensitization (2 studies), stress inoculation (1 study), counseling for nutrition exercise, relaxation, study skills, test-taking strategies (1 study), biofeedback-

assisted relaxation training (1 study), guided reflection (1 study), guided imagery training (1 study), guided imagery with relaxation training (1 study), and aerobic exercise (1 study). Brodersen (2017) noted nine of the 17 studies were experimental design, five were quasi-experimental, and one was a case study; while, 16 of the 17 studies were noted by the author to be effective. Three other types of interventions categorized as perit-test interventions were two descriptive studies including exam analysis (1 study) and test-taking skills workshop (1 study) that were noted as effective and one quasi-experimental study using pet therapy that was not effective. In summary the author noted that 19 interventions including aromatherapy, music therapy, and cognitive behavioral interventions were found to be helpful in regard to TA. Brodersen also supported the use of nonexperimental evidence such as collaborative testing, crib sheets, and humorous exam items. Brodersen concluded research is needed to corroborate and strengthen evidence to support existing interventions and to evaluate new interventions.

Therefore, it is important to examine existing interventions and to focus on the key variables of TA and academic performance. The review started with studies of a single type of intervention including three studies on aromatherapy (Johnson, 2014; Kutlu, Yilmaz, & Cecen, 2008; McCaffrey, Thomas, & Kinzelman, 2009), one autogenic training (Kanji, White, & Ernst, 2004), one biofeedback assisted relaxation therapy (Prato & Yucha, 2013), one desensitization (Dawley & Wenrich, 1973), one comparing relaxation exercise to physical exercise (Topp, 1989), two on guided reflection (Beggs, Shields, & Goodin, 2011; Sharif, Dehbozorgi, Mani, Vossoughi, & Tavakoli, 2013), one imagery (Stephens, 1992), three hypnotherapy (Boutin, 1978; Boutin & Tosi, 1983;

Ainsworth et al., 2010), one meditation (Malinski & Todaro-Franceschi, 2011), one mindfulness meditation (Chen, Yang, Wang, & Zhang, 2013), two music (Summers, Hoffman, Neff, Hanson, & Pierce, 1990; Lai, 2006), one muscle relaxation (Zargarzadeh, & Shirazi, 2014), one quieting response (Heaman, 1995), one finger tapping (Zlomke, 2007), one Emotional Freedom Technique (EFT) intervention (Mohler, 2013), and one test-taking intervention (Cornell, 2011).

Combined treatment interventions included a stress management program that contained five different components (Charlesworth, Murphy, & Beutler, 1981), autogenic training and STARS (Evans et al., 2010), and finally biofeedback assisted relaxation with autogenic training (Prato & Yucha, 2013). Of these 25 intervention studies, 17 occurred in the US., two in the United Kingdom, two in Iran, and one in Austria, China, Taiwan, and Turkey. The majority of the treatments were behavioral in nature. Fifty-six percent (14/25) of the intervention studies used instruments specific to measuring TA. Of the 14 studies with specific TA measures, 85% showed a statistically significant reduction in test anxiety following the intervention implementation (Ainsworth, et al., 2010; Boutin & Tosi, 1983; Dawley & Wenrich, 1973; Evan, et al., 2010; Johnson, 2014; Kutlu, et al., 2008; Lai et al., 2008; Mohler, 2013; Sharif et al., 2013; Stephens, 1992; Topp, 1989; Zargarzadeh & Shirazi, 2014; Zlomke, 2007). Nine of the 15 studies (Ainsworth et al., 2010; Boutin & Tosi, 1983; Charlesworth et al., 1981; Cornell, 2011; Evans et al., 2010; Kutlu et al., 2008; Mohler, 2013; Stephens, 1992) examined an academic performance measure such as test scores or GPA; however, only 37.5% showed a statistically significant improvement. One study reported a statistically significant improvement in

GPA (Boutin & Tosi, 1983), and two revealed improvements in test score (Evan et al., 2010; Mohler, 2013). Details regarding each study are described below.

Aromatherapy interventions included the use of either lavender, rosemary with lavender, or lemon as a fragrant stimulus to relax subjects during an exam. Kutlu et al. (2008) conducted a randomized, controlled, prospective study to explore the effect of aromatherapy on TA. The sample consisted of 95 students with 50 in the intervention group and 45 in the control group. The intervention group was placed in a closed room with 10 lavender incenses placed 15 minutes prior to the start of the exam. The control group was in another closed room without incense. Both rooms were of equal size and temperature. The exam lasted 60 minutes in both rooms; following the exam, the students were given a questionnaire and a Turkish version of the STAI. The questionnaire consisted of personal and socio-demographic questions which revealed no significant differences between the groups. The mean anxiety scores of the study group was significantly lower than the control group ($p < 0.001$). The mean test scores in the study group was higher than the control group but it was not statistically significant ($p = .531$).

McCaffrey et al. (2009) had similar findings among nurse practitioner students using a quasi-experimental design with pre-and posttest measures to evaluate differences between two essential oils, lavender and rosemary. The first examination was used to gather baseline data on participants. Before starting the exam, each student had his or her blood pressure and heart rate assessed and completed the TAS. After the exam the same data elements were measured again. For the second exam of the semester, the students had the same data gathered before and after the exam, but they were given a lavender

essential oil inhaler and were instructed to breathe in the aroma prior to the start and during the exam. The same process was followed with data collection for exam three with the exception that the students received rosemary essential oil inhaler instead of lavender. McCaffrey et al. (2009) met with the students after the second and third exams to inquire about the participants' feelings, concentration, and anxiety levels.

The data analysis revealed the posttest anxiety scores after exam three were lower but not statistically significant than those following exam 3 ($p = 0.03$). No significant differences were noted in systolic or diastolic blood pressure between pre- and posttest for measurements 1, 2 or 3. Measurement of the radial pulse was significantly different across the three tests. Posttest pulse readings were significantly lower with lavender use after test 2 (78 beats/min to 70 beats/min) ($p = .000$), but this was not seen with the rosemary use after test 3 (78 beats/min to 71 beats/min) ($p = 0.033$). Discussion findings revealed participants felt the lavender smell was pleasant, but some thought it caused them to relax too much and they verbalized a decrease in concentration levels. All participants enjoyed the rosemary and stated it increased their ability to concentrate and recall information. The participants even stated the rosemary cleared their head while the lavender caused feelings of fuzziness (McCaffrey et al., 2009).

Johnson (2014) explored the effect of lemon essential oil on cognitive test anxiety among sophomore nursing students. Students were randomized into a control and experimental group. No significant differences were noted between the groups' cognitive TA scores pre-intervention. The exam room was diffused with *Citrus limon* (lemon) oil 15 minutes prior to student arrival and throughout the exam. The average post-

intervention cognitive TA scores decreased significantly compared to the average pre-intervention cognitive TA scores ($t = 2.83, p = 0.01$). The cognitive TA scores among the 21 nursing students in the experimental group decreased from pretest ($M = 73.62$) to posttest ($M = 67.62$). No significant changes were noted in the control group.

Kanji et al. (2004) explored autogenic training in 1998 among 93 diploma, associate degree, and baccalaureate nursing students in the United Kingdom. This randomized control study had a three-group design. One group received the autogenic therapy for 20 minutes for 8 weeks. The second group was exposed to laughter for 20 minutes for 8 weeks. The third group was considered time control and received no treatment. Outcome measures included blood pressure, pulse rate, STAI, and the Maslach Burnout Inventory completed at baseline, 2 months, and 5, 8, and 11 months. The findings revealed a statistically significant greater reduction of state anxiety ($p < 0.001$) and trait anxiety ($p < 0.001$) in the autogenic group; however, the anxiety measurement specific to testing was not utilized. Blood pressure was significantly lower after treatment in systolic ($p < 0.01$) and diastolic ($p < 0.05$) blood pressures and heart rate ($p < 0.002$) than the other two groups. There were no differences between the groups regarding burnout.

Prato and Yucha (2013) used a pre- and posttest design to determine the effectiveness of biofeedback assisted relaxation training (BART) on the psychological and physiological responses to TA. Prato and Yucha had all four semesters of nursing students ($N = 156$) in an upper-division nursing program in Nevada to complete the TAI. The third semester students ($n = 37$) had the highest scores, so all were invited to

participate. The intervention group, consisting of 14 students received the BART intervention for 15 minutes, while the control group ($n = 13$) did not receive treatment. Students were instructed to practice BART for 15 minutes daily. The intervention group had statistically significant reductions in pulse ($p < 0.01$) and increases in skin temperature ($p < 0.001$). Comparison of the pre-BART TAI showed a slight trend upward post-BART TAI but it was not statistically significant ($p = 0.412$). Prato and Yucha purported that possibly the students did not learn the relaxation techniques and thus the intervention group did not see a reduction in TA.

Dawley and Wenrich (1973) conducted a massed group desensitization intervention to determine the effectiveness in reducing TA among 30 nursing students found to be in the upper quartile on TAQ (Mandler & Sarason, 1952). The authors used a randomized block procedure with 10 subjects receiving desensitization as a mass group, 10 were in a placebo group and 10 were the control group. The intervention group met for 140 minutes on three evenings over 8 days, while the placebo group met for 20 minutes to hear a pre-recorded lecture on study techniques and personal efficacy on three evenings. The control group had no intervention or time commitment. The groups completed pre and post-questionnaires. A significant difference was found in lower TA between the desensitization group versus the placebo group ($p < 0.01$) as well as between the desensitization group versus the control group ($p < 0.01$).

Topp (1989) compared the effects of relaxation exercises to physical exercise (aerobic dance) on TA among a convenience sample of 49 of 210 undergraduate nursing students. The volunteers self-selected to participate in either the relaxation exercise (9/45)

or physical exercise (16/45) within the treatment group. Subjects had to attend more than 70% of the exercise sessions for their data to be included within the treatment group. The remaining 20 students had demographic data and TA data collected and served as the control group. The relaxation exercise group's TAQ score pretest ($M = 16.9, SD = 8.4$) decreased to ($M = 13.7, SD = 7.4$) posttest ($p = 0.05$). The physical exercise group's TAQ score pretest ($M = 18.3, SD = 8.3$) decreased to ($M = 16.4, SD = 7.7$) posttest ($p = 0.05$). The control group's TAQ score pretest ($M = 17.5, SD = 7.2$) revealed no statistical reduction posttest ($M = 16.3, SD = 6.4$). The total time spent in each treatment group was 630 minutes over 7 weeks. Topp (1989) also reported an increase in estimated work capacity in the physical exercise group ($X^2 = 4.94, p = 0.03$) which was not found in either the relaxation exercise treatment group ($X^2 = 0.86, p = 0.38$) or the control group ($X^2 = 0.29, p = 0.59$).

Studies on guided reflection also showed promise in lowering TA. Beggs et al. (2011) found guided reflection using John's Model for structured reflection helpful in Ohio. Beggs et al. presented the model for structure reflection and an evaluation tool for guided reflection. The general theme presented was TA resulted from lack of self-confidence and fear of failing nursing exams. Application of the model allowed the student to recognize strengths and increase confidence. Workshops were held to assist with test preparation and test-taking skills to further boost self-confidence. Holistic methods of deep breathing and visualization were also included and were reported to help decrease anxiety before and during the exam. It was unclear how many students were

included in the study. Beggs et al. noted he and she comments but only shared specifics on one person with the pseudo name of Laura.

Sharif et al. (2013) studied the effect of guided reflection on TA in nursing students among second- and third-year nursing students in Iran. Of 147 students, 100 scored mild to severe TA on Sarason and Abolghasemi TAS, and of these, 80 agreed to participate. The intervention group started with 40 participants but lost six people; while the control group started with 40 and lost one student to attrition. The intervention consisted of John's nine-stage guided reflection model taught through lecture, question and answer, and discussions. The total time spent teaching and delivering the interventions was 12 hours divided equally over 2 days for a total of 720 minutes. The control group received no intervention. No real differences were seen between the groups in regarding to socio-demographic data. The control group had an increase in the mean and standard deviation of TA scores at three months ($p = 0.01$), while the intervention group had reduced TA immediately following the 2-day treatment and after 3 months. The comparison at 3 months revealed a significant reduction in TA from pre- treatment in the intervention group ($p < 0.001$).

Stephens (1992) explored imagery use among first-year baccalaureate and associate degree students in the south central and southeastern US, using a quasi-experimental pre- and posttest design with random assignment into three groups. The first group received imagery alone via audiotape developed by the author that lasted 15 minutes. Students were instructed to use the videotape 15 minutes daily for 5 consecutive days and decrease use to three times a week for 3 weeks. The second group received the

same treatment as group one but also received progressive relaxation presented before the first audiotape. The students in Group Two were to use the tape for 20 minutes daily for 5 consecutive days and decrease use to three times a week for 3 weeks. The third group was the control group who received no tape or treatment but was promised copies of the tapes at the study conclusion. The majority of participants were ADN students (73%) as compared to 27% BSN. The only significant difference between the demographic variables was number of children at home ($p = 0.0033$) with the imagery only group having more children living at home. The posttest A-state score compared to pretest was significantly associated with anxiety ($p = 0.003$). The main effect of the treatment group was also significant ($p = 0.001$). Unfortunately, no significant difference was found between pre-test and posttest examination scores. The author noted a problem with study retention (62%) as students verbalized lack of time to participate due to course load (Stephens, 1992).

Hypnotherapy has been studied three times in nursing students. The first hypnotherapy study reported by Boutin (1978) was a case study of a 17-year-old female. The student had above average intelligence documented (WAIS 112) but was performing poorly on freshman level nursing exams. The student reported severe headaches, nausea and dizziness with exam taking. She reported knowing the material until entering the exam where she “would tighten up, sense a loss of control and experience pain. She would be unable to cope with her feelings of frustration and become too rigid too search for appropriate answers and alternative solutions” (Boutin, 1978, p. 55). The response was not new to the student but resulted in her blanking and withdrawing and occasionally

passing out. She reported an inability to raise her grades in nursing school because of the emphasis on exam grades; whereas, in high school she could accommodate poor exam scores with extra projects. The student attended hourly sessions of rational stage directed hypnotherapy over an 8-week period. Improvement were seen from pretest to posttest score including a decrease in TAS from 28 pretest to 11 posttest with the normative data for TAS reported to be 12 ($SD = 4.3$) and her GPA improved from 1.4 on a 4-point system to 2.66 at the end of the semester.

The second intervention study to explore the benefits of hypnotherapy was conducted by Boutin and Tosi (1983) in Ohio among an all-female nursing student group ($N = 48$). The intervention consisted of rational stage direct-cognitive hypnotherapy (RSDH) that used hypnosis and vivid-emotive imagery that met for one hour for six weeks. Three other groups received hypnosis only, a placebo condition, or no treatment. Statistically significant improvements were noted in subjects' TA and physiologic measures from both the RSDH and hypnosis only group at posttest and at two-month follow-up. No differences were noted between the two therapists who administered the therapies ($p > 0.50$). The RSDH treatment showed significant improvements in TA ($p < .01$) and the grade-point average pre- and post-intervention ($p < .01$) compared to the hypnosis only group.

Ainsworth et al. (2010) studied the effect of hypnotherapy on exam anxiety and exam performance. Ainsworth et al. used a two-armed randomized controlled pilot study with a total of 24 first year nursing students in the United Kingdom. The subjects were equally divided into the intervention versus control groups. The intervention consisted of

three sessions. Session One lasted 20 minutes and taught participants a physical and mental relaxation exercise followed by imagination exercises with positive thoughts. The participants were given a compact disc (CD) containing the entire exercise to listen to at home to reinforce content learned. Sessions Two and Three consisted of additional relaxation techniques and participants were instructed on confidence, memory retention and reducing excessive stress and anxiety. At the end of the third session, participants received a new CD to listen to the night prior to their exam.

Three different therapists conducted the hypnotherapy sessions yet no differences were found related to therapist. Self-reported feelings about the hypnotherapy following the exam were evenly rated as more relaxed, more focused, and more confident. Only one person reported feeling less focused. The mean difference in math scores between the groups was not significant ($p = 0.918$). There was also no significant difference of anxiety scores between the groups ($p = 0.790$), and the authors noted this may have been due to the low participation from the class (less than 66% of those approached participated in the study). The reasons captured from non-participants for not participating included: (a) not overly anxious about exams; (b) did not want to be hypnotized; (c) do not feel I need additional support when taking exams, and (d) not in attendance when the trial was explained.

Malinski and Todaro-Franceschi (2011) examined the effect of co-meditation on reducing anxiety and facilitating relaxation in nursing students, nursing faculty and staff in New York. This quasi-experimental pre- and posttest design used participants as their own controls. Pre- and posttest data measurements included blood pressure, pulse, and

respiratory rate along with STAI questionnaires. The intervention started with the group breaking into pairs for the three phases. Phase One involved the facilitator making the “AAAHHH” sound for 5 minutes. Phase Two included counting from one to 10 softly and drawn out for 5 minutes. Phase Three entailed saying favorite word or “AAAHHH” for another 5 minutes. The intervention lasted approximately 20-30 minutes. Vital signs including blood pressure, pulse and respirations were collected pre- and post-intervention.

The STAI was administered after the intervention. Participants were provided a handout of the relaxation exercise and co-meditation sequence to practice with partner of their choice at least two times a week for a month. The participants also received a book. The participants returned in 1 month for follow-up data collection. There was a significant reduction in the intervention group’s state anxiety scores ($p < .001$) as well as a reduction in the intervention group’s trait anxiety scores ($p < .002$). There was a significant reduction in all three physiologic measures of systolic blood pressure ($p = .013$), pulse ($p < .001$), and respirations ($p < .0001$) in the before and after co-meditation values. No difference was noted in the diastolic blood pressure. The authors noted that only 14 of the 24 (58%) participants returned for the 1-month follow-up.

Chen et al. (2013) explored the effects of brief mindfulness meditation on anxiety symptoms and systolic blood pressure in 60 nursing students. The participants were randomized into either the treatment or control group. The intervention included 30 minutes of group meditation for 7 days for a total of 210 minutes. The control group received nothing. Outcome measures included pulse, blood pressure, self-rating anxiety

scale scores, and self-rated depression scale pre- and post-treatment. There was a significant reduction in self-reported anxiety ($p = 0.0000$), whereas, there was no significant difference in the self-reported depression score ($p = 0.082$) between pre- and post-treatment. The only vital sign showing slight reduction was the systolic blood pressure ($p = 0.034$). Unfortunately, it is unclear when the STAI instrument was completed in relationship to nursing exams so it is unclear if the anxiety was truly TA or general anxiety related to nursing school.

Music interventions have been inconsistent in effecting TA. In 1990, Summers et al. explored the effects of 60 beats per minute music on test-taking anxiety among 45 nursing students in Florida. Summers et al. used a convenience sample of nursing students taking a pediatric course for the intervention group ($n = 21$) while students taking the obstetric course served as the control group ($n = 24$). The intervention consisted of music with 60 beats per minute being played during an exam. The control group had a test on the same day in the same room at a different time and no music was played. No significant difference was noted between groups for state and trait anxiety scores. No significance was found between the group's pretests in regard to state and test anxiety or pulse. There was also no significance noted between the group's posttests related to state and trait anxiety scores and pulse rates.

Lai (2006) reported a different result to classical music in preliminary report. She used a crossover design with 38 nursing students randomly assigned to a music/regular or regular/music group sequence in Taiwan. Outcome measures included pulse and finger temperature along with Chinese versions of STAI and TAI. Classical music was played

during the examination. The results revealed music significantly lowered TA and increased finger temperatures in the treatment group ($p < 0.01$). Further reporting of this study by Lai et al. (2008) noted the classical music reduced TA ($p < 0.001$), state anxiety ($p = 0.005$), and increased finger temperature ($p < 0.001$) while the decrease in pulse rate was less significant ($p = 0.02$). The type of music might have led to different results between these two music intervention studies.

Progressive muscle relaxation was tested using a quasi-experimental study to determine effectiveness in reducing TA among third and fourth semester nursing students in Iran (Zargarzadeh & Shirazi, 2014). All third and fourth semester students ($N = 94$) were tested for TA. Fifty (53%) had moderate to high TA. Of these 49 students were divided into two groups. The intervention group ($n = 24$) was exposed to progressive muscle relaxation in four sessions plus the students were instructed to perform the relaxation twice a day at home until final exams. The control group ($n = 25$) had data collected only. The results revealed a significant difference in the mean scores of TA after the intervention between the two groups ($p = 0.00$) while there was no difference detected before the intervention ($p = 0.76$). Also, within the study group, there was a significant difference noted in the mean scores of TA before and after the intervention ($p = 0.00$); this was not the case for the control group ($p = 0.09$).

In 1995, Heaman studied the effect of a quieting response (QR) on reducing stress in forty junior baccalaureate nursing students using a quasi-experimental pretest-posttest control group design in Alabama. The quieting response was taught and applied for 90 minutes for five sessions over 6 weeks or a total of 450 minutes. The outcome measures

were the STAI scores and urinary potassium. The students receiving the intervention were instructed on the quieting response with biofeedback assistance. Significant differences were noted in the state anxiety in the treatment group ($p < 0.0001$). No difference was noted in the trait anxiety. This further supports TA as a state trait anxiety rather than trait anxiety.

Zlomke (2007) explored the benefits of finger-tapping during an exam on TA among nurse students in Wyoming. Zlomke (2007) used a quasi-experimental pretest posttest design with a convenience sample of 21 ADN students using Bauman and Melnyk (1994) finger tapping intervention at 100 taps per minute. The cohort of 53 was tested using TAI and 22 (41.5%) were found to be test anxious. One student failed to use the intervention, so her results were removed from the data analysis. Of the remaining 21 subjects, 10 were in the intervention group and 11 in the control group. Outcome measures included TAI total, worry, and emotionality scores. Significant improvement was only observed in the post treatment worry subscale ($p < 0.05$).

Mohler (2013) examined potential associations between variables of stress, TA, student expectations, and student success with the NCLEX-RN®. She also explored the utilization of Emotional Freedom Techniques (EFT) to reduce test anxiety in nursing students preparing for the NCLEX-RN® exam. The NCLEX-RN® exam is considered a high-stakes testing exam since nursing graduates cannot receive a nursing license to work without successfully passing this exam.

Charlesworth et al. (1981) explored the effects of a stress management program on ten nursing students in a medical surgical course in Texas. The experimental group (n

= 10), one medical surgical clinical group, received training on progressive relaxation, deep muscle relaxation, autogenic training, visual imagery and modified systematic desensitization in hourly sessions two times a week for 5 weeks for a total of 600 minutes. The students were encouraged to practice at home daily. The control group was a second medical surgical clinical group that consisted of eight participants. The control group received no treatment or time but completed the STAI questionnaire and consented to GPA data retrieval. There was no significant difference noted in the grade point average (GPA) between the groups for the semester of the intervention compared to the prior semester GPA. A slight difference was noted in the state anxiety between groups between pretest to final exam ($p < .10$) but it was not of statistical significance. There was a significant difference noted in the trait anxiety between groups between the pretest and final exam ($p < 0.05$). The students were asked to pick their top two preferred stress management techniques. Deep breathing was noted to be the favorite with 54.5% (6/11) responses, visual imagery was next with 45.4% (5/11) responses and tense-relax technique was preferred by 27% (3/11) responses.

Evans et al. (2010) used a multimodal approach to treat TA among junior nursing students in Tennessee. The goal was to administer an active control cognitive behavioral training program to reduce test anxiety and improve academic performance. Incoming students were screened for TA using the Westside Test Anxiety Scale. Fifty percent (42/84) of the students were identified as moderate to high TA. These students were then randomly assigned to either the treatment group or the control group. The treatment group ($n = 22$) received active control anxiety-reduction treatment protocol, which

consisted of a modified cognitive desensitization plus stretch-tense-deep breath and release relaxation and suggestion sequences (STARS). The intervention took an hour and each student received a training CD with instructions to review at least twice a week. The control group was given a packet of information on test anxiety reduction and was asked to review it twice. This first phase occurred in October 2009. The second phase was in March 2010, when the students completed the standardized HESI® test. The adjusted HESI® scores were 64 points higher for the treatment group compared to the control group. This HESI® advantage translated into 12.9 percentile advantage ($p < .05$). The specifics on which HESI® exam was administered was not reported. The post treatment GPA for the following semester revealed a 9.0 percentile advantage that was not of statistical significance ($p < .10$).

Cornell (2011) explored the effectiveness of a test-taking intervention on TA and academic performance in associate degree nursing students using a quasi-experimental design in the Midwestern U.S. The experimental group ($n = 31$) attended a test-taking intervention, while the control group ($n = 35$) received no treatment. The pre-intervention data was collected after the students had completed two exams. The test-taking strategy was implemented at one of the two campuses in a private community college. The test-taking strategy intervention lasted 60 minutes and was conducted as part of the curriculum delivery within normal class hours for the campus performing the experiment. The post intervention data was collected at the end of the semester. Outcome measures included TAI and Generalized Expectancy for Success Survey. The treatment group realized a small improvement in TA of 2.58 from pretest to posttest but it was not

of significance. The slight improvement in test scores among the treatment group was not statistically significant either.

Summary

TA presented real physiological and psychological alterations that prevent individuals from performing their best on exams. Research revealed TA was not a respecter of persons or geography but rather was a widespread phenomenon affecting persons of all ages globally (Seipp & Schwarzer, 1996). The multidimensional and dynamic nature of TA promoted multiple variations in study foci. Fortunately, research showed some promise in regard to reduction in reported TA, variables that moderated or mediated the negative effects on performance, and improvement in test performance. Since nursing is a major with rigorous curricula and high-stakes exams, it was a prime area to explore the benefits of a test-taking intervention on TA, emotionality, worry, and test performance. The aim of this study was to determine the effectiveness of a test-taking education intervention on lowering test anxiety (TA), promote early self-identification of high TA, decrease TA, promote student progression, reduce attrition, and increase supply of graduating nurses. Based upon the review of the literature a holistic cognitive intervention including time management, study skills, and test-taking strategies, with weekly boosting of the intervention via Facebook, was performed to determine the effects on TA total, emotionality, worry, and test performance.

CHAPTER III

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

The purpose of this two-group, posttest-only, experimental design pilot study was to determine the effectiveness of a test-taking intervention on lowering TA. The two-group experimental design with a posttest only reduced threats to the internal validity of the study by controlling for history, maturation, testing, statistical regression, instrumentation, selection, and mortality (Campbell & Stanley, 1963). It also reduced the external validity threat from the influence the pretest would sensitize participants to the intervention and post testing. In this study, participants were randomly assigned to the experimental and attention-control groups using a computer-generated software. The experimental group received a test-tasking educational intervention aimed at reducing TA while the attention-control group received a presentation comparable in terms of time and engagement. This chapter presents information regarding the setting, population and sample, protection of human subjects, instruments, data collection, and data analysis.

Setting

The setting for this study was a large upper division baccalaureate nursing program in a large city in the Gulf Coast area. This college of nursing (CON) was ideal because the location is within a metropolitan area with ethnic diversity, which is reflected in the student body, and has a biannual enrollment of nursing students averaging 100 students per enrollment. Classrooms within the CON were used for the live presentations for both

intervention and attention control groups and for data collection. Using a familiar setting promoted comfort for the participants and enhanced retention (Polit & Beck, 2017).

Population and Sample

The population for this study included generic junior baccalaureate nursing students who were enrolled in a fundamental concepts course and who normally take an Elsevier HESI® specialty fundamental exam as their comprehensive final and accounting for 15% of their course grade. Because the literature revealed insufficient studies with similar interventions to assess effect size needed to calculate potential sample sizes, it was not possible to complete a power analysis (Cohen, 1988). Based upon consecutive sampling and average enrollment per fundamental concepts course the pilot study occurred over two semesters. The attrition rate for college students in a class setting has been reported at 8.3% (Register et al., 1991). Therefore, a small effect size of .30 was assumed with alpha of .05, power of 80% and an attrition rate of 10% using a 1 tailed *t*-test. A sample of 306 would be needed to detect a difference in TA between the two groups plus attrition results in a desired population of 320 subjects. One-tenth of this number was the goal for this pilot study.

One mechanism used to increase power in studies is to increase the dose of the intervention. Strategies to dose up this test-taking intervention included online resources posted via social networking. Goldsmith and Albrecht (1993) found a relationship between support and test performance to the student's level of TA and perceived support. Facebook© provided a format for social networking for students to be engaged and learn from others within their group posting. Facebook "Strategies for Test Success" allowed the researcher to post examples of completed tools to assist with test preparation and

sample test questions to allow for application of strategies taught during the live intervention program. The attention control group also had social networking via Facebook “Professional Roles within Nursing” where educational preparation, licensing issues, typical days, pay ranges, and typical schedules were shared by three nurses in differing positions. Students in the attention control group also had access to pose questions about the uniqueness of the differing professional roles. Unfortunately, the Facebook format did not allow the researcher to track the number of times nursing students viewed content or track the time invested so subjects were asked to track time and self-report the time during final data collection.

Students were recruited at a large upper division baccalaureate nursing program during nursing orientation. A consecutive sample of students who attended nursing orientation and who were enrolled in the fundamental concepts course that gave informed consent to participate were included in the study. Other study inclusion criteria included those students who completed the 3-hour live class, participated in the online activities, and who completed the Elsevier HESI® specialty fundamental exam. Students were not excluded based upon GPA. None of the student volunteers were retaking the course so none of them had previously encountered a HESI® fundamental specialty exam.

Protection of Human Subjects

Permission to conduct this study was obtained from the Texas Woman’s University Houston campus Institutional Review Board (IRB). Potential volunteers received an invitation and a copy of the consent form during the junior student nursing program orientation. Students interested in taking part in the study attended an information

session following orientation to review the study purpose, information regarding the procedures for the study, time commitment, risks and benefits, and remuneration for participation.

The consent form outlined possible risks and protection of the participants as noted below:

1. Potential loss of confidentiality was minimized by securing consents and code sheets in a locked file within a locked cabinet in the investigator's office. Unique identification numbers were used to track participants in three phases of intervention. The code sheet will be shredded within 1 year of study completion. Signed consents were submitted to the IRB. Data was aggregated, and individual student data was not shared with the faculty, course managers, or program administrators.
2. Use of a Facebook private online forum groups required real names to access the private group and comments generated are associated with the person. To minimize this risk participants received a handout at the completion of phase one providing instruction to set up a Facebook account, access the private group once invited by the PI, and social nature of this forum. The voluntary nature of research participation was included on the handout as well as tips for Internet safety and maintaining a positive environment. Participants were reminded they could choose to discontinue their

participation at any time. The online activity did not require a set amount of sharing to remain in the study. The “friendship” (access) between group members ended, so participants were “unfriended” 48 hours after the last posting within the private groups.

3. Participants could experience temporary discomfort/anxiety from completing the demographic and TAI instrument immediately prior to a comprehensive final (situation specific TA). Therefore, Phase Three data collection was consciously limited in length to end at 15 minutes. The anticipated time for completion was 10 minutes as the average TAI time is 8 minutes; this allowed 2 minutes for participants to complete the demographic data.
4. Participants could experience a loss of time as the maximum time of participation was 6 hours and 45 minutes. To minimize this risk participation was voluntary and participants were informed of the time requirements for the study. Participants were reminded they could discontinue the study at any time.

Benefits of the study and remuneration included the following:

1. Participants received \$20 cash upon the completion of Phase One, which included the live presentation.

2. Participants received \$20 cash upon the completion of Phase Three, the survey completion prior to final exam.
3. Participants had access to additional content provided through the education intervention that either supported curricula content or emphasized a systematic approach to apply when taking tests.
4. Participants had access to refreshments provided during the live presentations.
5. Participants had access to candy, fruit, pens, and pencils at the end of the study.
6. Participants were eligible for a drawing of two \$25 gift card to Starbucks, a \$200 gift card to Best Buy, two stethoscopes, scissors, and penlights.

Additional benefits of considering this research included the receipt of pen and pencil with the distribution of the invitation flyer and consent form included with the nursing students' orientation materials as well as access to bags of M&M's, Skittles, apples, and carrots available the afternoon of nursing orientation for all potential participants. Subjects received \$20 cash upon completion of phase one (live presentation) and \$20 cash upon completion of phase three (final exam and survey completion). Another benefit was access to content in the form of questions provided through the educational intervention. This content either supported curricula content or emphasized a systematic approach to apply when taking tests. Refreshments were provided during live presentation breaks. Pens, pencils, and a thank you note were distributed at the end of the study upon exiting the classroom and raffle prizes were awarded.

The internet was used during Phase Two online activity using social networking media, Facebook private groups, to boost the educational component for both groups (intervention and attention control). Membership into the private groups was by invitation of the PI. Features within Facebook were set to accept members entered by the PI in the private group membership using participants' names. The group was listed on the Facebook© wall only after acceptance by the participant, and visibility was limited to group members. Each participant determined his or her depth of socializing (sharing) based upon comfort level. Because the polling feature within Facebook does not allow for anonymous voting the use of this feature was limited to opinions and was voluntary. Participants were asked to self-report their time spent on Facebook activity, as the PI did not have a means to monitor participation levels. The membership and friendship (access) to the PI's Facebook ended following completion of Phase Two.

Participants who desired to see the study results were asked to provide their email address on the consent form so a summary of the results could be emailed following the completion of the study. Signed consents were submitted to the IRB following completion of the study.

Instruments

Demographic data were collected in phase one via a Psych Data survey (see Appendix B). These data provided descriptive information about the two groups of study subjects. The information was not used to identify individual characteristics, but rather to provide a pictorial description of the characteristic of the sample population (Polit &

Beck, 2017). Information was used to compare and contrast demographic items between the two groups.

The propensity to TA was measured using the TAI, developed by Spielberger et al. (1980) that consisted of a self-reported 20-item four-point Likert scale based upon frequency with evenly spaced responses of *almost never*, *sometimes*, *often*, and *almost always* (see Appendix A). Questions were stated negatively excepting the first question, which was stated positively and inversely scored. The instructions were written at a fifth-grade reading level (Spielberger et al., 1980).

The instrument consisted of a total score, TAI-T, and subscales for worry (TAI-W) and emotionality (TAI-E). The TAI was norm referenced for college students (Spielberger et al., 1980) and has strong psychometric properties with a Cronbach's alpha greater than .90 for total score (Benson & Tippets, 1990; Spielberger et al., 1980) and greater than .80 for the subscales of worry and emotionality (Benson & Tippets, 1990; Spielberger et al., 1980). The TAI-T ranged from 20 to 80 points with score classifications for undergraduate students as scores between 20 and 29 classified as low test anxious, scores of 30 to 55 were moderately test anxious, and scores of 56 to 80 were high test anxious. Females consistently scored three to five points higher than males. The TAI-W and TAI-E subscales ranged from 8 to 32 points with females scoring higher than males. The test-retest reliability of $r = .80$ for 3-week and 2-week periods were reported for undergraduate students (Spielberger et al., 1980). The time for completion was 8 to 10 minutes with an average of 8 (Spielberger et al., 1980), making it the ideal for quick administration when TA peaked and the online format was consistent with the Elsevier

HESI® specialty fundamental exam. The TAI provided a measure of total test anxiety, worry, and emotionality prior to the final course exam to determine the effectiveness of the educational intervention provided.

The Elsevier HESI® specialty fundamental exam had two versions available with tested internal validity. This exam was administered following the usual procedure of the CON and requirements for test security provided for this online testing format allowed only forward movement and lock down browser to prevent examinees from accessing information other than the exam once the exam has started. The HESI® specialty fundamental exam provided a measure of academic performance. The Kuder Richardson Formula 20 (K-R 20) for the exam was 0.65.

Data Collection

Data collection began following IRB approval. In overview, this two-group, posttest only, experimental design consisted of three phases. The projected sample size for this pilot study was a minimum of 16 per group or 32 total participants. Subjects were randomly assigned to the experimental or attention control group using a computerized software program. The intervention group received a 3-hour live presentation on study tips and test-taking strategies followed by weekly postings of practice questions and feedback with a nurse educator using Facebook private group feature during the semester for 14 weeks starting the week after orientation. The online activity provided participants an opportunity to apply the strategies taught in the three-hour live presentation and served to boost the intervention. The attention control group received a 3-hour live presentation on multiple roles within the nursing profession followed by weekly postings of question

and answer sessions with guest speakers for 14 weeks following orientation.

Demographic data and information regarding prior experience with Facebook was collected during phase one of the study following orientation to nursing school using Psych Data. Phase Two included the 14 weekly sessions of online activities using Facebook private groups starting the week following orientation. Phase three consisted of data collection including of the TAI-T total score and TAI-W and TAI-E. The exam scores from the Elsevier HESI® specialty fundamental exam and course progression provided as aggregate data by groups from the course faculty following course completion. The mean scores of the four independent variables were analyzed to determine differences between the groups mean scores.

The steps of the research procedure were outlined below in chronological order:

1. Introduction of study occurred following nursing orientation to nursing school. The PI was on site during the orientation day with a table to promote interest in the research study and to answer questions prior to the information session and live presentations. Students attending orientation received a pen, notepad, and invitation to participate in the study along with a copy of the consent form at the beginning of the day with other orientation material. The researcher was introduced by a Co-director for Undergraduate Studies during the last break of the orientation program to demonstrate buy-in by the CON and leadership (Polit & Beck, 2017). Students were invited to stay for the information session,

attendees were introduced to the study and the consent form was read verbatim.

2. The information and consent session occurred immediately following the completion of the nursing orientation program. The PI spent 20 minutes prior to the live face-to-face presentation start time with all students who arrived for the information session. This 20-minute period occurred in a classroom at university campus once faculty left. The consent form was read to students in attendance with emphasis on study title, purpose, phases, time commitment, risks, benefits, and contact information prior to entertaining questions (see Appendix C). The researcher reinforced participation was strictly voluntary, and participants could withdraw at any time. Questions were answered in the public forum, and an invitation was extended for one-on-one questions after the session was over. After questions posed publicly were answered, those wishing to participate were asked to complete the consent form and return to the PI. Students declining participation were thanked and were free to leave.
3. Following the information and consent session, students who chose to participate completed the consent form and lined up to receive group assignment based upon computer randomization. Participants randomly assigned to the intervention group received the test-taking program. Participants randomly assigned to the attention control group received

the presentation on varying roles within the nursing profession. This procedure continued until each participant was randomly assigned into a group. Assignment of participants into groups remained the same for phases one and two.

4. An allotment of 5 minutes was provided to allow movement of participants into their assigned classroom for Phase One the three-hour live (face-to-face) presentation. The two different live presentations occurred simultaneously in two separate classrooms on two different floors.
 - a. The intervention group had a nurse educator deliver the test-taking strategies program using technology such as PowerPoint and a student response system to anonymously poll audience responses (see Appendix D). Practice questions increased student engagement. Refreshments were provided during the break. At the completion of the program, participants received a handout with instructions to guide the online activities in Phase Two. Participants were reminded to expect an invitation from PI to join the PI's Facebook private group for the online activities (Phase 2).
 - b. The control group had three different nurses present varying roles within the nursing profession. Content and strategies were planned to facilitate student engagement (see Appendix F). Refreshments

were provided during the break, which was scheduled at different times than the intervention group to prevent mixing of the groups. At the completion of the presentation, participants received a handout (Appendix G) with instructions to guide the online activities in Phase Two (see Appendix G). Participants were reminded to expect an invitation from PI to join the PI's Facebook private group for the online activities (Phase 2).

5. Each participant completing phase 1 from either group initialed a receipt of cash and verified working email address on consent form (see Appendix H), which was exchanged for \$20 cash upon exiting the classroom.
6. The first session of weekly online activities started Phase Two, the week following orientation. Each participant received a private invitation to join a private group via the PI's Facebook. Facebook accounts required names and email addresses. The settings for the Facebook private group were set to maximize privacy to restrict persons outside the group members from viewing. Communications were monitored frequently by the PI to facilitate development of group-specific content and to ensure nature of comments encouraged a positive learning environment. The PI reserved the right to delete a participant from the group if a participant made offensive remarks. The activities for Phase Two consisted of weekly posting of new material by 12:00 p.m. each Sunday during the

weekly online activities phase. The objective of this phase was to reinforce application of presentation content and/or promote reflection. Activities included question and answer sessions, case studies, factoids pertinent to content, audience polling, and chats with PI and/or members within their assigned group.

- a. Intervention group had a concentrated emphasis on application of the test-taking strategies with practice questions. Each week on Sunday, the online activities included three new test questions. Participant polling occurred; however, due to the inability to conduct anonymously, the nature of the questions focused on first thoughts when reading question, ease/difficulty answering, and factors influencing one's answer. Since Facebook did not allow tracking individual time spent within the private group, participants were asked to track time and self-report in phase three. Each participant was encouraged to decide individually on the level of involvement with discussion of practice questions. The PI shared answers to the test questions with rationale, application of test strategies, and tips on common mistakes. The PI posted discussion points for participants to further reflect upon and/or voluntarily share experience with group members. Members were encouraged to share (post to the Facebook wall) based upon individual comfort level. Tips to keep the wall from becoming overwhelming included request for questions to include

the date the question was posted along with specific question number and preferably within 48 hours of new questions being posted.

Within 48 hours of the posting of the last set of questions, group members were thanked for participating in phase two, and the intervention group members were deleted from the PI's Facebook and members were "unfriended" (removed from PI's list of friends).

b. The attention control group had a concentrated emphasis on differentiating education and experience requirements applicable to three different professional roles discussed in the live presentation. Case studies were used to highlight the application of the Texas Nurse Practice Act scope of practice based upon specific rules and regulations pertinent in the case studies. Professional organizations and resources to promote lifelong learning and evidence-based practice were posted. Questions to the various professional nurses who presented were managed by the PI who created a list of questions for each presenter, forwarded the list, and posted responses to the questions within 72 hours from the day the question was posted to the wall. Group members were asked to track their time spent participating in this private group on Facebook and to report the time during phase three data collection. Within 48 hours of posting the last scheduled day, group members were thanked for participating in

phase two, and the control group members were deleted from the PI's Facebook and members were "unfriended" (removed from PI's list of friends).

7. An online survey included data collection using a secure website started phase 3 and occurred immediately prior to the Elsevier HESI® specialty fundamental exam, in a classroom scheduled for the course final exam. Prior to sharing the password to access the surveys, participants were reminded that participation could be withdrawn at any time. Instructions with UIN were given to participants prior to data collection. Data fields were collected for each question asked on the Spielberger et al. (1980) TAI and time spent on online activities in phase two. Once participants completed their Elsevier HESI® specialty fundamental exam and exited the classroom, the PI verified completion of phase three while the participant initialed a receipt of cash voucher, which was exchanged for \$20 cash. Participants were thanked for their participation in the research study. Data collection was repeated the next semester the concepts course was offered to increase the sample size.
8. Destruction of the code sheet linking participant name to code number occurred one year following the completion of the study.

Treatment of Data

Data retrieved from the online format was backed up to decrease risk of loss. Prior to analysis, the data was reviewed for missing fields and outliers. Once normality of distribution was analyzed using Levene's test further analysis was performed using an

independent one-tailed *t*-tests. The Statistical Package for the Social Sciences 24 was used for data analysis. Data were password protected and stored in a locked cabinet in the primary researcher's office with limited access to facilitate data security. A description of demographic data was provided to determine characteristics of sample and compare differences between the intervention and attention-control group. Nominal and ordinal level demographic variables were reported using frequency and percentage. Means and standard deviations were calculated for interval and ratio demographic variables. A one-tailed *t*-test was used to test the differences between the intervention and attention-control group means for the dependent variables to test the four hypotheses.

Summary

This experimental posttest only study compared total test anxiety, test anxiety subcomponents worry and emotionality and test scores between the intervention group and attention control group to determine effectiveness of an educational test-taking program. The Zeidner's transactional model guided the design and implementation of the intervention. Academic performance was measured using an Elsevier HESI® specialty fundamental exam. Online activities using Facebook© private groups spread over 14 weeks boosted the intervention. An attention-control group was used to tease out Hawthorne effect. Though generalizability was limited; the pilot study provided information regarding the feasibility of such an intervention to counteract the negative influence of moderate to high test anxiety on test performance in hopes of reducing student attrition.

CHAPTER IV

ANALYSIS OF DATA

The purpose of this experimental posttest only study was to examine the effectiveness of a test-taking program on TA and academic performance in first semester baccalaureate nursing students randomly assigned into the intervention group or attention control group. The independent variable was a 3-hour live education intervention on test-taking strategies, followed by 14 weeks of online activities to apply the strategies, and the dependent variables included TA total score (TAI-T) and TA subcomponent scores of worry (TAI-W) and emotionality (TAI-E) as measured using TAI of Spielberger et al. (1980) and academic performance as measured by Elsevier HESI® specialty fundamental exam.

After IRB approval was obtained (see Appendix C), first semester junior level baccalaureate nursing students enrolled in the Concepts Course were recruited following nursing orientation in both the spring and fall semesters of 2017. The population consisted of adults who are first semester nursing students in a large public upper division baccalaureate nursing program in a large city in the Gulf Coast area. This college of nursing was ideal because the location is within a metropolitan area with ethnic diversity, which is reflected in the student body, and has a biannual enrollment of nursing students averaging 100 students per enrollment. Data collection occurred from January 13, 2017 to

December 18, 2017. This chapter includes a description of the study sample and presents the study findings.

Description of the Sample

Ten of the 93 (10.7%) students attending the spring 2017 nursing orientation enrolled in this study; while 54 of the 104 (51.9%) students attending fall 2017 nursing orientation enrolled in the study for a total sample size of 64. All the volunteers consented to participate in the study following the information session. Students were randomly assigned via a computerized program into groups with 32 assigned to the test-taking intervention group and 32 assigned to the attention control group. Each participant attended the entire live 3-hour presentation provided for the group with which they were randomly assigned. All 64 of the subjects were invited to phase two of the study by the PI and 59 accepted the invitation to the online activity phase starting the following week. The degree of participation in phase two varied widely as seen later in the discussion of findings. Two of the 59 surveys completed in phase three lacked sufficient data regarding the Phase 2 activity and were removed from the sample; therefore, the final sample size is 57 with $n = 29$ in the intervention group and $n = 28$ in the control group. The study results are reported as an aggregate data only.

The study participants ranged in age from 20 to 47 years, were mostly female students with 5 male students, and were ethnically diverse (see Table 1). The other category for ethnicity included one write in for Mediterranean and one for Native Hawaiian.

Table 1

Gender and Ethnicity Distribution

	Total (<i>N</i> = 57)		Intervention (<i>n</i> = 29)		Control (<i>n</i> = 28)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Gender						
Males	5	9%	3	10%	2	7%
Females	52	91%	26	90%	26	93%
Race						
African American	12	21.1%	6	20.7%	6	21.7%
Hispanic	14	24.6%	8	27.6%	6	21.7%
Asian	17	29.8%	8	27.6%	9	32.1%
Caucasian	12	21.1%	7	24.1%	5	17.8
Other	2	3.5%	0	0%	2	7.1%

The majority of the students (82.5 %) reported having 3 or more years of college education and more than half of the sample reported a previous degree (57.9%; see Table 2). The mean number of years of college and the majority holding previous degree was slightly higher than expected due to the current enrollment in a traditional baccalaureate of nursing. The mean number of years for the intervention group was 3.83 years ($SD = 1.04$); whereas, the mean number of years of college for the control group was 3.68 years ($SD = 1.49$). Twenty-two percent of the study population had more than five years of college education.

Table 2

College Education and Degree

	Total (<i>N</i> = 57)		Intervention (<i>n</i> = 29)		Control (<i>n</i> = 28)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
College Education						
2 years	10	17.5%	2	6.9%	8	28.6%
3 years	14	24.6%	11	37.9%	3	10.7%
4 years	20	35.1%	7	24.1%	12	42.8%
5 years	8	14%	7	24.1%	0	0%
6 years	4	7%	1	3.4%	3	10.7%
8 years	1	1.8%	0	0%	1	3.6%
Previous College Degree						
No	24	42.1%	14	48.3%	10	35.7%
Yes	33	57.9%	15	51.7%	18	64.3%

The majority of the students reported being single (91.2%) and having more than one support system currently. The only other marital status selected by the subjects was married (8.8%) as no one reporting being divorced or widowed (see Table 3).

Table 3

Marital Status and Support Systems – for total and both groups

	Total (<i>N</i> = 57)		Intervention (<i>n</i> = 29)		Control (<i>n</i> = 28)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Married						
No	52	91.2%	25	86.2%	27	96.4%
Yes	5	8.8%	4	13.8%	1	3.6%
Support systems						
Spouse	5	8.8%	4	13.8%	1	3.6%
Parents	48	84.2%	22	75.9%	26	92.9%
Partners	19	33.3%	13	44.8%	6	21.4%
Children	2	3.5%	1	3.4%	1	3.6%
Friends	36	63.2%	19	65.5%	17	60.7%
None	2	3.5%	1	3.4%	1	3.6%

The demographic data, regarding current support systems, were captured using a select all that apply option so the total percentage was greater than 100%. The majority (66.7%) of students reported having two support systems or more; while, 29.8% reported having only one support system. The top two support systems reported by subjects in both groups were parent and friends. The five subjects that reported being married all noted their spouses as part of their support system. The least reported support system was

children. One subject in each group selected this option. Unfortunately, one subject in each group reported having no support systems.

Participation in the online activities on Facebook varied widely with subjects from the spring 2017 cohort reporting less frequent engagement than subjects the fall 2017 cohort. The percentage of students who reported having a Facebook account prior to the study recruitment was 55 of 57 (96.5%). The percentage of subjects actively participating in the weekly survey polling and question and answer session in the spring cohort ranged from a low of 63% to a high of 86%; where, the percentage of subjects from the fall cohort ranged from a low of 80% to a high of 100%. The actual number of minutes of participation reported by the subjects was captured below and was reported by semester to reflect the difference reported among subjects (see Table 4). The difference in time was analyzed between the intervention group and the control group by semesters using a one-tailed *t*-test. There was not a significant difference in the time spent on Facebook during the spring semester between intervention and control groups ($p = 0.319$); however, there was a significant difference between groups for the fall semester ($p = 0.044$). Collectively, there was a significant difference in the time spent on Facebook during both semesters between the intervention and control groups ($p = 0.032$).

Interesting to note, the mean number of minutes reported by the intervention group was almost double that reported by the control group. Both groups reported positive feedback on the help the presenters provided in answering questions. The educator received three private instant messages through the Facebook feature during the 14 weeks of online activities. Two of the messages were from the subjects within the intervention

group and one message from a subject in the control group. The content of all three private instant messages requested more information on time management skills to deal with large volumes of content to learn in nursing school.

Table 4

Facebook Online Activity Participation and Helpfulness

	Intervention Range Mean (<i>SD</i>)	Control Range Mean (<i>SD</i>)	Statistical Test <i>t</i> -test
Minutes on Facebook			
Spring 2017	49.2 (<i>SD</i> = 60.1)	18.4 (<i>SD</i> = 24.1)	$t = 0.22$ $df = 55$ $p = 0.16$
Fall 2017	133.3 (<i>SD</i> = 142.9)	60.78 (<i>SD</i> = 89.4)	$t = 0.22$ $df = 55$ $p = 0.22$
Both semesters	118.8 (<i>SD</i> = 135.4)	49.2 (<i>SD</i> = 82.9)	$t = 0.22$ $df = 55$ $p = 0.01$
Facebook increased Understanding	<i>f</i> (%)	<i>f</i> (%)	
Yes	21 (72.4%)	18 (64.3%)	
No	8 (27.6%)	10 (35.7%)	

Findings

Data analysis included computing frequencies and histograms to screen for data entry errors, to assess for outliers, and to assess normalcy. Data from subjects not joining Phase Two of the study and not completing all fields in Phase Three data collection were removed from the analysis. Next, a Levene’s test for homogeneity was performed to assess for homogeneity of variance. An independent one-tailed *t*-test was used with a

power of 0.80 and a one-tailed alpha of 0.05 to test and reject all four directional hypotheses noted below.

Hypothesis One Tested

The first hypothesis was: Baccalaureate nursing students completing the intervention, a live 3-hour test-taking program followed by online activities using social networking media for weekly sessions consisting of three questions for fourteen weeks following orientation, have lower TAI total (TAI-T) scores before an Elsevier HESI® specialty fundamental exam than comparable nursing students completing an attention control activity, a live 3-hour presentation on multiple roles of the professional nurse followed by online activities using social networking media for fourteen weeks following orientation.

Participants completed the TAI instrument immediately prior to their HESI® fundamental specialty exam in order to obtain the propensity to TA in a real setting. The TAI-T scores showed a normal distribution of students' propensity to TA with a range from 23 to 75 with one student scoring both the lowest possible and highest possible score on the TAI-T. Approximately 80.7% of this study sample were noted to self-report moderate to high TAI-T immediately prior to the final exam. Nine of the 57 students (15.8%) were identified as having high TA with scores between 57 and 75, 37 of 57 students (64.9%) had moderate TA with scores of 32 to 54, and 11 of 57 students (19.3%) had low test anxiety with scores of 23 to 29 for the TAI-T.

A Levene's test for homogeneity of variance was nonsignificant ($F(-5.99, 7.451) = 0.022, p = .882$) indicating both the intervention and control group had similar dispersion

in regard to TAI-T. The mean TAI-T score was slightly higher for the intervention group. The mean TAI-T for those attending the live test-taking program was 42.55 while those attending the attention control program had a mean TAI-T score of 41.82. A one-tailed *t*-test was non-significant ($p = 0.44$) indicating the first directional hypothesis was not supported (see Table 5). The intervention and control groups did not have significant differences in total test anxiety. An effect size for the TAI-T was calculated using a Cohen's $d = 0.058$. For an effect of this size to be detectable, with a power of 0.80 and an alpha set at 0.05, a sample of 3,716 participants is needed for each group or a total of 7,432.

Hypothesis Two Tested

The second hypothesis was: Baccalaureate nursing students completing the intervention, a live 3-hour test-taking program followed by online activities using social networking media for weekly sessions for 14 weeks, have lower worry scores before an Elsevier HESI® specialty fundamental exam than comparable nursing students completing an attention control activity, a live 3-hour presentation on multiple roles of the professional nurse followed by online activities using social networking media for weekly sessions of 14 weeks.

Table 5

*Total Test Anxiety, Worry, Emotionality, and Exam Means and Standard**Deviations for Study Groups*

Variable	Intervention <i>M (SD)</i>	Control <i>M (SD)</i>	Statistical Test <i>One-tailed t-test</i>
Test Anxiety Total			
TAI-T	42.55 (12.88)	41.48 (12.41)	$t = 0.22$ $df = 55$ $p = 0.44$
Worry			
TAI-W	15.21 (5.75)	15.14 (5.23)	$t = 0.04$ $df = 55$ $p = 0.48$
Emotionality			
TA-E	18.00 (5.86)	17.50 (5.57)	$t = 0.33$ $df = 55$ $p = 0.37$
HESI® Test Score	864.38 (134.7)	831.43 (164.1)	$t = 0.83$ $df = 55$ $p = 0.21$

The TA-W scores ranged from 8 to 29 in the intervention group, while the scores for the attention control group ranged from 8 to 28. Following a nonsignificant Levene's test for homogeneity of variance ($F(-2.855, 2.983) = 0.016, p = .899$), a one-tailed independent t -test was completed (see Table 5). The second directional hypothesis was not accepted as the mean TA-W score for the intervention group ($M = 15.21$) was slightly higher than that of the attention control group ($M = 15.14$) and lacked statistical significance ($p = 0.48$). There was no difference in worry between the intervention and control groups. An effect size for the TAI-W was calculated using a Cohen's $d = 0.013$.

For an effect of this size to be detectable, with a power of 0.80 and an alpha set of 0.05, a sample of 76,134 participants is needed for each group or a total of 152,268.

Hypothesis Three Tested

The third hypothesis tested was: Baccalaureate nursing students completing the intervention, a live 3-hour test-taking program followed by online activities using social networking media for weekly sessions of fourteen weeks, have lower emotionality scores before an Elsevier HESI® specialty fundamental exam than comparable nursing students completing an attention control activity, a live 3-hour presentation on multiple roles of the professional nurse followed by online activities using social networking media for weekly sessions of 14 weeks.

The emotionality as measured by the TA-E scores ranged from 10 to 29 in the intervention group while the scores for the attention control group ranged from 9 to 32. Following a non-significant Levene's test for homogeneity of variance between groups ($F(-2.54, 3.54) = 0.35, p = .556$), a one-tailed independent *t*-test was conducted. The third directional hypothesis was rejected as the mean TA-E score for the intervention group ($M = 18, SD = 5.87$) was not lower than that of the attention control group ($M = 17.5, SD = 5.57$) and lacked statistical significance of $p = 0.37$. No difference was found between groups. An effect size for the TAI-E was calculated using a Cohen's $d = 0.087$. For an effect of this size to be detectable, with a power of 0.80 and an alpha set of 0.05, a sample of 1,621 participants is needed for each group or a total of 3,242.

Hypothesis Four Tested

The fourth hypothesis examining test scores was: Baccalaureate nursing students completing the intervention, a live 3-hour test-taking program followed by online activities using social networking media for weekly sessions of 14 weeks, have higher test scores before an Elsevier HESI® specialty fundamental exam than comparable nursing students completing an attention control activity, a live 3-hour presentation on multiple roles of the professional nurse followed by online activities using social networking media for weekly sessions of 14 weeks.

The Elsevier HESI® specialty fundamental exam scores for the intervention group ranged from 629 to 1105 with a mean score of 864.38 ($SD = 134.7$); while, the scores for the control group ranged from 548 to 1149 with a mean score of 831.43 ($SD = 164.1$). A Levene's test for homogeneity of variance was nonsignificant between the groups ($F(-46.62, 112.5) = 1.057, p = .308$), so a one-tailed independent t -test was conducted. Although the difference in the Elsevier HESI® specialty fundamental exam mean score was 32.95 points higher for the intervention group, this difference was not statistically significant ($p = 0.21$). This finding did not support a live 3-hour education intervention focusing on study tips, time management, and test-taking strategies to improve academic performance as measured by a final exam at the end of the semester. An effect size for the Elsevier HESI® specialty fundamental exam was calculated using a Cohen's $d = 0.219$. For an effect of this size to be detectable, with a power of 0.80 and alpha set at 0.05, a sample of 258 participants is needed for each group or a total of 516.

Summary of Findings

The 3-hour-face-to-face educational test-taking cognitive intervention followed by 14 weeks of online activities to boost the intervention did not yield a decrease in the dependent variables of TAI-T or in the subcomponents of TAI-W or TAI-E. Although the mean Elsevier HESI® specialty fundamental exam scores was 32 points higher for the intervention group than the control group this difference was not statistically significant ($p = 0.41$). Thus, none of the research hypotheses were supported in this pilot study. Another factor reviewed was the progression within this course. Two of the 57 students completing all three phases of the study did not progress due to course failure and both were in the control group. This was not statistically significant and may be attributed to variables beyond this study. In summary, more research with larger populations in multiple schools of nursing would be needed based upon the power analysis performed. A discussion of the study's findings compared with the literature will presented in the following chapter along with recommendations for future research.

CHAPTER V

SUMMARY OF THE STUDY

The purpose of this experimental posttest only study was to explore the effectiveness of a live 3-hour test-taking intervention followed by 14 weeks of online Facebook activities on TAI-T scores, the subcomponents of worry and emotionality, and academic performance as compared to an attention control group. This two-group experimental design with a posttest only was used to compare the mean scores between the groups. Demographic information related to age, gender, race, marital status, support systems, education, and degrees possessed were gathered. The student independent one-tailed *t*-test compared mean scores between the groups, to determine significance, and to reject the four directional hypotheses. In this chapter, the findings of the study are discussed, conclusions are described, implications are purposed, and recommendations for future research are presented.

Summary

Fifty-seven junior level baccalaureate nursing students accepted into a nursing program in the Gulf Coast region, enrolled in the fundamentals concept course and attending the Spring 2017 ($n = 10$) and Fall 2017 ($n = 47$) nursing orientation were enrolled in and completed this study. Two interventions were introduced. One group received an intervention consisting of test taking strategies and test anxiety reduction while the other group received an attention control intervention consisting of information

related to professional nursing roles. The participants provided informed consent and attended the 3-hour live presentation to which they were randomly assigned via computer software. Each one of the participants provided a name and an email address for the Facebook activities starting the week after classes started and ending the week prior to finals. Students were more engaged in the test-taking strategies online activities than the professional roles online activities via Facebook per self-report of minutes involved. Overall, the subjects from the fall 2017 cohort were more engaged than the subjects from the spring 2017 cohort.

The first hypothesis was not supported that the intervention group would have lower total test anxiety scores as measured by TAI-T compared to the control group ($p = .44$). The second hypothesis was also not supported that the intervention group would have lower test anxiety subscale of worry (TAI-W) compared to the control group ($p = .48$). The third hypothesis was not supported because there was no statistical difference seen in the mean scores of the of the test anxiety subscale of emotionality (TAI-E) between the groups ($p = .37$). The fourth hypothesis projecting an increase in mean Elsevier HESI® specialty fundamental exam scores for the intervention group was rejected because an improvement of 32 points was not statistically significant ($p = .41$).

Discussion of Findings

The Transactional Model of Test Anxiety developed by Zeidner (1998) served as the conceptual framework for this study. The model depicted study skills and test wiseness as two of the personal variables influencing an individual's perception of the test situation that impacts state test anxiety. It includes subscales for worry and

emotionality and triggers coping reactions that result in the individual's adaptational outcomes, including, but not limited to, performance accuracy. The model captured the multidimensional complex nature of TA and its application to this study was supported by the review of the literature. Unfortunately, when performing research on a concept as large and as complex as TA, the researcher was unable to account for all the variables. The findings from this study did not lend support to the model since the 3-hour test-taking education intervention failed to produce a significantly different TAI-T or the subscales TAI-W and TAI-E between the intervention and control group. The intervention group had a higher mean test average; however, this improvement was not statistically significant ($p = 0.21$) and did not reveal the anticipated adaptational outcome of improved performance accuracy as measured by group mean scores on the Elsevier HESI® specialty fundamental exam. Zlomke (2007) also utilized the Transactional Model of Test Anxiety developed by Zeidner (1998) to study a behavioral intervention consisting of 30 minutes of finger tapping at 100 taps per minutes. Each study that detailed a framework used a different framework to explore TA among nursing students so there was no consistency found.

The recruitment and retention rates of this study were similar to those reported in previous studies. The recruitment efforts of this study yielded 32.5% student nurse participation from the combined spring and fall cohort of new students. This enrollment rates were slightly higher than that seen by Topp (1989) where he had 49 of 210 students enroll (23.3%); but, were lower than Sharif et al. (2013) who had 80 out of 147 (54.4%) enroll. The retention rate of this study was 87% in which 57 of the 64 students completed

all three phases of the study, exceeding the 62% retention rate reported by Stephens' (1992). Reasons for attrition were the same, with lack of time due to course load being reported in both studies. Additional time commitment for intervention studies may explain the lower enrollment rates in intervention studies (Carraway, 1987; Cornell, 2011; Mohler, 2013; Topp, 1989) compared to non-intervention studies in similar settings and populations (Poorman, 1988; Waltman, 1997). The sample size of this pilot study was less than desired, and less than the Cornell (2011) study that had a sample size of 66. The Cornell (2011) student was the most comparable study to the current pilot study.

The age range of 20 to 47 years of age and the mostly female sample (91%) were fairly consistent with previous studies (Duty et al., 2016; Mohler, 2013) examining TA intervention among nursing students. The presence and degree of support systems among nursing students was rarely reported in previous studies, although its relationship with anxiety due to the cyclic nature and attrition from nursing school were documented (Carpenter, 2010; Hilbert & Allen, 1985). Developmental factors considered when comparing the results of this study to those reviewed in the literature found similarities in age and gender. Differences in the years of college and previous degrees existed. The current study findings are that the mean years of college was 3.83 years ($SD = 1.04$) for the intervention group and 3.68 years ($SD = 1.49$) for the control group. More than half of the subjects possessed a college degree which was a higher proportion than anticipated in a sample of students enrolled in a traditional baccalaureate program of nursing. The achievement of a previous college degree may have influenced the subjects study habits and probability of passing a standardized exam may have positively influenced student

confidence. Unfortunately no other nursing TA intervention reported similar findings to allow for comparison. Furthermore, reports of the influence of developmental issues on TA have been inconsistent in previous research findings. Sapp (1996) noted TA decreased over time; yet, students continue to be plagued with TA in graduate school McCaffrey et al. (2009) among a class of nurse practitioner students. The study by Clutter et al. (2017) revealed, TA as measured by cortisol levels, increased over the semester in junior and senior level nursing students and peaked for tests that were considered higher stakes.

The population of this study had a greater percentage of ethnic diversity than that reported by previous studies. This study was fairly well distributed among Caucasian non-Hispanic (21.1%), Asian (29.8%), Hispanic (24.6%), African American (21.1%) and two other (3.5%) consisting of one Native Hawaiian and one Mediterranean. Other studies reported the vast majority of subjects were of Caucasian, non-Hispanic or European American descent 91% to 93% (Cornell, 2011; Evans et al., 2010). Based upon Gardner (2005) finding that the majority of students lost to attrition were minority students, this may help explain the results seen in this study.

Although the instruments to measure TA were varied, the majority of studies reporting the percentage of students with moderate to high TA was noteworthy. The percent of students reporting high TA in this study was 15.8% while 64.9% had moderate test anxiety; compared to Alizadeh et al. (2014) where 43.1% had moderate anxiety and 26.4% had severe anxiety as measured by the TAI instrument. Zargarzadeh and Shirazi (2014) found 53% of third and fourth semester students had moderate to high TA. Evans

et al. (2010) found 50% of the junior level nursing students were moderate to high TA. Zlomke (2007) noted 41.5% of associate degree nursing students were test anxious. Augner (2015) found only 10.7% of sophomore, junior, and senior year Austrian nursing students were highly test anxious using the German version of the TAQ. This study sample is not remarkably different from students in other nursing programs.

Previous research studies examining the effectiveness of interventions to reduce TA among nursing students varied widely in the type of intervention (behavioral, cognitive, and combination interventions). For this discussion the focus was limited to cognitive interventions. The length of time for similar cognitive interventions was not consistently reported in the literature; however, the times that were reported varied in length from 30 minutes (Cornell, 2011) to 300 minutes (Ashley & O'Neil, 1991).

The number of studies reporting actual empirical evidence of statistically significant reductions in TA among nursing students is limited. Many have utilized instruments other than the TAI with TAS, TAQ and STAI being the most frequently reported. Yet, among those studies that utilized the TAI most reported only the TAI-T score for comparison. The mean TAI-T score in the current study was 42.55 ($SD = 12.88$) for the intervention group and 41.48 ($SD = 12.41$) for the control group among first semester nursing students. This level of anxiety is higher than that reported by Poorman (1988) where the mean TAI-T was 36.05 post intervention; however, this was in a group of second semester senior nursing students in western Pennsylvania, so this may lend support to the developmental changes noted by Sapp with TA decreasing as the student progresses. Students in this study were first semester students enrolled in the early

portion of their clinical education. Zlomke (2007) reported the TAI-T mean post treatment was 52.2 ($SD = 17$) and 61.1 ($SD = 12$) in the control group posttest measurement.

The improvements seen in academic performance measures following educational interventions showed slight improvements in test scores yet most or all were not statistically significant. Cornell (2009) performed a 30 minute test-taking class as part of the regular curriculum at one university setting compared to another university setting that did not cover the test-taking strategies. The improvement noted by Cornell (2010) was a 4.72 point increase following treatment in the intervention group and a 0.99 point increase in the control group. The results of this study were similar in regard to academic performance as measured by test scores were similar to those of Cornell (2011) who found slight improvement in exam scores; however, the level of improvement was not statistically significant. Evans et al. (2010) reported a 64 point increase on a standardized HESI® test following the STARS treatment. This HESI® advantage translated into a 12.9 percentile advantage and was statistically significant ($p < 0.05$). Modifying TA requires significant intervention and is difficult to achieve.

Conclusions

Conclusions derived from study findings include the following:

1. Many nursing students experience moderate to high levels of test anxiety.
2. Test anxiety is a complex challenge that is not easily modifiable.
3. It is feasible to obtain nursing student commitment to participate in interventions through face to face encounters followed by Facebook.

4. Investigating nursing student test anxiety is challenging because of the robust intervention and instrument sensitivity needed to produce an effect size sufficient to have a sample size small enough to enable study feasibility.

Implications

The implications derived from this study include the following:

1. Interventions to modify test anxiety need to focus on multiple personal variables, beyond study skills and test-taking skills, to better facilitate a reduction in total TA and the subcomponent of worry.
2. Cognitive educational interventions delivered in group formats are manageable although this intervention did not create anticipated effects.
3. Online activities to apply the test-taking strategies may prove beneficial in nursing students.
4. Intervention studies should focus on students who are moderately or highly test anxious as including students with low test anxiety may be skewing the data when comparing group means.

Recommendations for Further Study

The following recommendations are suggested for further research:

1. Modify the intervention to a more robust comprehensive intervention that are holistic in nature including cognitive interventions such as hypnosis, study skills and test-taking interventions plus behavioral interventions such as progressive relaxation techniques and systematic desensitization.
2. Study test anxiety using a more holistic TAI such as TAS or Westside Test Anxiety Scale that better captures the multiple stressors experienced by the student nurse population.
3. Continue to study first semester nursing students from multiple universities in hopes of improving student success.
4. Consider requiring student participation in some type of TA intervention as part of orientation due to the high prevalence among nursing students.
5. Develop ways to build upon the classification of TA typology outlined by Zeidner and Matthews (2005) to target interventions based upon student response to TA.

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Appendix A
Test Anxiety Inventory (TAI)

Test Anxiety Inventory (TAI)

Test Anxiety Inventory (TAI), originally referred to as Test Attitude Inventory, was developed by Spielberger, Gonzalez, Taylor, Algaze, and Anton in 1978 to specifically to measure the test anxiety (TA) in high school and college students (Spielberger, Gonzalez, Taylor, Anton, Algaze, Ross, & Westberry, 1980). The TAI is a self-reported 20-item Likert scale based upon frequency with evenly spaced responses of almost never, sometimes, often and almost always. Items are stated negatively with the exception of the first question, which is stated positively and inversely scored. The TAI, also known as Test Aptitude Inventory is practical for this research project since the instrument is readily available in an online format, which is consistent with the usual format for course final. The TAI is written at a fifth grade reading level and is easy to understand. The time for completion is 8 to 10 minutes with an average of 8 (Spielberger et al., 1980), making it ideal for quick administration when TA may peak prior to a comprehensive exam.

Reproduction and/or copying of TAI is prohibited so a copy of the manual with a sample instrument and scoring information was obtained from www.mindgarden.com the instrument measures a student's propensity to TA a situation-specific personality trait (Spielberger et al., 1980). The instrument consists of a total score, TAI-T and subscales for worry (TAI-W) and emotionality (TAI-E). The TAI has norm reference for college students (Spielberger et al., 1980) based upon 1,449 undergraduates (654 males, 795 females) from an introductory psychology course in a university setting. The 20-item TAI demonstrated a Cronbach's alpha of .92. The TAI-T ranges from a minimum of 20 to a maximum of 80 points. The two subscales include eight items apiece and range from scores of eight to 32 points. TAI score classifications for undergraduate students include the following ranges scores between 20 and 30 are classified as low test anxious, scores of 31 to 55 are moderately test anxious, and scores of 56 to 80 are high test anxious. The TAI-T scores for females are consistently 3 to 5 points higher than those of their male counterparts. Females consistently score higher on the TAI-W and TAI-E subscales than the males.

Sample Item	Almost Never	Sometimes	Often	Almost Always
The harder I work at taking test, the more confused I get.	1	2	3	4

Appendix B
Demographic Data Sheet

Demographic Data Sheet

Unique Identification Number: _____ (provided by the PI).

Gender: _____ Male _____ Female _____ Transgender

Age: _____ (years)

Marital Status: _____ Single _____ Married _____ Separated _____ Divorced
_____ Widowed

Race: _____ African American _____ Hispanic _____ Asian _____ Caucasian
_____ Other, please specify _____

Education:

- _____ 1 year of college
- _____ 2 years of college
- _____ 3 years of college
- _____ 4 years of college
- _____ 5 years of college
- _____ Other, please specify _____

College Degrees:

- _____ None
- _____ Yes, please specify degree(s) and field(s) _____, _____

Current Support Systems (please check all that apply):

- _____ Spouse
- _____ Parents
- _____ Partner
- _____ Children
- _____ Friends

Appendix C

Institutional Review Board Approval



Institutional Review Board
Office of Research
6700 Fannin, Houston, TX 77030
713-794-2480
irb-houston@twu.edu
<http://www.twu.edu/irb.html>

DATE: September 14, 2016

TO: Ms. Patricia Schrader
Nursing - Houston

FROM: Institutional Review Board (IRB) - Houston

Re: Approval for Reducing novice baccalaureate of nursing student test anxiety and improving test performance through a test taking intervention: A pilot study (Protocol #: 19147)

The above referenced study has been reviewed and approved by the Houston IRB (operating under FWA00000178) on 9/14/2016 using an expedited review procedure. This approval is valid for one year and expires on 9/14/2017. The IRB will send an email notification 45 days prior to the expiration date with instructions to extend or close the study. It is your responsibility to request an extension for the study if it is not yet complete, to close the protocol file when the study is complete, and to make certain that the study is not conducted beyond the expiration date.

If applicable, agency approval letters must be submitted to the IRB upon receipt prior to any data collection at that agency. A copy of the approved consent form with the IRB approval stamp is enclosed. Please use the consent form with the most recent approval date stamp when obtaining consent from your participants. A copy of the signed consent forms must be submitted with the request to close the study file at the completion of the study.

Any modifications to this study must be submitted for review to the IRB using the Modification Request Form. Additionally, the IRB must be notified immediately of any adverse events or unanticipated problems. All forms are located on the IRB website. If you have any questions, please contact the TWU IRB.

cc. Dr. Ainslie Nibert, Nursing - Houston
Dr. Elizabeth Anne Young, Nursing - Houston
Graduate School

Appendix D

Reducing Novice BS Nursing Student Test Anxiety and Improving Test
Performance through A Test-Taking Intervention Lesson Plan for Intervention
Group

Reducing Novice BS Nursing Student Test Anxiety
and Improving Test Performance Through A Test-Taking
Intervention Lesson Plan for Intervention Group

Learning Objectives	Topic	Time Frame	Content	Teaching Strategies	Evaluation Outcomes
Describe the purpose of the program.	Test-Taking Strategies	15 min	Course objectives Confidentiality	Lecture using PowerPoint slides and discussion	Questions regarding program will be answered using a classroom response system in an anonymous mode.
Complete online survey via Psychdata	Demographic data	10 min	Confidentiality		
Explore the role of the nursing student as an adult learner and a study participant.	Student Roles	10 min	Student responsibilities as adult learners. Student as study participant. Student engagement.	Lecture using PowerPoint slides and discussion	Questions regarding program will be answered using a classroom response system in an anonymous mode.

Discuss Nursing Test and how they differ from other college exams.	Testing Formats	15 min	NCLEX-RN test question formats and level of difficulty.	Lecture using PowerPoint slides and discussion	Questions regarding program will be answered using a classroom response system in an
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					anonymous mode.
Break with refreshments		10min			
Explore a systematic approach to reading and answering test questions.	Test Taking Strategies	35 min	Test Taking Strategies using APPROACH format	Lecture using PowerPoint slides and application of APPROACH format with questions.	Questions regarding program will be answered using a classroom response system in an anonymous mode.
Break with refreshments		10min			
Explore time management tips, study aids and study priorities.	Study & Test Prep	30 min	Create time management plan. Review various types of study aids. Develop study priorities.	Lecture using PowerPoint slides and discussion	Each student will develop an individual study plan. Student will incorporate learning style in study aids.
Define test anxiety and explore strategies to reduce and/or control anxiety.	Test anxiety and Keys to Channel Anxiety	30 min	Test taking anxiety and test performance. Strategies to channel anxiety.	Lecture using PowerPoint slides and discussion Demonstrate deep breathing	Return demonstration of deep breathing.
Wrap up		10 min			Distribute TWU Purple Handout

Appendix E

Reducing Novice BS Nursing Student Test Anxiety and Improving Test Performance
through A Test-Taking Intervention Instructions for Online Activities: Intervention
Group

Reducing Novice BS Nursing Student Test Anxiety
and Improving Test Performance Through A Test-Taking

Intervention Instructions for Online Activities: Intervention Group

Facebook© Private Group (TWUHH)

First let me thank for your participation in Phase One. Now, we are entering into Phase Two, which consists of online activities developed to promote your application of the content taught in the live presentation and how it applies to you. Please remember during this second phase of the study you determine the depth of socializing (sharing with group members) you are comfortable with. If you have questions or concerns, please contact the PI (contact information below). Please access the private group and review the material but limit the time spent on this activity to less than 20 minutes per day. Remember participation is voluntary and you can discontinue your participation at anytime. Below you will find tips to assist.

Instructions to create Facebook© account

[http://www.Facebook.com/pages/Internet-](http://www.Facebook.com/pages/Internet-Safety/158692947332#!/help/?page=419)

[Safety/158692947332#!/help/?page=419](http://www.Facebook.com/pages/Internet-Safety/158692947332#!/help/?page=419) **Instruction to accept invitation**

from Patricia Schrader to join private group

<http://www.Facebook.com/help/?page=982>

The term netiquette refers to the etiquette of the Internet.

1. The most important rule of netiquette is, "Think before you post." If what you intend to post will not make a positive contribution to the discussion and be of interest to several readers, do not post it!
2. Never forget that the person on the other side is human. Always be courteous.
3. Personal messages to one or two individuals should not be posted to the forums -- use the Personal Message feature instead.

4. Be brief.
5. Write well. Follow standard grammar and spelling rules and try not to use slang. If needed, use the spell-check feature.
6. Stay on-topic. If you want to digress, it's better to start a new topic.
7. Be careful with humor and sarcasm. Without the voice inflections and body language of personal communications, it's easy for a remark meant to be funny to be misinterpreted.
8. Avoid the use of all CAPITAL LETTERS in posts. (All CAPS is considered "shouting" and makes your posts harder to read.)
9. Refrain from lashing back at a poorly behaving member or participating in a flame war; instead, click the "Report to moderator" link to notify the forum moderator(s) of the event.

The PI reserves the right to remove a participant from the group for offensive remarks or actions that do not support a positive learning environment for all members of the group.

PI Contact Information:

Patricia Schrader, MSN, PhD student pschrader@twu.edu 281-889-9098

Appendix F

Reducing Novice BS Nursing Student Test Anxiety and Improving Test Performance
through A Test-Taking Intervention Lesson Plan for Attention Control Group

Reducing Novice BS Nursing Student Test Anxiety
and Improving Test Performance Through A Test-Taking
Intervention Lesson Plan for Attention Control Group

Learning Objectives	Topic	Time Frame	Content	Teaching Strategies	Evaluation Outcomes
Introduction of Guest Presenters Review student responsibilities in the role of research participant.	Roles within professional nursing Role of research participant	10 min	Roles in nursing Need for confidentiality	Discussion with input from audience	Participants demonstrate active listening
Complete online survey via Psychdata	Demographic data	10 min	Confidentiality		
Explore the Role of BS Acute Care Staff Nurse	Educational preparation Job requirements TBON Standards of practice Week and day in the life of acute care nurse Lifelong learning Professional associations/ resources	30 min	Education requirement for position Share sample job requirements Locate Texas Board of Nursing Website Discuss briefly typical work week and day schedule of activities Share insight into lifelong learning List favorite association/ resources	Lecture PowerPoint Internet Poll audience Flipchart responses	Questions regarding the role will be answered
Break with refreshments		10 min			
Explore the Role of Nurse Practitioner	Educational preparation Job requirements TBON Standards of practice Week and day in the life of	30 min	Education requirement for position Share sample job requirements Locate Texas Board of Nursing AP Standards of Practice	Lecture PowerPoint Internet Poll audience Flipchart Audience responses	Questions regarding the role will be answered

	acute care nurse Professional associations/ resources		Discuss typical work week and day schedule of activities Share insight into lifelong learning List favorite association/ Resources		
Explore the Role of Nurse Educator	Educational preparation Job requirements TBON Standards of practice Week and day in the life of acute care nurse Professional associations/ resources	30 min	Education requirement for position Share sample job requirements Discuss patient advocacy and liability Discuss briefly typical work week and day schedule of activities	Lecture PowerPoint Internet Poll audience Flipchart audience responses	Questions regarding the role will be answered
Break with refreshments		10 min			
Case Study	Importance of development of a study plan. How to create a plan. Important aspects to include in a plan.	20 min	Plan development Creating a plan Aspects to include in a plan	PowerPoint slides and discussion	Student participation in answering questions of case study
Audience Polling	Explore common facts pertinent to various roles within professional nursing.	20 min	Fatigue Errors Role as patient advocate	Flipchart	Student participation in answering polling questions
Wrap up		10 min			Distribute TWU Green Handout

Appendix G

Instructions for Online Activities Attention Control Group

Instructions for Online Activities Attention

Control Group Facebook© Private

Group (TWUHT)

First, let me thank for your participation in Phase One. Now we are entering into Phase Two, which consists of online activities developed to promote your application of the content taught in the live presentation and how it applies to you. Please remember during this second phase of the study, you determine the depth of socializing (sharing with group members) you are comfortable with. If you have questions or concerns please contact the PI (contact information below). Please access the private group and review the material but limit the time spent on this activity to less than 20 minutes per day. Remember participation is voluntary and you can discontinue your participation at anytime. Below you will find tips to assist.

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[http://www.Facebook.com/pages/Internet-](http://www.Facebook.com/pages/Internet-Safety/158692947332#!/help/?page=419)

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from Patricia Schrader to join private group

<http://www.Facebook.com/help/?page=982>

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1. The most important rule of netiquette is, "Think before you post." If what you intend to post will not make a positive contribution to the discussion and be of interest to several readers, do not post it!
2. Never forget that the person on the other side is human. Always be courteous.
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4. Be brief.

5. Write well. Follow standard grammar and spelling rules and try not to use slang. If needed, use the spell-check feature.
6. Stay on-topic. If you want to digress, it's better to start a new topic.
7. Be careful with humor and sarcasm. Without the voice inflections and body language of personal communications, it's easy for a remark meant to be funny to be misinterpreted.
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PI Contact Information:

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Appendix H

Remuneration Voucher

Remuneration Voucher

Date of Transaction: _____

Amount of Cash Remuneration: \$20 _____

Person Awarding Cash Remuneration: _____

Person receiving the remuneration will write in study participant number: _____

Study Title: Reducing Novice Baccalaureate of Nursing Student Test Anxiety and Improving Test Performance through a Test Taking Intervention: A Pilot Study

Study Purpose: To facilitate early detection of high test anxiety, reduce test anxiety and examine effect of educational intervention on test anxiety.

Contact Information:

Patricia Schrader, MSN, PhD Student

pschrader@twu.edu

281-889-9098