The Role of Academic Optimism and Study Habits in College Student Test Anxiety

A project completed in partial fulfillment of the requirements for the Honors Program

by

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Abstract

In the current study, academic optimism (including trust in professors, academic press, and identification with university) and study habits were explored as predictors of two dimensions of test anxiety: worry and emotionality. Using multiple linear regression, surface approach study habits and trust in professors emerged as predictors of worry, whereas identification with university emerged as a predictor of emotionality. Surface approach study habits and trust in professors accounted for 24% of the variance for worry, and identification with university accounted for 12% of the variance for emotionality. These relations held true for female students only. Future studies should continue to investigate the predictive value of academic optimism and study habits in college student test anxiety, as well as continuing to identify other predictive factors.
The Role of Academic Optimism and Study Habits in College Student Test Anxiety

The existence of test anxiety (TA) among U.S. college students is of concern because it impacts their ability to show their true academic performance (Akanbi, 2013; Chapell, Silverstein, Takahashi, Newman, Gubi & McCann, 2005; Culler & Holahan, 1980; Damer & Melendres, 2011; Dendato & Diener, 1986; Eum & Rice, 2011; Wittmaier, 1972). Not only is the existence of test anxiety in college students negatively influential on academics, but also on students’ overall physical and mental being (Akanbi, 2013; Damer & Melendres, 2011; Putwain & Symes, 2012; Shadach & Ganor-Miller, 2013; Spielberger, 1980). Many studies have looked at external factors (e.g., school environment) that contribute to students’ test anxiety; however, few studies have looked at internal factors such as academic optimism and perceptions of one’s own study habits (Adams & Forsyth, 2011; Ali & Mohsin, 2013; Biggs, 1987; Culler & Holohan, 1980; Dendato & Diener, 1986; Tschannen, Bankole, Mitchell & Moore, 2013; Wittmaier, 1972; Wu, 2013). Although evidence has shown that test anxiety impacts students at all levels of education, this experience has become a significant issue for college students (Damer & Melendres, 2011; Lowe, 2014). Both parents and educational institutions are putting greater pressures on college students to perform well, leading students to face overwhelming concerns about the testing environment. For these reasons, the current study examined predictive factors of academic optimism and study habits to understand test anxiety from the college students’ subjective viewpoint. These factors are discussed below.

Test Anxiety

Considering past research, it has been widely accepted that multiple factors are associated with the experience of test anxiety, making it a multidimensional construct (Chapell et al., 2005; Damer & Melendres, 2011; Putwain & Symes, 2012). Often test anxiety is expressed as a feeling
that an examination setting is threatening (Akanbi, 2013; Ali & Mohsin, 2013; Damer & Melendres, 2011; Putwain & Symes, 2012; Shadach & Ganor-Miller, 2013). Like any anxiety-related condition, TA includes deficits in cognition, emotion, physiology, and behavior (Damer & Melendres, 2011; Shadach & Ganor-Miller, 2013). Individuals experiencing TA will report physiological complaints during the time of an examination as a result of the autonomic nervous system being aroused (Ali & Mohsin, 2013; Damer & Melendres, 2011; Spielberger, 1980). These physical complaints define the emotionality component of TA, including feelings of being tense, anxious, and apprehensive (Ali & Mohsin, 2013; Damer & Melendres, 2011; Spielberger, 1980). This experience is also associated with the TA component of worry including negative and self-defeating thoughts of inadequacy and a fear of failure (Akanbi, 2013; Ali & Mohsin, 2013; Chapell et al., 2011; Damer & Melendres, 2011; Eum & Rice, 2011; Putwain & Symes, 2012). Worry is distinguished from emotionality as being the “definite and most powerful component of test anxiety,” and always occurs during an experience of TA (Ali & Mohsin, 2013; Damer & Melendres, 2011; Eum & Rice, 2011; Putwain & Symes, 2012). For example, test anxiety can be induced if students feel that their abilities are inadequate for explaining what they know (Culler & Holahan, 1980; Damer & Melendres, 2011; Shadach & Ganor-Miller, 2013). Students may know the material covered on an exam, but the overwhelming physiological arousal and emotional feelings of inadequacy and failure distract their attention from being able to recall this information (Culler & Holahan, 1980; Damer & Melendres, 2011; Shadach & Ganor-Miller, 2013; Wine, 1971). In effect, they devote too much attention on task-irrelevant thoughts (Wine, 1971). Emphasizing all four components of anxiety often makes the endeavor of studying TA difficult; therefore, one study noted that there is no one model that can account for
all predictive factors of test anxiety, while staying consistent with findings from all past research (Chapell et al., 2005).

Akanbi (2013) points out that test anxiety can be displayed differently from individual to individual, causing differences in how it affects each student’s performance on examinations. Some students are capable of handling the pressure of an examination setting, whereas others develop psychological conditions, such as TA (Damer & Melendres, 2011). Most students, especially those in college, will report some experiences of worry and feelings of being overwhelmed before an exam (Akanbi, 2013; Chapell et al., 2005; Damer & Melendres, 2011). However, the extent to which this affects academic performance and normal functioning is where the line is drawn between worrying and actual experiences of test anxiety. Recent reports have stated test anxiety is being experienced by 10-40% of students at all ages, with one study stating that this experience impacts 30% of freshman university students (Akanbi, 2013; Damer & Melendres, 2011; Lowe, 2014). With freshman university students experiencing test anxiety at the same percentage of students overall, this result shows that college students may be impacted by test anxiety at more substantial levels (Damer & Melendres, 2011). Spielberger (1980) describes three ways in which TA is expressed in students: as a personality trait, as an emotional state, and as a clinical state. When TA is experienced as a personality trait, students report perceiving the examination setting as threatening. When TA is experienced as an emotional state, students immediately feel a certain degree of anxious arousal as they enter the examination setting. Lastly, when TA is experienced as a clinical state, the degree of anxiety due to an examination is closely related to the degree of generalized anxiety disorder (Spielberger, 1980). Students experiencing test anxiety will fall under one of these categories; therefore, the degree to
which students experience test anxiety is vital because knowing this information can give teachers and other educational officials an idea for when and how they need to intervene.

More importantly, it should be noted that sex is a contributing factor of TA, and significant sex differences in levels of test anxiety occur, with female students self-reporting that they experience test anxiety at significantly higher levels than males (Akanbi, 2013; Chapell et al., 2005; Lowe, 2014). The actual sex difference in test anxiety scores is estimated to vary by one-third of a standard deviation (Chapell et al., 2005). These differences are said to exist among elementary, middle school, high school, and college students; however, the magnitude of this difference is said to decrease during high school and college because males and females begin to experience test anxiety at closer intensities (Chapell et al., 2005; Lowe, 2014). Also, one past study has determined that sex differences exist across multiple test anxiety measures, including the Test Anxiety Inventory (TAI), the Test Anxiety Measure for Adolescents (TAMA), and the Adult Manifest Anxiety Scale-College Version (AMAS-C) (Lowe, 2014). Male and females are both able to answer items without the measures prompting a sex bias in the language of these items. The fact that these sex differences occur without measurement or sex bias supports the ability to study TA using a single-scoring system for males and females (Lowe, 2014). Not many studies have looked at what factors of test anxiety contribute to these sex differences. However, one study notes that these differences may be due to the fact that females tend to be more emotional, less self-controlled in emotional reactions, and are more likely to report their levels of test anxiety than males (Akanbi, 2013). The accuracy of this assumption is unknown; therefore, future studies need to examine what factors may be leading to these sex differences.

Past research has extensively studied which predictive factors are associated with the experience of test anxiety. Some of the factors that have been noted as contributing to levels of
test anxiety include school environment, parental over-involvement, failure and incompetence beliefs, achievement goal orientations, perfectionism, academic optimism and study habits (Adams & Forsyth, 2011; Ali & Mohsin, 2013; Culler & Holahan, 1980; Dendato & Diener, 1986; Eum & Rice, 2011; Putwain & Symes, 2011; Shadach & Ganon-Miller, 2013; Tschannen-Moran et al., 2013; Wittmaier, 1972; Wu, 2013). An aspect of the environment that tends to impact levels of test anxiety is how threatening students perceive the examination setting to be. Next, when students feel pressured by their parents to perform well, they may find this examination setting even more threatening than it should be (Ali & Mohsin, 2013; Shadach & Ganon-Miller, 2013). Parental judgments of performance usually start at an early age, and continue to affect students into. As students begin to internalize these achievement standards and expectations, they begin to develop their own achievement goals in order to prove to their parents that they are capable of success, yet they often feel incompetent of doing so (Ali & Mohsin, 2013; Shadach & Ganon-Miller, 2013). Low competence is both related to high achievement goal orientations and high test anxiety, where students over compensate for their fear of failure by attempting to outperform their peers (Eum & Rice, 2011; Putwain & Symes, 2012). Furthermore, students may become overly fixated on performing perfectly as they are concerned about the possibility of failure (Eum & Rice, 2011; Putwain & Symes, 2012). The effects of academic optimism and study habits are discussed below. Overall, these factors above have been noted as being predictive of higher levels of test anxiety; therefore, further research needs to acknowledge their impact along with examining other factors that may be influential.

Akanbi (2013) points out that for academic success to happen, anxiety is necessary because otherwise students would not prepare for examinations to the extent that they do when they’re anxious. However, there is a general consensus that test anxiety is negatively associated
with overall academic achievement, meaning that as test anxiety goes up, academic achievement goes down (Akanbi, 2013; Chapell et al., 2005; Culler & Holahan, 1980; Damer & Melendres, 2011; Dendato & Diener, 1986; Eum & Rice, 2011; Wittmaier, 1972). The consequences of test anxiety are seen at every educational level, making it a detrimental phenomenon to over success as a student (Akanbi, 2013; Chapell et al., 2005). Aspects of academic achievement that are associated with test anxiety include: lower GPA, lower overall class grades, reduced classroom motivation, lower academic self-concept, poorer test performance, poorer recall and competence task performance, and higher school dropout rates (Akanbi, 2013; Chapell et al., 2005; Culler & Holahan, 1980; Damer & Melendres, 2011; Dendato & Diener, 1986; Eum & Rice, 2011; Wittmaier, 1972). For example, one study found that the difference in grades between low test anxious students and high test anxious students was one third of a letter grade (B+ to B) (Chapell et al., 2005). Although anxiety may play a small part in academic success, positive attitudes usually lead to less symptoms of psychological disturbance, such as TA in this case (Chang, 2002). One study has found group therapy to be helpful in reducing the existence of test anxiety in college students because being part of a group reduces feelings of isolation and shame associated with this phenomenon (Damer & Melendres, 2011). In addition, systematic desensitization has shown positive effectiveness in reducing test anxiety (Dendato & Diener, 1986). These findings reveal the importance of considering individual differences in how test anxiety is felt and expressed, because the impact of TA affects academic achievement from student to student in various ways. This indicates the need for examining students’ internal perceptions of this experience.

Overall, college is a stressful environment for many students; therefore, it is not surprising that some students develop test anxiety at this time (Damer & Melendres, 2011). With
testing requirements increasing throughout the U.S., college students not only face growing pressures to perform well by their parents, but also from their educational institutions (Damer & Melendres, 2011; Lowe, 2014). Continuing past research on this phenomenon helps to understand TA through various factors. As we add potential predictive factors to new studies, researchers can have a better understanding of how much each factor accounts for experiences of TA. In the end, the goal of future research should be to find the most comprehensive model of predictive factors of test anxiety in order to reduce the number of students facing this condition.

**Academic Optimism**

Like test anxiety, academic optimism is a multidimensional construct and emphasizes cognitive, affective, and behavioral beliefs about positively influencing students’ academic performance as a whole (Adams & Forsyth, 2011; Beard, Hoy & Hoy, 2010; Tschannen et al., 2013; Wu, 2013). Past research has studied academic optimism extensively from the collective faculty perspective. Specifically, Collective Faculty Academic Optimism includes three components: 1) Collective Teacher Efficacy (teachers’ beliefs that collective efforts of faculty will positively impact student success), 2) Collective School Academic Press (a focus on learning that promotes actively engaging students in appropriate activities), and 3) Collective Teacher Trust in Clients (feelings that students and parents are benevolent, reliable, competent, honest, and open. Building another construct of academic optimism, one study examined Teacher Academic Optimism from the individual teacher’s perspective, and measured items of 1) Teacher Self-efficacy (individual teacher’s beliefs of his or her own capability in producing academic success and engagement with students), 2) Teacher Trust in Clients (individual teachers’ beliefs about being able to provide a trusting relationship to parents and students), and 3) Teacher Perception of Own Academic Press (individual teacher’s ability to get students
actively engaged in appropriate learning tasks) (Beard et al., 2010). In studies of both Collective Faculty Academic Optimism and Individual Teacher Academic Optimism, the three dimensions are positively correlated with each other. Furthermore, findings from both have shown positive impacts on student achievement when these forms of academic optimism are high. However, few studies have considered this construct from the students’ perspective, which is potentially more influential of student success (Tschannen-Moran et al., 2013). Only in recent studies has the shift occurred from teacher academic optimism to student academic optimism, indicating the need for academic optimism to be developed at the student level (Adams & Forsyth, 2011; Beard et al., 2010; Tschannen-Moran et al., 2013; Wu, 2013).

Tschannen-Moran et al. (2013) adapted the construct of academic optimism to consider the student perspective using three components including 1) Trust in teachers (e.g., “Teachers at this school are good at teaching”), 2) Academic Press (e.g., “This school is serious about learning”), and 3) Identification with School (e.g., “I feel proud of being part of my school”). For trust in teachers, this study found the relationship between teachers and students to be similar to that of a child and a caregiver. When students perceive teachers as being trustworthy, they feel more academically oriented, have a sense of belonging, and seek and accept the support they perceive as needing. When students have high academic press, they are more likely to succeed because they feel school offers them an interesting challenge in that expectations are high and achievement is acknowledged. Lastly, when students have a high identification with school, they feel that teachers care and are concerned about their success as a student, leading students to be more engaged in school related activities. Although this study indicates that academic optimism can be adapted to explain the students’ perspective, this study is of elementary, middle, and high school students, not college students (Tschannen et al., 2013). At this time, student academic
optimism has not been studied in a college student population. One goal of the current study is to extend this construct to undergraduates.

The effects of academic optimism on test anxiety have not been studied in past research; therefore, the potential for a new line of research is noted. Some research concludes that student academic optimism is impactful on students’ academic achievement (Tschannen et al., 2013), but the relationship between academic optimism and psychological challenges, such as TA, is not discussed in any research of student academic optimism. For these reasons, a second goal of the current study is to examine academic optimism as a predictor of TA.

**Study Habits**

Another important internal factor in determining the presence of test anxiety is student’s studying approaches (Culler & Holahan, 1980; Dendato & Diener, 1986; Wittmaier, 1972). Study habits are defined as preparation approaches students use before taking an in-class exam or standardized test (Biggs, 1987; Biggs, Kember & Leung, 2001). Past research has determined two types of approaches to studying, including the Deep Approach and the Surface Approach. The difference between the two types of study approaches is distinguished by understanding students’ motives and strategies. Motive refers to students’ intentions for how they will study and strategy refers to their actual methods of executing study behavior. Both motive and strategy are described with surface and deep intensities. Deep motives involve an intrinsic interest in learning and deep strategies involve methods that maximize meaning from what is being learned. On the other hand, surface motives involve a fear of failure and surface strategies involve narrow focused rote learning. Students often jump from one approach to the other depending on the
testing situation, indicating that students neither choose one approach over the other (Biggs, 1987; Biggs et al., 2001).

The factors associated with study habits can be described in three categories: 1) Presage factors (personal factors independent of the learning situation), 2) Process factors (learning-focused activities that determine the way a student goes about learning), and 3) Product factors (learning outcomes) (Biggs, 1987; Biggs et al., 2001). This dynamic system of learning indicates what students’ backgrounds are like, how students prepare for examinations, and how students perform on examinations. In particular, student factors that have been associated with study habits include: time spent studying, time spent cramming, classes missed, late exams, distractibility, and delay in responding during examinations (Culler & Holahan, 1980; Dendato & Diener, 1986). The impact of these study habits has been associated with student academic achievement and experiences of test anxiety, where effective study habits leads to better academic achievement and lower levels of test anxiety (Biggs, 1987; Biggs et al., 2001; Culler & Holahan, 1980; Dendato & Diener, 1986).

Some studies find the effects of study habits on test anxiety to be significant (Culler & Holahan, 1980; Wittmaier, 1972), whereas other studies find changes in study habits to be ineffective in reducing test anxiety (Dendato & Diener, 1986). Most studies assume that there are two ways to tackle the problem of experiencing test anxiety: 1) address the problem first hand or 2) avoid the problem completely (Wittmaier, 1972). Some studies assert that test-anxious students implement poor study habits, making them fail to learn the material required for an examination (Dendato & Diener, 1986; Wittmaier, 1972). This method leads students to “cram” before an exam, or avoid studying altogether. In turn, this makes students concerned that they are unprepared for what the examination may cover (Dendato & Diener, 1986; Wittmaier, 1972).
However, other studies find that when students report having past experiences with test anxiety, they compensate for their fear of failure by studying for more hours (Culler & Holahan, 1980; Wittmaier, 1972). With this method, students begin studying for an exam well in advance, and may create study guides or note cards as resources for learning material (Wittmaier, 1972). This result coincides with past research that suggests test anxiety is important for influencing to what extent students perform study habit behaviors (Akanbi, 2013). Additional research is needed to resolve such inconsistencies.

When students have poor study habits and experiences of test anxiety, it leads to overall academic failure, and one study notes that study habits more so than test anxiety lead to this result (Dendato & Diener, 1986). It is interesting to note that even when students report having high levels of test anxiety, if they exercise effective study habits, they perform better than those who adopt poor study habits (Culler & Holahan, 1980). Specifically, the amount of time spent studying was significantly associated with differences in GPA for high test-anxious students, but not low-anxious students. This result indicates that for some high-anxious students, studying for a longer period of time makes up for the fact that they are experiencing test anxiety. Cramming for an examination was significantly negatively associated with GPA for both high-anxious students and low-anxious students, meaning that as students crammed more, their GPA decreased. The number of classes missed in a semester was significantly negatively correlated with GPA for the high-anxious students, but not for the low anxious students (Culler & Holahan, 1980). Therefore, high-anxious students may be more concerned about their ability to perform on exams when they know they’ve missed class often. Overall, the ways that students approach examinations is of importance to both academic achievement and experiences of test anxiety;
therefore, the current study acknowledges the impact that study habits may have when coupled with academic optimism.

**Current Study**

The current study will examine student academic optimism and study habits as predictors of test anxiety. More importantly, the current study will determine how these two factors affect experiences of test anxiety for males and females separately, due to past research indicating there are significant sex differences in levels of test anxiety. The current study has two goals in mind: 1) to assess an adaption of a measure of academic optimism for a **college student** population and 2) to assess how study habits and academic optimism contribute to two dimensions of test anxiety: worry and emotionality. The following predictions are explored:

1. **For both male and female students, three dimensions of academic optimism will be predictive of both dimensions of test anxiety.** Tschannen et al. (2013) has noted that academic optimism has a positive impact on overall academic achievement. With past research concluding that test anxiety has a strong relationship to overall academic achievement (Akanbi, 2013; Chapell et al., 2005; Culler & Holahan, 1980; Damer & Melendres, 2011; Dendato & Diener, 1986; Eum & Rice, 2011; Wittmaier, 1972), the current study assumes a similar relationship will develop between academic optimism and test anxiety.

2. **Males will report greater surface approach study habits than females, and females will report greater deep approach study habits than males.** Males are said to decrease their use of deep approach study habits in both high school and college, but this decrease does not occur in female students (Biggs, 1987; Biggs et al., 2001). The current study hypothesizes that we will see the same sex differences in our sample.
3. for both male and female students, those with high scores for surface approach study habits will also have significantly higher levels of both dimensions of test anxiety. For both male and female students, those with high reports for deep approach study habits will also have lower levels of test anxiety. There are inconsistencies in past research determining whether or not having poor or effective study habits leads to higher or lower levels of test anxiety (Culler & Holahan, 1980; Dendato & Diener, 1986; Wittmaier, 1972). The current study wants to expand this research further in determining how significant poor and effective study habits are in predicting levels of test anxiety.

**Method**

**Participants**

Undergraduate students attending a private liberal arts university in the Midwest were invited via a flyer hanging near the psychology lab to participate. Also, those enrolled in introduction psychology courses during the time of the study were asked to participate in order to fulfill course requirements. Seventy-two college students participated (31 male and 41 female). Although multiple factors (sex, age, class level, major) were measured in a demographic survey, only data on sex contributed to the final analysis of data (see Table 1). A large portion of the sample represented the freshman class level and students majoring in the areas of math, computer science, and natural sciences.

Table 1

*Participant Characteristics*
Materials and Procedure

Upon arrival to the psychology lab, participants were asked to read and sign a consent form. Minors were asked to take a consent form home and get parental/guardian consent before their participation appointment. Once informed consent was given, participants were asked to answer a few demographic questions (e.g., age, sex, major, class level). Following the demographic survey, participants were asked to complete the following three measures in one of six counterbalanced orders so that carryover effects could be avoided.

Test anxiety. Test anxiety, a feeling that an examination setting is threatening, was measured using the Test Anxiety Inventory (TAI) (Akanbi, 2013; Putwain & Symes, 2012; Shadach & Ganor-Miller, 2013). Studying test anxiety using an age-appropriate measure is important to avoid measurement bias; therefore, the TAI is used in the current study because it is widely used within the context of high school and college students (Ali & Mohsin, 2013; Chapell
et al., 2005; Lowe, 2014). The TAI is a 20 item self-report questionnaire in which participants rate on a four-point Likert scale how often they experience feelings of stress and anxiety before or during an exam, ranging from 1 – almost never to 4 – almost always (e.g. “Thoughts of failure distract me from concentrating on the test question”) (Ali & Mohsin, 2013; Chapell et al., 2005; Damer & Melendres, 2012; Shadach & Ganor-Miller, 2013; Spielberger, 1980). Total scores for the TAI are on a continuous scale range from 20 to 80, and scores for the two subscales (Worry and Emotionality) range from 8 to 32. Students who have a raw total score of 36+, a raw worry score of 12+ and a raw emotionality score of 15+ fall above the 50th percentile rank (Spielberger, 1980). Scores falling above the 50th percentile indicate higher levels of test anxiety, and scores below the 50th percentile indicate lower levels of test anxiety. The TAI has high internal consistency for total, worry, and emotionality scales, α’s > .88 (Spielberger, 1980).

To score the TAI, individual items for each scale were added together. The total scale was computed adding items 1 (reverse values), 12, 13, and 19. The two subscales were computed adding items 3+ 4+5+6+7+14+17+20 (worry) and items 2+8+9+10+11+15+16+18 (emotionality) (Spielberger, 1980). All three scales were used in the final analysis of data.

**Academic optimism.** Academic optimism is a multidimensional construct including trust in teachers, academic press, and identification with school (Tschannen-Moran et al., 2013). A Student Academic Optimism Questionnaire (SAOQ) was developed by adapting items identified by Tschannen-Moran et al. (2013) to assess elementary, middle, and high school students’ academic optimism for use with a college student population; therefore, subscale names were changed to Trust in Professors, Academic Press, and Identification with University (e.g., adaption from “This school…” to “This university…”). The SAOQ is a 28 item self-report questionnaire, where participants rate on a three-point Likert scale how true each item is
perceived to be true, ranging from 1 – very true to 3 – not true at all (e.g., “I feel proud of being a part of this university”) (Tschannen et al., 2013). Scores for the two subscales, trust in professors and identification with university, range between 10 to 30 and scores for the academic press subscale range from 8 to 24. Tschannen et al. (2013) did not outline percentile ranks to interpret scores for academic optimism items; therefore, the current study interpreted subscale scores based on a comparison of average ratings on the 3-point Likert scale. Scores closer to 3 for each subscale indicated higher academic optimism related to that subscale, and scores closer to 1 for each subscale indicated lower academic optimism related to that subscale. The SAOQ has high internal consistency for trust in teachers, academic press, and identification with school, α’s > .93 (Tschannen et al., 2013).

After reverse scoring the questionnaires, the three subscale scores were computed adding scores from items 1-10 (trust in professors), 11-18 (academic press), and 19-28 (identification with university). All three scales were used in the final analysis of data.

**Study habits.** Study habits, preparation approaches students use before taking an exam or other testing tool, were measured using the Revised Two-Factor Study Process Questionnaire (R-SPQ-2F) (Biggs, 1987; Biggs, Kember & Leung, 2001). The R-SPQ-2F has been widely accepted as the best measurement for studying students’ beliefs toward their approaches to learning material and methods of studying that they use before examinations (Biggs, 1987; Biggs, Kember & Leung, 2001). The R-SPQ-2F is a 20 item self-report questionnaire, where participants rate on a five-point Likert scale how well each item applies to them, ranging from A – Never or only rarely true of me to E – always or almost always true of me (e.g. “I do not find my course very interesting so I keep my work to the minimum”) (Biggs, 1987; Biggs, Kember & Leung, 2001). Scores for the approach scales indicated whether or not students approached
studying at a deep or surface level. Scores for the motive and strategy scales indicated how concerned students were about studying and the methods of studying student engaged in. Students who scored high for the deep approach scale have an intrinsic interest in learning (motive) and maximize meaning from what is being studied (strategy) (Biggs, Kember & Leung, 2001). Students who scored high for the surface approach scale often have a fear of failure (motive) and studied by rote learning (strategy) (Biggs, Kember & Leung, 2001). This measure has a high internal consistency for both the Deep approach scale and the Surface approach scale, $\alpha$’s > .64 (Biggs, Kember & Leung, 2001).

To score the R-SPQ-2F, answers to individual items were translated from letter scores to numerical scores so that A = 1, B = 2, C = 3, D = 4, E = 5 (Biggs, Kember & Leung, 2001). The Deep approach scale was computed adding scores from items 1+2+5+6+9+10+13+14+17+18. The Surface approach scale was scored using items 3+4+7+8+11+12+15+19+20. As well, deep motive subscale scores were computed adding items 1+5+9+13+17, and deep strategy subscale scores were computed adding items 2+6+10+14+18. Surface motive subscale scores were computed adding items 3+7+11+5+19, and Surface strategy subscale scores were computed adding items 4+8+12+16+20 (Biggs, Kember, & Leung, 2001). All scales were used in the final analysis of data.

**Results**

Test anxiety is a phenomenon that impacts students of all ages, especially those in college. Academic optimism and study habits were examined as predictors of test anxiety. Only the effects of study habits on test anxiety have been studied in past research, making the effects of academic optimism a new line of research to consider. Two goals were proposed in the current study: 1) to assess an adaption of a measure of academic optimism for a college student.
population and 2) to assess how study habits and academic optimism contribute to two dimensions of test anxiety: worry and emotionality. Both goals were accomplished within our sample. We hypothesized that not only would three dimensions of academic optimism influence levels of test anxiety, but also that there would be both a sex difference between surface and deep approach scores and an opposite effect between surface approach and deep approach study habits on levels of test anxiety.

### Academic Optimism

Average ratings on the SAOQ are shown in Table 2 as a function of sex. Overall, both male and female students had high reports of academic optimism on the three-point Likert scale. Average ratings for the three subscales were reported above 2.00 for both males and females. In other words, both males and females scored higher than the mid rating (2) for each subscale. A 2 (Sex) x 3 (Dimension) mixed ANOVA on average ratings showed a main effect of dimension, $F(2,140) = 51.93, p < .001$. Students reported highest for trust in professors and academic press $p$’s > .05. In other words, students are reporting highest for perceiving that they have a trusting relationship with professors and being in an environment that is academically oriented. This does not mean that students are not identifying with their university at all, it just means that they are reporting the lowest in this area.

Table 2

*Average Ratings (3-pt. Likert Scale) for Dimensions of Academic Optimism*

<table>
<thead>
<tr>
<th>Sex</th>
<th>n</th>
<th>Academic optimism</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Trust</td>
<td>Academic press</td>
<td>Identification with school</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>31</td>
<td>2.49 (.30)</td>
<td>2.50 (.36)</td>
<td>2.20 (.30)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>41</td>
<td>2.53 (.32)</td>
<td>2.60 (.32)</td>
<td>2.18 (.29)</td>
<td></td>
</tr>
</tbody>
</table>
There were no statistically significant sex differences for the trust in professors, academic press, and identification with university subscales of academic optimism. Without sex differences, this result indicates that academic optimism is a construct where scores for subscale factors are not influenced by sex. This result did not match the current study’s hypotheses.

Intercorrelations for trust in professors, academic press, and identification with university are shown in Table 3 as a function of sex. The three dimensions of academic optimism are statistically significantly positively correlated for males; however, only trust in professors and identification with university are statistically significantly positively correlated for females $p < .05$. When subscales are positively correlated, as one subscale score increases, it predicts an increase in other subscale scores as well. As can be seen for males, there are positive increases in scores between all three dimensions. In contrast, for females there is only an increase in scores between trust in professors and identification with university. This result may indicate that males perceive all three dimensions of academic optimism to be similar constructs, whereas females only find the constructs of trust in professors and identification with university to be similar aspects of academic optimism.

Table 3

*Academic Optimism Intercorrelations*

<table>
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<tr>
<th>Sex</th>
<th>Dimension</th>
<th>Trust in Professors</th>
<th>Academic Press</th>
<th>Identification with university</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Trust in professors</td>
<td>--</td>
<td>.64**</td>
<td>.42*</td>
</tr>
<tr>
<td></td>
<td>Academic press</td>
<td>--</td>
<td>--</td>
<td>.58**</td>
</tr>
<tr>
<td></td>
<td>Identification with university</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>Trust in professors</td>
<td>--</td>
<td>.14</td>
<td>.31*</td>
</tr>
<tr>
<td></td>
<td>Academic press</td>
<td>--</td>
<td>--</td>
<td>.30</td>
</tr>
<tr>
<td></td>
<td>Identification with university</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
</tbody>
</table>

* $p < .05$
** $p < .01$
Study Habits

Average ratings on the R-SPQ-2F are shown in Table 4 as a function of sex. Overall, both male and female students reported low-mid study habit processes on the five-point Likert scale. Both male and female students were reporting below the midpoint (3) for surface motive, deep motive, and deep strategy, except males reported above and females reported below the midpoint for surface strategy.

Table 4

<table>
<thead>
<tr>
<th>Sex</th>
<th>Surface Motive</th>
<th>Surface Strategy</th>
<th>Deep Motive</th>
<th>Deep Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>2.18 (.79)</td>
<td>2.75 (.82)</td>
<td>2.95 (.72)</td>
<td>2.89 (.89)</td>
</tr>
<tr>
<td>Male</td>
<td>2.52 (.56)</td>
<td>3.18 (.52)</td>
<td>2.78 (.49)</td>
<td>2.82 (.59)</td>
</tr>
</tbody>
</table>

Average ratings were submitted to a 2 Sex x 2 Approach (surface vs. deep) x 2 Dimension (motive vs. strategy) mixed ANOVA. The analysis revealed a near significant Approach x Sex interaction in which female students gave lower ratings than males for surface approaches, $F(1, 70) = 3.86, p = .05$ (see Figure 1). This result indicates that when compared to females, males report using approaches to studying that are at a surface level. As a result, not only do males possibly feel a greater fear of failure, but also may use rote-learning strategies more often. Males report similar ratings for surface and deep approach; in contrast, females report higher deep approach ratings than surface approach ratings. Males are just as likely to use a surface approach as compared to a deep approach, yet females chose a deep approach more often than a surface approach.
Figure 1. This graph depicts the near significant approach x sex interaction for study habits.
Males reported higher ratings for surface approach than females, but males and females reported
similar ratings for deep approach.

Males scored statistically significantly higher in both surface motive and surface strategy
subscales of study habits, $F(3, 210) = 3.23, p < .05$ (see Figure 2). Since males scored near
significantly higher for surface approach than females, it is not surprising that they scored near
significantly higher in both dimensions of the surface approach. Overall, there were no
statistically significant sex differences for deep approach, surface approach, deep motive, or deep
strategy scores. Without sex differences for deep approach (both motive or strategy) scores, this
result suggests that males and females are equally likely to have an intrinsic interest in what they
are learning, as well as being equally likely to maximize meaning from what they study. This
result did not match the current study’s hypotheses.
Figure 2. This graph depicts the relationship between four dimensions of test anxiety (motive & strategy) and sex. Males reported significantly higher ratings of surface motive and surface strategy as compared to females.

Furthermore, the Approach x Dimension interaction was significant, $F(1, 70) = 52.41, p < .001$ (see Figure 3). When students reported deep approach study habits, they reported equivalent motive and strategy ratings. In contrast, when students reported surface approach study habits, they reported lower ratings for motive than strategy. It seems as though students intend (motive) to approach studying more so at a deep level rather than a surface level, but they end up using surface-level methods (strategy) as frequently as deep approaches. This result is important to note in regards to the negative impact that surface-level study habits have on college student test anxiety.
Figure 3. This graph depicts the significant Approach x Dimension interaction for study habits. Students reported higher deep motive ratings, but reported higher surface strategy ratings.

Intercorrelations for deep approach (motive and strategy) and surface approach (motive and strategy) are shown in Table 5. These correlations were not examined as a function of sex due to the marginally significant effect described above. To emphasize the differences between the two approaches of study habits, the current study found the correlation between surface approach and deep approach scores to be statistically significantly negatively correlated. This result suggests that having a surface approach to studying is different than having a deep approach to studying. In addition, it is important to note that surface and deep motives predict strategy, as these are statistically significant positive correlations. When students have either a surface or deep intention for studying, the strategy in which they use to study imitates this intention.
Table 5

*Study Habits Intercorrelations*

<table>
<thead>
<tr>
<th>Approach</th>
<th>Dimension</th>
<th>Motive</th>
<th>Strategy</th>
<th>Motive</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface</td>
<td>Motive</td>
<td>--</td>
<td>-.66**</td>
<td>-.48**</td>
<td>-.45**</td>
</tr>
<tr>
<td></td>
<td>Strategy</td>
<td>--</td>
<td>-.43**</td>
<td>-.30**</td>
<td></td>
</tr>
<tr>
<td>Deep</td>
<td>Motive</td>
<td>--</td>
<td></td>
<td>.75**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Strategy</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**p < .01

**Test Anxiety**

Means and standard deviations for test anxiety scores are shown in Table 6 as a function of sex. Overall, both male and female students reported low-mid levels of test anxiety within a range of 20-80. A 2 (Sex) x 2 (Dimension) mixed ANOVA showed a main effect of dimension, $F(1, 70) = 5.34, p < .05$, where females were reporting significantly higher scores on both dimensions of test anxiety (worry and emotionality). When compared to mean scores in a TAI norming sample, males in the current study reported average scores within a one-point interval of the norming sample mean for total test anxiety, worry, and emotionality (Spielberger, 1980). Similarly, females in the current study reported average scores within a 4-point interval of the norming sample mean for total test anxiety, worry, and emotionality (Spielberger, 1980). This result shows that men have less variance in their reports of test anxiety, and females may differ greater in their reports of test anxiety.

Table 6

*Descriptive Statistics for Dimensions of Test Anxiety*

<table>
<thead>
<tr>
<th>Sex</th>
<th>Test anxiety</th>
<th>Total$^1$</th>
<th>Worry$^2$</th>
<th>Emotionality$^3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td>36.74 (11.70)</td>
<td>14.26 (5.45)</td>
<td>15.00 (4.97)</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>46.88 (12.33)</td>
<td>17.22 (5.13)</td>
<td>20.34 (5.44)</td>
</tr>
</tbody>
</table>

$^1$ $F(1, 70) = 12.46, p < .01, d = .84$

$^2$ $F(1, 70) = 5.58, p < .01, d = .56$

$^3$ $F(1, 70) = 18.31 p < .01, d = 1.02$
When comparing percentile ranks of the TAI norming sample, male students in the current study reported means for total test anxiety at the 53rd percentile, means for worry at the 65th percentile, and means for emotionality at the 46th percentile. In essence, males reported higher than average for total test anxiety and worry, but below average on emotionality.

Similarly, female students in the current study reported means for total test anxiety at the 65th percentile, means for worry at the 71st percentile, and means for emotionality at the 61st percentile. Females reported above average for total test anxiety, worry and emotionality. Given these percentiles, female students’ higher average scores for total test anxiety, worry and emotionality put them at relatively higher percentile ranks than males.

A one-way multivariate ANOVA was run to assess sex differences (see Table 6). As predicted, women scored statistically significantly higher than men on total test anxiety, as well as each subscale of test anxiety (worry and emotionality). The two subscales – worry and emotionality – were positively correlated in both men ($r(30) = .66, p < .01$) and women ($r(40) = .66, p < .01$). Students who scored high on worry also scored high on the emotionality. Female students were more likely to experience test anxiety, and the extent to which they experienced this phenomenon was greater than males. In this case, females reported experiencing more self-defeating thoughts of concern and emotionally aroused symptoms in reaction to their perceived evaluative stress (Spielberger, 1980). As a result, female students could potentially perform worse on examinations when they experience these higher levels of test anxiety. This result matched the current study’s hypotheses and coincided with past research (Akanbi, 2013; Chapell et al., 2005; Lowe, 2014) in concluding sex differences exist in college student test anxiety.
**What predicts test anxiety?** Figure 4 shows the actual relationships between predictor variables and two dimensions of test anxiety. Dimensions of academic optimism are positively correlated, dimensions of study habits are negatively correlated, and dimensions of test anxiety are positively correlated. Two dimensions of academic optimism (identification with university and academic press) are statistically significantly positively correlated with deep approach study habits, but no dimensions of academic optimism are correlated with surface approach study habits. The most important correlation to note is the one between surface approach study habits and the worry dimension of test anxiety, where there is a statistically significantly positively correlation. The predictive relationship between surface approach study habits and the worry dimension of test anxiety is important to note as the regression model is discussed below. Deep approach study habits were not correlated with either dimension of test anxiety.

* Figure 4. This figure shows the hypothesized relationships between predictor variables and two dimensions of test anxiety. Solid lines indicate significant correlations.
To assess whether academic optimism and study habits predict test anxiety, stepwise linear regression analyses were run for males and females separately. Each analysis used the dimensions of academic optimism (trust in professors, academic press, and identification with university) and overall approaches to studying (surface and deep) as predictors. One analysis model assessed worry as the criterion while the other assessed emotionality.

For males, none of the variables for academic optimism or study habits emerged in the model as significant predictors for either dimension of test anxiety. Male students typically experience test anxiety less than female students, so the variables that influence how much they experience this phenomenon is more difficult to capture. With this result, it can be assumed that predictor variables other than academic optimism and study habits are more substantial in influencing their levels of test anxiety.

In contrast, for females, two different models predicted worry and emotionality. With respect to the worry dimension of test anxiety, a surface approach to studying and trust in professors emerged as predictors, $R^2 = .24, F(2, 38) = 7.19, p < .01$ (see Figure 5a). Beta weights suggest that the surface approach variable leads to an increase in test anxiety, whereas the trust in professors variable leads to a decrease in test anxiety. This is a noteworthy finding in that it makes logical sense; only studying at the surface-level should make students feel more overwhelmed before an exam, and having a perceived trusting relationship with professors should make students fear examination settings less. If we can get female students to study at a deeper level, and improve professor behavior so that students perceive them to be more trusting, we may be able to decrease the extent to which they experience test anxiety. It is also striking that these variables only predict the worry dimension of test anxiety. In this case, this finding implies that these are factors influencing concerning thoughts before entering an examination.
setting, with students being most concerned with the actual characteristics of the exam. In other words, when students are about to take an exam, they might be overwhelmed by thoughts of how little they studied, and by thoughts of whether or not they trust a professor to create an exam in which they can obtain a passing grade. Overall, this model accounted for a significant portion of the variance (24%) in female student test anxiety scores; however, it is important to note that a large portion of variance (76%) cannot be accounted for by variables of academic optimism and study habits. This may be due to the nature of those concerning thoughts. Further research needs to acknowledge this variance accounted for, while also attempting to identify other predictive factors that contribute to a greater $R^2$ score.

With respect to the emotionality dimension of test anxiety, the only significant predictor was the degree to which students identified with their university, $R^2 = .12, F(1, 39) = 6.67, p < .05$ (see Figure 5b). Beta weights suggest that decreases in test anxiety can be found when students report greater identification with university. Like the first model, this finding is noteworthy; students who perceived a sense of belonging at their university should not be as emotionally aroused when entering an examination setting. If students feel welcomed wherever they go, whether that’s the cafeteria, the gym, the classroom, etc., they should not be emotionally stimulated by the examination setting in the classroom. To these students, entering a classroom for an exam does not make them feel as anxious or tense. This is important to note because it means that when these students are taking an exam they are physically functioning somewhat normally, and their autonomic nervous systems are activated less. Overall, this model accounts for a significant portion of the variance (12%), leaving 88% of the variance accounted for by unknown factors. Although this seems to be a small proportion of variance, the significance that
it has in predicting female students experiences of test anxiety is notable. Further research needs
to identify other predictive factors that may contribute to a greater $R^2$ score.

**Figure 5.** Standardized beta weights are presented to indicate how strong the predictor variables
are for two dimensions of test anxiety. Positive beta weights indicate increases in test anxiety,
whereas negative beta weights indicate decreases in test anxiety.

**Discussion**

In the current study, we accomplished both of our proposed goals. First, we found
dimensions of college student academic optimism to hold true for males in a college student
population. All dimensions of college student academic optimism were correlated with each
other, indicating that these items have internal consistency for males. However, females only
reported trust in professors and identification with university to be associated with each other.
This result may indicate that not all of these items have internal consistency for females.
Secondly, we found three significant relationships between college student academic optimism, study habits, and two dimensions of test anxiety. The first significant relationship is between surface approach study habits and the worry dimension of test anxiety, where students that report greater surface approach study habits having an increased level of worry. The second significant relationship is between trust in professors and the worry dimension of test anxiety, where students that report greater trust in professors having a decreased level of worry. When a surface approach to studying is coupled with trust in professors, 24% of the variance is accounted for in the worry dimension of test anxiety. Lastly, there is a significant relationship between identification with university and the emotionality dimension of test anxiety, where students with greater identification with university having decreased levels of emotionality. This relationship accounts for 12% of the variance accounted for in the emotionality dimension of test anxiety.

We did not find any of our hypotheses to hold true. The relation between our hypotheses and our results are discussed below.

1) For both male and female students, three dimensions of academic optimism will be predictive of both dimensions of test anxiety

Students were found to generally have high reports of academic optimism. This result implies that students perceive having a relationship with professors based on trust, are academically oriented, and feel a sense of belonging at their university (Tschannen et al., 2013). As mentioned above, there is a significant relationship between two dimensions of college student academic optimism and the two dimensions of test anxiety; however, this relationship holds true for female students only. First, trust in professors is significantly related to lower levels of the worry dimension of test anxiety. Perceiving a trusting relationship with professors leads female students to be less concerned with a fear of failure while in an examination setting.
This result is useful for professors and education officials because universities can administer training in order to promote more trusting relationships with female students. This kind of training may help professors build a better rapport with female students, and reduce their female students’ reported experiences with test anxiety. Secondly, identification with professors is significantly related to lower levels of the emotionality dimension of test anxiety. Female students who perceived a sense of belonging at their university reported not being as emotionally aroused when entering an examination setting. This result indicates that if female students feel welcomed wherever they go, whether that’s the cafeteria, the gym, the classroom, etc., they should not be emotionally stimulated by the examination setting in the classroom. To these students, entering a classroom for an exam does not make them feel as anxious or tense. This is important to note because it means that when female students are taking an exam they are physically functioning somewhat normally, and their automatic nervous systems are activated less. Educational officials and staff should employ programs for promoting a sense of belonging for female students at all year levels, so that these students do not develop or increase their physical complaints of test anxiety. Overall, this result expands past research due to the fact that no other studies have examined the relationship between academic optimism and test anxiety. Furthermore, no past research has adapted the construct of student academic optimism for a college student population. This relationship should be examined further in future studies of both academic optimism and test anxiety.

Although we did not hypothesize about sex differences between dimensions of test anxiety, we found that there were no statistically significant sex differences for any of the three subscales. Without sex differences, this result indicates that academic optimism is a construct where scores for subscale factors are not influenced by sex. This result is surprising due to the
fact that intercorrelations between these dimensions for males and females revealed sex differences in the underlying pattern of relations. All dimensions for males were statistically significantly positively correlated with each other, but only trust in professors and identification with university were significantly positively correlated for females. These correlational differences may suggest that males and females perceive the three dimensions of academic optimism in different ways. Males perceive all three dimensions of academic optimism to be similar constructs, whereas females only find the constructs of trust in professors and identification with university to be similar. Since the construct of college student academic optimism is novel, further research needs to be dedicated to examining the sex differences between these dimensions. The current study expands past research in making a first attempt in discovering how male and female college students perceive the dimensions of academic optimism.

2) Males will report greater surface approach study habits than females, and females will report greater deep approach study habits than males.

The current study found that there were no statistically significant sex differences between deep approach and surface approach scores. There was a near significant 2 Sex (Male vs. Female) x 2 Approach (Surface vs. Deep) interaction, in which female students gave lower ratings than males for surface approaches and females report higher ratings than males for deep approaches. Without significant sex differences for surface approach and deep approach scores, this result suggests that males and females are equally likely to adopt either method. Overall, this result diminishes the stereotype that males care less about their studies and adopt more surface level approaches to studying than females. Past research claimed that males decrease their use of deep approach study habits in both high school and college, yet this decrease does not occur in
female students (Biggs, 1987; Biggs et al., 2001). Results of the current study suggest that this is not the case due to there being no sex differences in the types of approaches students adopt (either male or female). The current study expands past research in finding that no sex differences exist between the usage of study approaches in a college student population as compared to other lower levels of education.

However, there were statistically significant sex differences between surface motive and surface strategy subscales of study habits. Males reported higher than females in both surface motive and surface strategy scores. As a result, not only do males possibly feel a greater fear of failure, but also may use rote-learning strategies more often. This finding is important to note as it confirms the stereotype that males adopt more surface level intentions and methods to studying than females. The current study expanded past research in finding that sex differences exist when motives are compared to strategies. Although a sex difference exists for surface dimensions, there were no sex differences between deep motive and deep strategy subscales of study habits. A college student population may only show sex differences when comparing their surface motives and strategies, and not in examining differences between deep motives and strategies. Professors need to recognize when these sex differences exist in prompting students to prepare for exams. Educational programs aimed at building effective study habits need to recruit male students more in knowing this information.

3) For both male and female students, those with high scores for surface approach study habits will also have significantly higher levels of both dimensions of test anxiety. Conversely, for both male and female students, those with high reports for deep approach study habits will also have lower levels of test anxiety.
The current study found this hypothesis to be halfway true, in that a surface approach variable leads to an increase in the worry dimension of test anxiety for female students only. This is a noteworthy finding, suggesting that only studying at the surface-level may influence female students to feel more overwhelmed before an exam. This conclusion implies that studying at a surface-level approach influences female students by increasing concerning thoughts before entering an examination setting. These students become most concerned with their preparation methods, rather than their physical complaints, which distracts their attention from the actual task of taking the exam. In other words, when students are about to take an exam, they might be overwhelmed by thoughts of how little they studied.

Overall, this result helps to understand the inconsistencies in past research concerning the effect of poor study habits on anxious test takers. It is apparent that those with poor study habits also have higher levels of test anxiety. Although the current study did not examine this relationship with respect to academic achievement, it can be assumed that students would not have high academic success. As well, the current study found it interesting that this factor was related to cognitive deficits only, and not physical deficits. Physical complaints of test anxiety are clearly not impacted by the way students perceive their study habits. Therefore, we suggest that study-related therapies need to incorporate cognitive-behavioral methods in order to change the way students think about their studies and the ways in which they react to these cognitions during examinations.

Deep approach scores were not found to be predictive of test anxiety for males or females in the regression model. This result may indicate that using deep approaches to studying does not influence levels of test anxiety. In fact, this result helps to understand the inconsistencies in past research concerning the influence of effective study habits on anxious test takers. This result
suggests that the deeper you study for an exam, whether that be more hours studied, more adequate methods of learning material, or beginning the study process well in advance, does not impact how anxious you feel during an exam. Overall, this result is strange, because it is inconsistent with some conclusions from past research. Some studies claim that deeper study habits make students less concerned with how they perform on an examination (Culler & Holahan, 1980; Wittmaier, 1972). If they feel they studied adequately, they are not concerned or emotionally aroused when entering the examination setting. This is clearly not the case in our sample. In our sample, the only predictive indicator of study habits on how much test anxiety students will experience is a surface approach. As a result, our study asserts that poor study habits, rather than effective study habits, are predictive of test anxiety levels.

Regression Model

By examining the predictive relationships between college student academic optimism, study habits, and test anxiety, the current study found two predictive relationships. Two dimensions of academic optimism (identification with university and academic press) are statistically significantly positively correlated with deep approach study habits, but no dimensions of academic optimism are correlated with surface approach study habits. The most important correlation to note is the one between surface approach study habits and the worry dimension of test anxiety, where there is a statistically significantly positively correlation. The importance of the relationship is significant when examining how we can predict students’ levels of test anxiety.

In the regression model, we find that a surface approach to studying coupled with trust in professors emerged as predictors of the worry dimension of test anxiety. When we know students’ surface approach study habits scores and trust in professors scores, we can make
estimated predictions of what their levels of test anxiety will be. This predictive model is said to account for 24% of the variance in levels of test anxiety. This is a significant proportion of test anxiety accounted for, which indicates that these two factors alone account for almost \( \frac{1}{4} \) of test anxiety levels. With this being said, professors and educational officials can use this predictive model for understanding students’ abilities for success in the classroom.

**Limitations of Current Study**

Although the current study found three of its hypotheses to hold true, we must acknowledge the limitations to these results. First, the current study only studied 72 college students from a small private, liberal arts university might not generalize to undergraduates at other types of institutions. Secondly, this university low professor-to-student ratios (roughly 1 professor per 20 students), which may influence the quality of relationships students have with professors. In turn, these perceived deeper relationships with professors might influence their reports of academic optimism. Thirdly, a majority of participants were made up of freshman students. Past research has shown that freshman level students often have greater experiences with test anxiety, which may influence the extent by which overall test anxiety was experienced by participants in the current study (Wittmaier, 1972). Fourth, the current study is based on self-report measures only, and not any experimental investigation. Participants could have misreported about their levels of academic optimism, study habits, and experiences of test anxiety; therefore, there are no direct conclusions that can be made about causation. However, the current study acknowledged the unethical nature of inducing test anxiety, and the Institutional Review Board would not have approved an experimental design. Lastly, we did not control for the Hawthorne Effect, where students may have felt and reported more test anxiety in knowing that they’re participating in a research study. Characteristics of the Psychology Lab, such
as having blank white walls and a reflective mirror might have influenced students into thinking
that we were watching how they filled out their surveys. Students may have interpreted this
experience in a similar way they would perceive being in an examination setting in the
classroom. Future studies should control for these variables in promoting a less threatening
examination situation.

**Implications for Future Research**

In conclusion, future studies of test anxiety need to discover new factors that may be
influential to this experience. Factors studied in past research need to be reevaluated, along with
hypothesizing these new related factors. As we did in the current study, future studies need to
continue studying the predictive effects of academic optimism and study habits on college
student test anxiety. The current study has found both factors to be influential on test anxiety;
therefore, an equation for predicting test anxiety levels needs to be developed, incorporating the
variance accounted for by these factors. Overall, a comprehensive model of test anxiety factors
needs to be generated.

Future studies need to improve study procedures so that causative relationships can be
determined. First, these studies should attempt to find an ethical way to study test anxiety in an
experimental way. This will allow for more definite conclusions to be made of how predictor
factors influence levels of test anxiety. Next, more participants should be recruited in hopes of
being able to generalize to a greater population of college students. With greater generalization,
there is a possibility that education officials will see this experience as prominent and will
produce policy to improve students’ experiences with test anxiety. Lastly, if a new sample has
greater demographic variance, these factors should be examined further in relation to college
student test anxiety. These factors could include: sex, class level, major, social economic status, and type of university attending (public vs. private).

In relation to improving the experience of test anxiety, effective school counseling methods need to be developed to reduce the number of students experiencing test anxiety. These methods may include systematic desensitization and study-related therapies. It is important to note that when these therapies are incorporated together, they tend to be more effective. Specifically, study-related therapies need to combine cognitive-behavioral features in order to change the way students think about their studies and the ways in which they react to these cognitions during examinations. These changes in study habits will help to reduce the cognitive and behavioral deficits of test anxiety.
References


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