



## The Moderating Role of Defensive Pessimism in the Relationship Between Test Anxiety and Performance in a Licensure Examination

Rene M. Nob

*De La Salle University Manila*

Alyonna Marie L. Bumanglag

Genevie Mae A. Diwa

Guia Isabel Ponce

*St. Paul University Manila Philippines*

### Abstract

This study aims to determine if the dimensions of test anxiety (worry and emotionality) can negatively predict test takers' performance in a licensure examination. It also aims to test if defensive pessimism can buffer these predictive relationships. The study involved data from 101 individuals who took the Philippine licensure examination for Occupational Therapy and Physical Therapy. Results from logistic regression analysis reveal that worry negatively predicts examination performance. However, emotionality turns out to be a positive predictor, after controlling for worry. Furthermore, defensive pessimism weakens the negative effect of worry on examination performance, but did not serve as a moderator in the relationship between emotionality and examination results. Future research directions and some practical implications are further discussed.

*Keywords:* test anxiety, worry, emotionality, defensive pessimism, licensure examination

### Introduction

Assessment remains to be an integral part of our educational system. While schools and teachers are encouraged to make use of a variety of

methods of assessment, summative tests remain to be a popular choice. Some tests matter more than others. For example, passing or failing high-stakes tests, such as licensure examinations, is said to have more serious consequences for the individual (Cole & Osterlind, 2008). It is very important that performance in these exams reflect students' true abilities. However, other individual factors may also influence the outcomes of exams. For example, test anxiety has been identified in previous research to have detrimental effects on test performance (Wong, 2008). Other lines of research also suggest that some individuals harness their education-related anxieties to prepare for forthcoming academic challenges, such as in the case of preparing for examinations (Norem & Cantor, 1986). Such individuals are said to be defensive pessimists. To the best of our knowledge, no study has been conducted about the potential protective role of defensive pessimism against the detrimental effects of test anxiety. Hence, this study would like to investigate if defensive pessimism will buffer the impact of test anxiety on performance in a licensure examination.

### **High-Stakes Tests and Test Anxiety**

High-stakes tests are said to be assessments with meaningful consequences to the students (Cole & Osterlind, 2008). Some tests serve as basis for students to accelerate to another grade level, while others serve as requirement for entering college. High-stakes tests, especially licensure examinations, ensure the public that the individuals who passed meet the minimum standards to perform their respective professions. Failure to pass a licensure examination may cause a major career setback for the individual, such as not being able to practice his or her profession.

Because of the seeming importance of licensure examinations, many examinees may feel anxious before or even during the test. Such experience is referred to as, test anxiety. Anxiety is a highly unpleasant affective state similar to intense fear, which can include feelings of threat, vague objectless fear, a state of uneasiness and tension, and a generalized feeling of apprehension that can affect an individual's concentration in various situations (Basavanna, 2000). Anxiety is characterized by high arousal, negative valence, uncertainty, and a low sense of control (Gray, 1991). It usually occurs when an anticipated event is expected to make demands for which a person is unprepared for and therefore, lacks the necessary coping skills (Costello, 1976). Anxiety has been associated to error-related negativity via reduced active goal maintenance and compensatory

reactive control efforts (Moser, Moran, Schroder, Donnellan, & Yeung, 2013). It can also be conceptualized as a state of distress that can affect an individual's performance in reaction to situations that resemble previous undesirable events. Individuals who feel anxious tend to focus on the potential negative outcomes, which they may have experienced before, and believe that those outcomes are more likely to happen again in similar situations (Lerner & Keltner, 2001). This is the reason why most anxious individuals tend to escape the potentially unfavorable event.

Test anxiety is a strong negative emotional reaction that students feel before and during an examination (Akca, 2011; Hong & Karstenson, 2002). This is likely because of students' fear of evaluation (Liebert & Morris, 1967). Such may be related to having an avoidance temperament (Liew, Lench, Kao, Yeh, & Kwok, 2014), and may develop among students who experienced failure, even after exerting effort (Liepmann, Marggraf, Felfe, & Hosemann, 1992). Test anxiety is said to be "directly related to fears of negative evaluation, dislike of tests, and less effective study skills" (Hembree, 1988, p. 73). This happens when exam takers feel threatened by a test they are about to take or are currently taking, which triggers certain negative reactions.

There are two components of test anxiety: worry and emotionality (Morris & Liebert, 1970; Damer & Melendres, 2011). Worry is defined as a cognitive expression of concern over an impending evaluative performance. This may include pessimistic expectations, thoughts about possible negative outcomes, self-criticism, overwhelming fear about failing grades, and absent-mindedness (Berk & Nanda, 2006; Zeidner, 1998). Students who predict failure in the exam would experience anxiety and may see the exam as threatening. As a result, students who are test-anxious are filled with thoughts of self-deprecation such as, "I am going to fail this examination." The focus of the individuals is on the consequences and implications of failure rather than the examination itself (Zeidner, 1998). Worrying causes the mind to slow down by suppressing clear thought, resulting to problem-solving processes becoming more complex (Akca, 2011).

Another dimension of test anxiety according to Morris and Liebert (1970) is emotionality. Emotionality can be considered as the physiological component of test anxiety. Individuals may experience tensed muscles, fast heart rate, the feeling of sickness, dizziness, sweating, and shaking when taking a test (McDonald, 2001). These physiological reactions are said to decrease the concentration of students, thus, resulting to poor performance in tests (Arguelles, McCraty, & Rees, 2003; McCraty, 2005).

## Test Anxiety and Test Performance

Given the gravity of the consequences of passing or failing a high-stakes test such as a licensure examination, it is important that students' performance be reflective of their true potential as future practitioners. However, literature about test anxiety indicates that, such academic emotion may actually get in the way of students' optimum performance. For instance, Wong (2008) reported that there is a small to moderate negative relationship between test anxiety and academic performance. According to Eysenck and Calvo (1992), anxiety often weakens performance especially under test conditions. Highly anxious people who report to have greater worry and emotionality tend to perform poorly than students with low test anxiety. Wine (1971) suggested that the loss of focus during a task marks the difference between a high test-anxious person and low test-anxious person. A low test-anxious person focuses well on test-relevant stimuli while performing a task, but a high test-anxious person focuses on test-irrelevant stimuli. Splitting of attention because of irrelevant stimuli could interfere with the performance (Wine, 1971).

Looking at the cognitive and emotional components of test anxiety and their relationship with measures of academic performance, the study of Cassady and Johnson (2002) reveals that cognitive test anxiety (i.e., worry) is negatively associated with test scores in various course examinations. On the other hand, while excessive emotionality resulted to poor test performance, moderate levels of arousal seem to be beneficial (Cassady & Johnson, 2002).

Chapell et al. (2005) found that among undergraduate students, both worry and emotionality are negatively correlated with both grades and cumulative grade point average (CGPA). However, it should be noted that the correlation coefficient for emotionality and grades, and emotionality and CGPA were much less than the correlation coefficient between worry and grades, and worry and CGPA (Chapell, et al., 2005). Furthermore, among graduate student participants in the same study, emotionality was no longer associated with grades and CGPA (Chapell, et al., 2005).

In the study of Rana and Mahmood (2010), regression results reveal that worry negatively predicted students' academic achievement. However, upon controlling for worry, emotionality no longer served as a unique predictor. This is despite the fact that emotionality negatively correlated to achievement, based on the preliminary correlation analysis (Rana & Mahmood, 2010).

These findings suggest that worry is a more consistent negative correlate of measures of academic performance (Cassady & Johnson, 2002; Chapell, et

al., 2005; Rana & Mahmood, 2010). However, findings with regard to emotionality are less consistent. While emotionality is negatively correlated with academic performance (Chapell, et al., 2005; Rana & Mahmood, 2010), the literature suggests that it may not have a unique impact on achievement beyond the influence of worry. Emotionality may be mostly nested in worrying, and unlikely to have a negative impact outside that which worrying affords (Deffenbacher, 1977; Morris, Smith, Andrews, & Morris, 1975; Schwarzer, 1984). Furthermore, there is also some evidence that emotionality might even be optimal in moderate levels; in such a way that it might actually enhance performance in a test (Cassady & Johnson, 2002). Nevertheless, the result of the study of Cassady and Johnson (2002) implies that high level of emotionality is detrimental to performance. Hence, the present study proposed the following hypothesis: (H1) Worry will negatively predict examination performance. (H2) Emotionality will negatively predict examination performance to a lesser degree compared to worry.

### **Buffering Effect of Defensive Pessimism**

Anxiety need not always have to have detrimental effects on test performance. There are some people who utilize anxiety as a means to motivate themselves to prepare for examinations (Norem & Cantor, 1986). Such people are those who possess defensive pessimism. According to the Theory of Self-Regulated Learning, students can become active participants in the learning process (Pintrich, 2004). They are potentially capable of being aware of the nature of the task, learning experiences, setbacks, and end goals, for the purpose of controlling these various aspects of learning, to achieve desired outcomes (Pintrich, 2004). The use of specific strategies is crucial in becoming a self-regulated learner. One strategy used to negotiate with undesirable emotions and enhance motivation is defensive pessimism (Garcia, 1995; Norem & Cantor, 1986; Pintrich, 2004).

Defensive pessimism is acknowledged as a self-regulated learning strategy that involves “setting unrealistically low expectations in a risky situation in an attempt to harness anxiety so that performance is unimpaired” (Norem & Cantor, 1986, p. 1208). An individual’s pessimism is said to be defensive because there is an existing inconsistency between that individual’s past successful performance and the low expectation they have for future success (Thompson & le Fevre, 1999). In order for these individuals to protect themselves from potential disappointment for their performance, they set low expectations for

themselves, or expect the worst out of the situation. In turn, they use the anxiety generated by these thoughts as motivation for them to perform better. According to Terada and Ura (2015), defensive pessimists can attain higher levels of performance because they control their negative thinking beforehand and prepare for the worst possible outcomes. Norem and Cantor (1986) demonstrated through an experiment that although defensive pessimists gave lower predictions in their performance and scored high on anxiety, they performed as well as optimists. This shows that individuals, depending on how they view the situation at hand, can moderate the usual effects of anxiety on their performance. Hence, it is hypothesized that: (H3) Defensive pessimism will buffer the negative impact of worry and emotionality on examination performance.

## Method

### Participants

The participants for this study were 101 exam takers who took the Physical Therapists (PT) Licensure Examination and Occupational Therapists (OT) Licensure Examination on the second month of last year. Out of 101 participants, 73 are females (72.3%). Their age ranged from 20 to 28 years old ( $M_{age}=22.6$ ,  $SD=1.639$ ). The participants came from 31 different schools and 2 review centers. There were 47 participant who attended in review center 1 (46.5%) and 54 attended review center 2 (53.5%).

### Measures

Informed consent was secured from the participants prior to data gathering. It was emphasized in the consent form that the results of the licensure examination, whether they pass or fail, will also be used in the analysis. Weeks before the schedule of their licensure examination, two measures were administered to assess participants' worry, emotionality, and defensive pessimism.

**Test Anxiety Inventory (TAI).** The TAI was developed by Spielberger (1980) based on his extensive research. It is a 20-item self-report instrument of test anxiety, in which the respondents would rate a set of statements using a four-point scale: 1=almost never; 2 sometimes; 3=often; 4= almost always.

There is a total score for test anxiety, but there are subscales for the two components: Worry (TAI/W) and Emotionality (TAI/E). Eight items from the TAI is categorized as worry items (numbers 3, 4, 5, 6, 7, 14, 17, and 20); another eight items represent emotionality items (numbers 2, 8, 9, 10, 11, 15, 16, and 18). All of these aforementioned items, together with four remaining items (numbers 1, 12, 13 and 19) comprise the total test anxiety. It should be noted that item 1 is scored in reverse. In the current study both subscales showed good reliability. TAI/W obtained an alpha of .82, while TAI/E has an alpha of .90.

**Defensive Pessimism Questionnaire (DPQ).** The DPQ is a 17-item questionnaire designed by Norem (2001) to measure pessimism (items 1, 2, 6, and 15) and reflectivity (items 4, 7, 8, 10, 12, 14, 16 and 17) regarding possible outcomes. Each item is scored from 1 (not at all true of me) to 7 (very true of me). Items 2 and 16 are scored in reverse, while items 5 and 9 are fillers. Items 11 and 13 are said to be experimental items, and hence, was treated as fillers as well. Item 3 is used to differentiate defensive or realistic pessimists. As a measure of overall defensive pessimism, Norem (2001) instructs to sum the ratings for pessimism and reflexivity items. For the current research, the average ratings were computed, instead. In this study, the overall measure of defensive pessimism has an acceptable reliability, with an alpha of .72.

**Examination Performance.** Given that there is limited access to the actual scores of the participants in their respective licensure examinations, examination performance was simply coded as 0 for fail and 1 for pass.

## Data Analysis

Pearson  $r$  correlation was used to initially analyze the associations among the different constructs. Given that the outcome variable, which is examination performance, was measured as a binary: pass or fail, while the predictors were measured as continuous variables, logistic regression was used to test the main hypotheses.

## Results

This study intended to determine whether test anxiety can negatively predict the results of PT and OT licensure examinations and whether defensive pessimism can buffer such negative effects. It was hypothesized that the test

anxiety components, emotionality, and worry will negatively predict performance in the PT and OT licensure examination. Likewise, it was hypothesized that defensive pessimism, as a moderator, can buffer the relationship between the two components of test anxiety and licensure examination performance. In order to address the research problems, a series of logistic regression analysis was conducted.

Table 1 shows the mean and standard deviation values of the variables that were included in the study. Likewise, Pearson  $r$  correlations were computed to evaluate the relationships among the variables.

Table 1

*Mean, Standard Deviations, and Zero-Order Correlations of the Licensure Exam Results, Emotionality, Worry, Test Anxiety, and Defensive Pessimism*

	<i>M</i>	<i>SD</i>	2	3	4
(1) Licensure Exam			-.048	-.341***	-.165
(2) Emotionality	2.501	.6693	--	.740***	.271**
(3) Worry	2.225	.5772		--	.410***
(4) Def. Pessimism	5.027	.7376			--

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Correlation analysis reveals that worry and emotionality are strongly correlated ( $r = .740$ ). Between the two, only worry is negatively associated with licensure exam performance to a moderate degree ( $r = -.341$ ). Furthermore, defensive pessimism is also correlated with emotionality ( $r = .271$ ) and worry ( $r = .410$ ). The results are reasonable since the experience of defensive pessimism is based on the experience of anxiety over future performance.

One of the objectives of the study is to determine if worry and emotionality negatively predicts the results of the PT and OT licensure examinations. Table 2 shows that collectively, the predictor variables significantly accounts for 20.3% of the variance in the licensure examination result,  $\chi^2(3) = 22.923, p = .0001$ .

Specifically, worry negatively predicted ( $B = -2.977, p = .001$ ), while emotionality positively predicted ( $B = 1.834, p = .004$ ) the result of the licensure examination. Defensive pessimism, on the other hand, did not serve as a significant predictor ( $B = .009, p = .981$ ). This shows that those who experience worry are more likely to fail the examination, while those who experience emotionality are more likely to pass, assuming that the other predictor variables



were held constant. While the result involving worry supports one of our hypotheses, the result with regard to emotionality, as a component of test anxiety, did not. Though emotionality is considered as a component of test anxiety, it shows a positive, instead of a negative impact on examination performance. This means that, assuming that participants have the same level of worrying, those who experience more physiological arousal, such as nervousness, are actually more likely to pass the licensure exam.

Table 2

*Results of Worry, Emotionality and Defensive Pessimism as Predictors of Licensure Exam Performance*

Variables	B	SE	p
Worry	-2.977	.755	.001
Emotionality	1.834	.638	.004
Defensive Pessimism	.009	.366	.981

Cox & Snell  $R^2 = .203$

Omnibus  $\chi^2(3)=22.923, p=.0001$

The final goal of this study is to determine whether defensive pessimism can moderate the impact of worry and emotionality on performance. Separate analyses were made for worry and emotionality, as predictor variables. Since these two are highly correlated, we decided that when analysis was conducted for one of them, the other should serve as a covariate, and hence was controlled for. For example, when we analyzed if defensive pessimism moderates the effect of worry on licensure exam result, emotionality was controlled for by including it in the analysis as a covariate. This allowed looking at the unique pattern of relationships under the assumption that the participants have a constant level of emotionality.

Table 3

*Result of the Moderation Analysis among Worry, Defensive Pessimism, and Exam Results*

Variables	B	SE	p
Worry	-3.2906	.8305	.0001
Defensive Pessimism	-.0466	.4098	.9095
Worry x Def. Pessimism	1.3292	.7053	.0595
Emotionality (control)	2.0747	.6674	.0019

Cox & Snell  $R^2 = .2363$ ,  $p = .0001$ 

Result of the analysis of the moderating role of defensive pessimism on the relationship between worry and licensure examination reveals that the overall model accounts for 23.63 % of the variance in the exam results. It was revealed earlier that worry negatively predicts the performance in the test. However, a marginal significant interaction effect shown in Table 3 suggests that defensive pessimism somehow moderates the relationship between worry and exam results ( $B=1.3292$ ,  $p=.0595$ ). This means that while those who failed were more likely to have experienced more worry in general, such may also depend on whether that person resorts to defensive pessimism or not.

Table 4

*Conditional Effects of Worry Depending on the Level of Defensive Pessimism*

Level of Defensive Pessimism	Effect (B)	SE	p
High	-2.3101	.8427	.0061
Average	-3.2906	.8305	.0001
Low	-4.2710	1.1003	.0001

Table 4 shows the conditional effects of worry across low, average, and high levels of defensive pessimism. While the effect of worry remains to be negative across all the levels of defensive pessimism, it can be noticed that the impact diminishes at higher levels of defensive pessimism. This signifies that while defensive pessimism may not exactly buffer the negative effect of worrying, such negative effect is of lesser magnitude for defensive pessimists. That is, while worry can contribute to failing a PT and OT licensure examination, such is less likely when one utilizes anxiety to prepare for such

summative assessment. This result somehow provides support to our second hypothesis.

Table 5

*Result of the Moderation Analysis among Emotionality, Defensive Pessimism, and Exam Results*

Variables	<i>B</i>	<i>SE</i>	<i>p</i>
Emotionality	1.8411	.6532	.0048
Defensive Pessimism	.1080	.3927	.7834
Emo x Def. Pessimism	.6359	.6078	.2954
Worry (control)	-2.9590	.7904	.0002

Cox & Snell  $R^2 = .2125, p=.0001$

With regard to emotionality, Table 5 reveals that the model accounts for 21.25% of the variance in the exam results. Moderation analysis clearly shows that there is no interaction effect ( $B = .6359, p = .2954$ ). This means that defensive pessimism does not moderate the relationship between emotionality and licensure exam performance. Therefore, assuming the students have the same amount of worry experienced, those who report more physiological arousal are more likely to pass the licensure exam, regardless if they engage in defensive pessimism or not.

## Discussion

The objective of the study was to see if test anxiety, particularly worry and emotionality, can negatively predict the result of the licensure examination in Physical Therapy and Occupational Therapy. Furthermore, the current investigation aimed to find out if defensive pessimism, as a self-regulated learning strategy, can buffer such anticipated negative effects of worry and emotionality on examination performance.

As expected, the two components of test anxiety are correlated, suggesting that they are dimensions of the same psychological construct. Furthermore the correlation was not too strong that they can be regarded as grossly overlapping.

While it was hypothesized that worry and emotionality will negatively predict performance in the licensure examination, results only provide partial supported such predictions. Worry indeed negatively predicted examination results. As argued earlier, excessive worrying about tests and its consequences may take away important resources from students (Zeidner, 1998), resulting to the possible impairment of various problem-solving processes (Akca, 2011). This finding is consistent with previous results (Cassady & Johnson, 2002; Chapell, et al., 2005; Rana & Mahmood, 2010); therefore, strengthening the theorized negative impact of worry on measures of achievement.

On the other hand, the hypothesized negative relationship between emotionality and examination performance not only failed to gain support, but went to the direction that is opposite of what was expected. Instead of a negative relationship, emotionality positively predicted results of the licensure exam. Previous findings with regard to the impact of emotionality have been inconsistent (Cassady & Johnson, 2002; Chapell, et al., 2005; Rana & Mahmood, 2010). Although emotionality in taking an examination is theoretically expected to be detrimental to academic achievement, some studies suggests that it may actually do the opposite. This current finding seems to concur with the results of Cassady and Johnson (2002), which indicated that physiological arousal can be beneficial to students. These physiological manifestations of anxiety may have been effective in arousing the participants to perform well in the licensure examination. It can be argued that high levels of emotionality can enhance the performance since it excites the body system above normal functioning capacity causing the individual to perform well (Coon & Mitterer, 2012).

Likewise, it should be noted that the current finding is under the condition for which the participants are assumed to have the same level of worry. This means that, should everyone have the same degree of worry, those who experience more physiological arousal are actually more likely to pass the licensure exam. While emotionality may emanate from worry itself (Deffenbacher, 1977), perhaps the kind of arousal which is not a product or side effect of worrying can actually be beneficial.

Furthermore, given the fact the participants were trained in allied health, they are probably knowledgeable of the physiological mechanisms of anxiety. Hence, they likely perceived emotionality as a result of normal bodily processes experienced by people, in response to challenges or threatening situations. They may have even capitalized on such arousing experience. Future researchers are encouraged to further investigate the inconsistencies in the effects of emotionality as a component of test anxiety. It will be good to be able to test

hypotheses about possible conditions when emotionality can be detrimental or beneficial to students.

With regard to the result of the moderation hypotheses, defensive pessimism somehow weakened the negative effects of worry on the licensure examination performance. This means that while being preoccupied with the negative outcomes of an exam can be detrimental to the actual performance, the strength of this relationship is weaker when individuals manage their worries and anxieties by preparing for the worst case scenarios (Norem & Cantor, 1986). This finding provides some evidence to the possible benefits students may get out of defensive pessimism (Norem & Cantor, 1986; Terada & Ura, 2015). Students who relatively set low expectations for themselves are less likely to experience the debilitating effect of anxiety on performance because they tend to prepare more (Norem & Cantor, 1986). Defensive pessimists are more deliberate in answering (as opposed to guessing), especially when they think of potential negative outcomes (Seery, West, Weisbuch, & Blascovich, 2008). Findings in the study of Riveiro (2014) also suggest that defensive pessimism is associated with the use of other desirable learning strategies.

Nevertheless, it should be noted that while defensive pessimism do buffer the negative effect of worry, results show that test anxiety still imposes its detrimental effect even at high levels of defensive pessimism, though to a lesser degree. This means that despite defensive pessimists' effort to use anxiety as motivation, such may not be enough to fully negate the detrimental effects to test anxiety. Despite being associated to many positive attributes (Riveiro, 2014), defensive pessimism is also related to negative student attributes. For example defensive pessimism has been associated with having performance-avoidance achievements goals (del Mar Ferradás, Freire, Núñez, Piñeiro, & Rosário, 2017). Further research is needed to confirm the consistency of defensive pessimism, as a protective strategy against test anxiety; and the conditions for which such role might hold true.

Based on the findings, some practical implications can be drawn. Considering that worry can be detrimental to test performance, measures to minimize worrying while preparing for or during the exam should be put into place. Teachers should create learning environments that promote confidence among students. Students who are preparing for an important examination should also be educated about the debilitating effects of worry on test performance. Furthermore, since worrying might be difficult to control, students should at least be taught how to utilize such the way defensive pessimists do, which is to use worry as motivation to prepare more for

upcoming examinations. Based on the current evidence, this should somehow mitigate the negative effects of worry on test performance. Since emotionality associated with taking tests was observed to have a positive influence on examination performance based on the current investigation, students should learn not impose negative interpretation over the physiological arousal they experience. Instead, they should think of capitalizing on such arousal as it may simply mean that their body is mustering various physiological resources in preparation for an important event, such as taking a high-stakes test.

## References

- Akca, F. (2011). The relationship between test anxiety and learned helplessness. *Social Behaviour and Personality*, 31(1), 101-112.
- Arguelles, L., McCraty, R., & Rees, R. (2003). The heart in holistic education. *Encounter: Education for Meaning and Social Justice*, 16(3), 13-21.
- Basavanna, M. (2000). *Dictionary of psychology*. New Delhi: Allied Publishers Ltd.
- Berk, R., & Nanda, J. (2006). A randomized trial of humor effects on test anxiety and test performance. *Humor: International Journal of Humor Research*, 19(4), 425–454.
- Cassady, J., & Johnson, R. (2002). Cognitive test anxiety and academic performance. *Contemporary Educational Psychology*, 27(2), 270-295.
- Chapell, M., Blanding, Z., Silverstein, M., Takahashi, M., Newman, B., Gubi, A., et al. (2005). Test anxiety and academic performance in undergraduate and graduate students. *Journal of Educational Psychology*, 97(2), 268-274.
- Cole, J., & Osterlind, S. (2008). Investigating differences between low-and high-stakes test performance on a general education exam. *Journal of General Education*, 57, 119-130.
- Coon, D., & Mitterer, J. (2012). *Introduction to psychology: Gateways to Mind and Behavior*, 13e. Belmont CA: Wadsworth.
- Costello, C. (1976). *Anxiety and depression: The adaptive emotions*. Montreal: McGill-Queen's University Press.
- Damer, D., & Melendres, L. (2011). "Tackling Test Anxiety": A group for college students. *The Journal for Specialists in Group Work*, 36(3), 163-177.
- Deffenbacher, J. (1977). Relationship of worry and emotionality to performance on the Miller Analogies Test. *Journal of Educational Psychology*, 61(2), 191-195.

- del Mar Ferradás, M., Freire, C., Núñez, J., Piñeiro, I., & Rosário, P. (2017). Motivational profiles in university students. Its relationship with self-handicapping and defensive pessimism strategies. *Learning and Individual Differences, 56*, 128-135.
- Eysenck, M., & Calvo, M. (1992). Anxiety and performance: The processing efficiency theory. *Cognition & Emotion, 6*(6), 409-434.
- Garcia, T. (1995). The role of motivational strategies in self-regulated learning. *New Directions for Teaching and Learning, 1995*(63), 29-42.
- Gray, J. (1991). Fear, panic, and anxiety: What's in a name? *Psychological Inquiry, 2*, 77-78.
- Hembree, R. (1988). Correlates, causes, effects, and treatment of test anxiety. *Review of Educational Research, 58*(1), 47-77.
- Hong, E., & Karstenson, L. (2002). Antecedents of state test anxiety. *Contemporary Educational Psychology, 27*(2), 348-367.
- Lerner, J., & Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology, 81*(1), 146-159.
- Liebert, R., & Morris, L. (1967). Cognitive and emotional components of test anxiety: A distinction and some initial data. *Psychological Reports, 20*(3), 975-978.
- Liepmann, D., Marggraf, C., Felfe, J., & Hosemann, A. (1992). Anxiety, action orientation, subjective state and situational aspects: A study of tank-lorry drivers. In K. Hagtvet, & T. Johnsen, *Advances in Test Anxiety Research* (Vol. 7, pp. 130-141). Amsterdamllisse: Swets and Zeitlinger.
- Liew, J., Lench, H., Kao, G., Yeh, Y., & Kwok, O. (2014). Avoidance temperament and social-evaluative threat in college students' math performance: A mediation model of math and test anxiety. *Anxiety, Stress, & Coping, 27*(6), 650-661.
- McCraty, R. (2005). Enhancing emotional, social, and academic learning with heart rhythm coherence feedback. *Biofeedback, 33*(4), 130-134.
- McDonald, A. (2001). The prevalence and effects of test anxiety in school children. *Educational Psychology, 21*(1), 89-101.
- Morris, L., & Liebert, R. (1970). Relationship of cognitive and emotional components of test anxiety to physiological arousal and academic performance. *Journal of Consulting and Clinical Psychology, 35*(3), 332-337.
- Morris, L., Smith, L., Andrews, E., & Morris, N. (1975). The relationship of emotionality and worry components of anxiety to motor skills performance. *Journal of Motor Behavior, 7*(2), 121-130.

- Moser, J., Moran, T., Schroder, H., Donnellan, B., & Yeung, N. (2013). On the relationship between anxiety and error monitoring: A meta-analysis and conceptual framework. *Frontiers in Human Neuroscience*, 7, 1-19.
- Norem, J. (2001). Defensive pessimism, optimism, and pessimism. In E. Chang, *Optimism and Pessimism: Implications for Theory, Research, and Practice* (pp. 77-100). Washington, DC: American Psychological Association.
- Norem, J., & Cantor, N. (1986). Defensive pessimism: Harnessing anxiety as motivation. *Journal of Personality and Social Psychology*, 51(6), 1208-1217.
- Pintrich, P. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review*, 16(4), 385-407.
- Rana, R., & Mahmood, N. (2010). The relationship between test anxiety and academic achievement. *Bulletin of Education and Research*, 32, 63-74.
- Riveiro, J. (2014). Optimistic and defensive-pessimist students: differences in their academic motivation and learning strategies. *The Spanish Journal of Psychology*, 17, 1-18.
- Schwarzer, R. (1984). Worry and emotionality as separate components in test anxiety. *Applied Psychology*, 33(2), 205-220.
- Seery, M., West, T., Weisbuch, M., & Blascovich, J. (2008). The effects of negative reflection for defensive pessimists: Dissipation or harnessing of threat? *Personality and Individual Differences*, 45(6), 515-520.
- Spielberger, C. (1980). *Test Attitude Inventory: Preliminary Professional Manual*. Palo Alto, CA: Consulting Psychologists Press.
- Terada, M., & Ura, M. (2015). Positive thinking impairs subsequent self-regulation: Focusing on defensive pessimists and optimists. *Journal of Educational and Developmental Psychology*, 5(2), 28-38.
- Thompson, T., & le Fevre, C. (1999). Implications of manipulating anticipatory attributions on the strategy use of defensive pessimists and strategic optimists. *Personality and Individual Differences*, 26(5), 887-904.
- Wine, J. (1971). Test anxiety and direction of attention. *Psychological Bulletin*, 76(2), 92-104.
- Wong, S. (2008). The relations of cognitive triad, dysfunctional attitudes, automatic thoughts, and irrational beliefs with test anxiety. *Current Psychology*, 27, 177-191.
- Zeidner, M. (1998). *Test Anxiety: The State of the Art*. New York: Plenum Press.