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The relationship between test anxiety and academic performance of untreated test anxious college students

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of untreated test anxious college students**

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University of Nevada, Las Vegas, 1991

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The Relationship Between Test Anxiety and Academic Performance
of Untreated Test Anxious College Students

By
Joanmarie C. Vlach-Kolesar

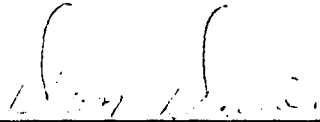
A thesis submitted in partial fulfillment
of the requirements for the degree of

Master of Arts
in
Psychology

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The thesis of Joanmarie C. Kolesar for the degree of Master of Arts in Psychology is approved.



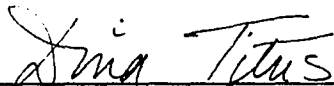
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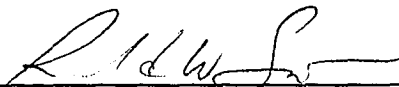
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July, 1990

Abstract

The relationship between test anxiety and academic performance was determined for a sample of fifty-three college students. Classroom examination scores and measures of preterm and postterm self-reported anxiety were collected to test the basic assumptions: (a) that there is a relationship between test anxiety and academic performance; (b) that test anxiety has a debilitating effect on academic performance; (c) to investigate if academic performance changes for test anxious subjects without treatment; and (d) if untreated test anxiety will manifest "spontaneous improvement" over the course of a semester when no treatment modality is involved. The results were consistent with general findings that there is a significant negative correlation between anxiety and academic performance, additionally the academic performance of test anxious subjects without treatment did not significantly increase or decrease over the course of the semester and finally there was no significant change in untreated test anxious subjects' test anxiety over the course of a semester.

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Introduction and Literature Review

The term test anxiety has been used since the 1950's to denote a special case of general anxiety. Test anxiety is usually defined as a class of behaviors or responses to an individual's experience of evaluation or testing. According to Mandler and Sarason (1952), during an examination, anxious students do not perform as well as calmer students.

In one of the earliest contributions to the field of test anxiety research, Mandler and Sarason (1952) postulated that the chief differentiating characteristic of high-test-anxious persons is the emission of interfering responses when confronted with evaluative settings.

Research by Mandler and Watson (1966) confirmed that high test anxious persons attend to the intrusion of irrelevant thoughts that interfere with performance (e.g., "I am stupid", "I am going to flunk this exam"). Support for this interference model of test anxiety has come from the work of a number of investigators (Liebert & Morris, 1967; Marlett & Watson, 1968; Morris & Liebert 1969, 1970; Spiegler, Morris, & Liebert, 1968). Liebert and Morris (1967) posited an important distinction by suggesting that there are two distinguishable components of test anxiety: one emotional and one cognitive. The cognitive component, which has been shown to correlate strongly with academic performance is labeled "worry". The emotional component which is usually found not to correlate significantly with academic performance is referred to as "emotionality".

Worry or cognitive responses are task-irrelevant debilitating preoccupations whereas emotionality is defined as physiological and affective arousal. According to the attentional model of test anxiety proposed by Wine (1971), high test anxious students become preoccupied with these irrelevant responses. Test performance is disrupted by this ruminative, self-evaluative worry and students cannot devote sufficient attention to the test-taking task. Investigators in the area of test anxiety have shown increasing interest in this model in recent years and have focused investigations into the nature of cognitions that underlie performance decrements.

The scope of the problem of test anxiety is documented by dozens of different treatment modalities for treating test-anxious individuals (Spielberger, Anton, & Bedell, 1976). The negative effects of test anxiety on academic performance have been repeatedly documented (Alpert & Haber, 1960; Mandler & Sarason, 1952; Paul & Eriksen, 1964; Spielberger, 1966). Finger and Galassi (1977) report that reviews of therapeutic intervention procedures have ranged from pessimism (Chestnut, 1965; Kirk, 1952) to limited optimism (Allen, 1972). The limited optimism has been based upon outcome studies that have successfully alleviated test anxiety (Finger & Galassi, 1977). However, in a review of the literature, Finger & Galassi (1977) revealed that, although anxiety was reduced, academic performance improved in only 16 of 54 (29.6%) of the studies.

The inconsistency between test anxiety and performance reflected in the literature suggests a complex relationship between these two variables. An understanding of the variables that determine whether test anxiety will have a detrimental effect on performance is important from a practical perspective. If test anxiety causes performance decrements effective intervention is necessary.

Current Test Anxiety Treatments

In recent years, various methods in the treatment of test anxiety have been tried, including group and individual counseling, systematic desensitization, cognitive techniques, structured psychodrama, hypnosis, Pavlovian conditioning, cognitive techniques, and re-educative psychotherapy among others. Some of the major approaches are discussed below.

Behavior Therapy. A variety of behavioral counseling techniques have been developed to treat anxiety reactions. As the term implies, most investigators have conceptualized test anxiety in terms of excessive arousal involving anxiety-based behaviors. Accordingly, systematic desensitization and other exposure techniques designed to inhibit anxiety-evoking imagery and excessive physiological responding, have been major treatment approaches used to reduce test anxiety. Relaxation is produced via a previously rehearsed technique using deep muscle relaxation. A hierarchy of anxiety-producing images is used while relaxation techniques are being practiced. One disadvantage to

systematic desensitization is that it is time consuming to learn and practice the relaxation techniques.

Although systematic desensitization remains the most extensively researched method available for reducing circumscribed anxieties (Allen, 1972; Katahn, Strenger, & Cherry, 1966; Paul & Shannon, 1966), the basic procedure has been modified and alternative or combined methods such as cue-controlled relaxations, (Russell & Lent, 1982), self-management approaches (Snyder & Deffenbacher, 1977), flooding and implosive therapies (Dowley, 1973; Graff, MacLean & Loving, 1971; Prochaska, 1971), and modeling (Warner & Hansen, 1970) have been demonstrated by investigators as being effective for the treatment of test anxiety.

Cognitive Therapy. The incorporation of cognitive variables within behavior therapy represents a relatively clear trend. Much of the current work in this area has been based on the clinical observation of Ellis (1962), who has argued that modification of inappropriate expectations and beliefs could lead to behavior change. Steps have been taken to incorporate many of Ellis' concepts and procedures into the field of cognitive behavior therapy (Beck, 1976; Goldfried & Davison, 1976; Goldfried, Deconteco, & Weinberg, 1974; Meichenbaum, 1977).

The relevance of a more cognitively oriented approach in the treatment of test anxiety is noted by Wine (1971), whose review suggests that anxious individuals not only experience emotional arousal but also

engage in excessive worry about the adequacy of their performance. Based on the assumption that test anxiety may be comprised of both "emotionality" and "worry" components (Liebert & Morris, 1967; Morris & Liebert, 1969), Meichenbaum (1972) developed a treatment package involving cognitive restructuring and modified desensitization. This procedure contains two components: a semantic portion that teaches clients to substitute task-oriented instructions for negative self-statements, and a modified form of systematic desensitization that decreases inappropriate autonomic responses. Compared with traditional systematic desensitization, this cognitive package produced greater reductions in test anxiety (Goldfried, Linehan, & Smith, 1978).

Study Skills Training. Rather than being viewed as an anxiety-related disorder, ineffective test performance can also be conceptualized as a skills deficit (Kirkland & Hollandsworth, 1979). It may be that the use of anxiety reduction techniques alone without providing training for the acquisition of appropriate test-taking skills is insufficient in the treatment of test anxiety (Mitchell & Ng, 1972). According to Culler and Holahan (1980), test anxious students have poor study habits, resulting in failure to learn the required material.

Study skills training procedures developed by Talley and Henning (1981) and Langan (1978) include: goal setting, time management, note taking, and test taking strategies. According to Osterhouse (1972),

emphasis is on the fact that more efficient preparation could result in lower levels of tension or apprehension prior to and during examinations.

If lack of study skills was the major problem of test anxious students, re-educative skills training might be beneficial in relieving anxiety and improving academic performance. However, research indicates that study skills training alone is usually not effective in either reducing anxiety or improving academic performance (e.g., Altmaier & Woodward, 1981; Dendato & Diener, 1986; Osterhouse, 1972).

Multimodal Treatment. The relatively poor record of behavioral and cognitive therapies in improving academic performance and the failure of study skills training alone in reducing test anxiety appears to add to a growing body of evidence favoring a combined or multimodal approach to therapeutic intervention (Allen, 1971; Dendato & Diener, 1986; Lent & Russell, 1978; Osterhouse, 1972).

In a recent study by Dendato and Diener (1986), a combination of relaxation-cognitive therapy, designed to treat both the worry and emotionality components of test anxiety, and study skills training, designed to teach efficient study habits and test taking strategies was effective both in reducing anxiety, improving performance, and was more effective on both measures than was either treatment component alone. Assessment of this multimodal technique merits further investigation.

Conclusions and Predictions

The nature of test anxiety and its effects on test-taking behavior is still not completely understood. Many different types of therapeutic interventions have been employed. Behavioral approaches have been successful in reducing anxiety but successful reduction of anxiety is not sufficient to bring about improvement in academic performance. In a review of the literature Wine (1971) concluded that studies of test-anxiety "...have evolved from interest in specific treatment techniques rather than from an analysis of the nature and effects of test anxiety" (p. 101). As Finger and Galassi (1977), and Sarason (1980), have suggested, it may be more fruitful for research efforts to concentrate on defining the test anxiety variables more clearly.

Despite an impressive amount of research there is a great deal of inconsistency in the analysis of the role of test anxiety on academic performance (Spielberger, 1966). The inconsistent results using various treatment interventions for test anxious subjects raises several questions: (1) can changes in test anxiety occur for nontreated samples?; (2) how much change can be attributed to the psychometric properties of the scales themselves?; and (3) how much change can be attributed to acclimation, regression toward the mean, retest etc.?

Changes have been reported in anxiety levels and academic performance between groups employing different modes of treatment and between treatment groups and no-treatment control groups.

However, only one study Suinn (1969), investigated changes in scores occurring over time in a non-treated sample. The results demonstrated that small decreases in test anxiety will occur without treatment.

Gilbreath (1971) found that academic gains made by untreated control-group subjects who had volunteered for a study-counseling program were significantly greater than improvement shown by a group of nonparticipants who had been matched on initial grades and academic aptitude. Spielberger and Weitz (1964) presented data that showed that highly anxious untreated control subjects obtained a slightly greater increase in academic performance than did subjects receiving group counseling. In a review of 49 studies, Allen and Desaulniers (1974) found that in 58% of the investigations of test anxiety, the treated groups showed greater improvement than untreated groups on self-report measures of anxiety. Not one study reported greater improvement of the untreated subjects over the treated subjects. However, most studies have reported increases or no change in anxiety level and decreases in academic performance for non-treated control subjects when compared to treatment groups.

Table 1 surveys the no-treatment control (NTC) groups that were used as control subjects for a variety of therapeutic strategies. The review encompasses eight investigations providing descriptive information about the studies. The "Study" column lists the authors of the research. The "Interval" column describes the estimated interval of time

between the Pretreatment (Pre) and Posttreatment (Post) measures. "Measure" indicates the test anxiety measure used. Z indicates the z score for the change score between Pre and Post. Z scores were computed (for all tests except the 37 item Test Anxiety Scale, (TAS, Sarason & Stoops, 1978) from means and standard deviations provided by Allen (1970). The mean and standard deviation of the 37 item TAS was obtained from Sarason (1980).

The table provides considerable information about the status of NTC groups. All subjects were high anxious. A high degree of self-reported test anxiety was used as the screening criterion. More than one anxiety measure was used in a number of studies.

Although many of the interventions were reported to produce effects greater than the NTC group, the summary indicates that NTC groups also improved with time. There was, on average, a small decrease in test anxiety over the course of approximately one semester for approximately 100 subjects. This decrease could be the result of regression toward the mean. Allen and Desaulniers (1974) completed a two year follow up study on nine out of the original ten subjects that were reported by Allen 1971. At follow up two years later, both treated and non-treated control subjects reported less anxiety, but the difference between the two groups was not statistically significant ($t(44) = .78$). Grade point average changes indicated that subjects in all conditions achieved increasingly higher grades throughout their academic career.

Table 1

Summary of studies comparing changes in normalized anxiety scores for no-treatment control groups

Study	Estimated Interval (in weeks)	Measure	Z-pre	Z-post	Change Z-post - Z-pre	Mean Change	N
Allen, 1971	13	AD TAS	1.57 .59	1.58 .46	.01 -.13	-.06	10
Allen, 1973	10	AD AAT- STAI (T) STAI(S) TAS	.48 -.79 -.24 .05 -.36	1.09 -.40 -.05 .57 -.12	.62 .40 .20 .52 .24	.39	9
Dendato & Diener, 1986	9	STAI(S)	1.63	1.13	-.50	-.50	11
Holroyd, 1976	9 +4	AAT-	1.06 1.06	.94 .68	-.12 -.38	-.25	12
Horne & Matson, 1977	6	TAS*	.28	.45	.17	.17	20
Meichenbaum, 1972	6 +4	AD AAT-	1.78 -.24 -.24	1.35 -.53 -.82	-.44 -.29 -.59	-.44	5
Lent & Russell, 1977	6	TAS* AAT- STAI(T) AD	1.46 .50 .44 1.01	1.17 .43 .32 .25	-.29 -.07 -.12 -.76	-.31	26
Russell & Lent, 1982	8	TAS	.43	.24	-.19	-.19	10
Weighted Total Mean						-.14	103

TAS - Test Anxiety Scale

AD - Anxiety Differential

AAT- - debilitating effects scale, Achievement Anxiety Test

STAI(T) - State-Trait Anxiety Inventory, Trait scale

STAI(S) - State-Trait Anxiety Inventory, State scale

The present study was designed to investigate and provide information on the variables that determine whether relative academic performance of untreated test anxious college students is likely to improve or deteriorate if left untreated and if test anxiety scores will automatically decline over the course of the semester. The following hypotheses were formulated: (a) as test anxiety increases, examination scores will decrease; and (b) untreated test anxiety will not automatically decline due to factors of repeated testing, maturity or acclimation except for normal regression toward the mean over a single semester.

Method

Subjects

During the first week of the semester, 103 undergraduates enrolled in an evening introductory psychology class at the University of Nevada, Las Vegas (UNLV) were invited to participate in the study. Ninety three subjects initially agreed to participate in exchange for extra credit. These 93 subjects completed a Test Anxiety Inventory (TAI, Spielberger, 1972; Spielberger et. al., 1976), a personal data sheet, and a consent form. Only 53 subjects were present and agreed to participate in the second session of the experiment. Of the remaining 40 subjects, 13 had dropped the class and the other 27 either were absent from class or chose not to participate in the second session.

Of the participating 53 subjects, there were 22 men and 31 women with a mean age of 23.55 years ($SD = 6.44$). Only 47 subjects reported their class standing. Of those reporting, 31 were freshmen, 13 sophomores, 2 juniors and 1 senior.

Materials

The TAI was used as a measure of anxiety. The TAI is a self-report psychometric scale, measuring individual differences in test anxiety as a situation-specific personality trait. The TAI Test Form is one page and includes directions, space for recording responses and uses a Likert scale response format. The 20-item paper-pencil test measures the two components of test anxiety: "Worry" and "Emotionality". Respondents

report how frequently they experience specific anxiety symptoms in examination situations. Based on published norms for College Undergraduates (Spielberger et. al., 1976), a raw score of 50 marks the 84th percentile ($T = 60$) for men and the 70th percentile ($T = 56$) for women. Scores could range from a minimum of 20 to a maximum of 80, with a high score indicating high anxiety. The worry and emotionality subscales consist of eight items each and therefore weighted scores range from 8 to 32.

Procedure

During the first week of the fall 1989 semester during a regular class period, students were given an explanation of the procedures and asked to complete the TAI (see Appendix A for sample questions), a consent form, and a personal data sheet (included as Appendices B, and C respectively). The exam format for the class consisted of two 45 point multiple choice exams and one 60 point final. Exam 1 was administered the 6th week of the semester, Exam 2 the 11th week and the Final was administered during finals week, the 16th week of the semester. The subjects' test grades throughout the semester were recorded. During the last class of instruction prior to the final exam, subjects were again given the Test Anxiety Inventory. All students present at the last session were debriefed, offered a copy of the results of the study when completed and were informed of the counseling services (for test anxiety) that are available free of charge to students at the UNLV Counseling Center.

Overall grade point averages (TGPA) were obtained from the University registrar at the end of the spring 1990 semester and included as an additional criterion of academic performance.

Results and Discussion

Anxiety Measure

The means and standard deviations of the TAI scores at both preterm (PRE) and postterm (POST) administrations for all subjects are presented in Table 2. The difference between the means was not significant $t(52) = 1.08, p > .05$. Anxiety scores did not change over the course of the four month semester.

Table 2
Means and Standard Deviations of all Subjects Preterm and Postterm

	N	Mean	SD
PRE	53	41.40	13.15
POST	53	39.89	13.34

The slight decrease in TAI scores could be attributed to psychometric measurement error (i.e., regression toward the mean, test/retest), a conclusion consistent with that of Suinn (1969).

Correlational Analysis of All Continuous Variables

A correlation matrix including all of the continuous variables is presented as Table 3.

Table 3

Correlation Matrix of all Subjects on all Variables

	PRE	POST	EXAM1	EXAM2	FINAL	TOTAL
PRE						
POST	.704**					
EXAM1	-.459**	-.492**				
EXAM2	-.359**	-.362**	.559**			
FINAL	-.302*	-.293*	.548**	.777**		
TOTAL	-.420**	-.423**	.786**	.897**	.915**	
TA	.700**	.687**	-.464**	-.291*	-.273*	-.384**
GPA	-.215	-.141	.289	.062	.532**	.392*
TGPA	-.371**	-.386**	.566**	.639**	.743**	.757**
AGE	-.185	-.012	.420**	.198	.390**	.389**
PRWO	.936**	.668**	-.431**	-.360**	-.298*	-.409**
PREM	.949**	.643**	-.495**	-.357**	.301*	-.431**
POWO	.681**	.939**	-.494**	-.361**	-.307*	-.435**
POEM	.660**	.962**	-.423**	-.295*	-.219	-.347**

* $p < .05$; ** = $p < .01$

Table 3 (continued)

	TA	GPA	TGPA	AGE	PRWO	PREM	POWO	POEM
TA								
GPA	-.358*							
TGPA	-.149	.680**						
AGE	-.118	.374*	.347**					
PRWO	.613**	-.400*	-.397**	-.111				
PREM	.635**	-.119	-.380**	-.238*	.623**			
POWO	.636**	-.213	-.451**	-.078	.677**	.840**		
POEM	.624**	-.036	-.302*	.027	.606**	.623**	.836**	

* $p < .05$; ** = $p < .01$

CODES:

PRE	= Score on TAI (Test Anxiety Inventory) at beginning of semester
POST	= Score on TAI (Test Anxiety Inventory) at end of semester
EXAM 1	= Number of points on first test (out of possible 45 points)
EXAM 2	= Number of points on second test (out of possible 45 points)
FINAL	= Number of points on final exam (out of possible 60 points)
TOTAL	= Total number of points received (out of possible 150 points)
TA	= Self-reported test anxiety (Low = 1, High = 2)
GPA	= Self-reported grade point average
TGPA	= True grade point average
AGE	= Subject's age in years
PRWO	= Score on the TAI's worry subscale at beginning of semester
PREM	= Score on the TAI's emotionality subscale at beginning of semester
POWO	= Score on the TAI's worry subscale at end of semester
POEM	= Score on the TAI's emotionality subscale at end of semester

Scores on the PRE were highly correlated with the POST scores ($r = .70, p < .01$). EXAM1, EXAM2, and FINAL were also all highly correlated. Significant negative correlations were obtained with PRE and EXAM1 ($r = -.46, p < .01$); EXAM2 ($r = -.36, p < .01$); and FINAL ($r = -.30,$

$p < .05$). These results indicate that the higher the PRE score the lower the EXAM score. This negative correlation declines somewhat over the course of the three exams.

PRE and POST both correlated significantly with self reported TA PRE ($r = .70, p < .01$) and POST ($r = -.69, p < .01$). These findings suggest that the higher the TA score the more likely the subjects were to report they were test anxious. The correlation of TA with EXAM scores was similar to the correlation of TAI scores with the EXAM scores. TGPA correlated positively and significantly with 5 of the variables (EXAM1, EXAM2, FINAL, TOTAL, GPA) and negatively and significantly with PRE ($r = -.37, p < .01$) and POST ($r = -.39, p < .01$).

A quite unexpected finding concerned the pattern of correlations between POST and EXAM1, EXAM2, and FINAL. If there is an effect of anxiety on performance it would be expected that the correlation between FINAL and POST would be the strongest since the POST was administered closest in time to the FINAL. However, the opposite of this was true and POST had the strongest relationship with EXAM1. This pattern of correlations suggests a possible test/retest contamination, subjects remembering what was on the PRE measure and duplicating it on the POST.

The subscales of worry and emotionality were compared and since the TAI, PRE and POST are composed of these subscales they naturally correlate very highly. The relationship between PRWO and PREM,

POWO and POEM and EXAM1, EXAM2, and FINAL all correlate negatively at a significant level ranging in correlation from an $r = -.22$ to $r = -.49$. The correlations among EXAMS (EXAM1, EXAM2, and FINAL) and the worry and emotionality subscale scores are similar to the correlations of EXAMS and the full-scale scores. This finding is inconsistent with previous findings that indicate emotionality is not significantly correlated with academic performance (Morris & Liebert, 1970; Wine, 1971).

Multiple Regressions

A multiple regression was performed using POST as the dependent variable. PRE scores alone accounted for 49.5% of the variance ($r = .704$). The sum of EXAM1 and EXAM2 added slightly to the amount of explainable variance (52.7%). With these two variables in the equation, $r = .72$, $F(2,50) = 27.82$, $p < .001$.

A second multiple regression was performed using FINAL as the dependent variable. With EXAM 1 ($\beta = .69$) and EXAM 2 ($\beta = .19$) entered in the regression equation POST ($\beta = .05$) does not add to predicting FINAL. With these three variables $r = .79$, $F(3,49) = 27.10$, $p < .001$.

Differences Between High and Low Anxious Subjects

Fifteen subjects were classified as high-anxious (HA) determined by a raw score of 50 or above on the TAI. This represents the top 26% of the group. Those subjects scoring 30 and below and representing the bottom 30% were designated as low anxious (LA). The means and

standard deviations of the HA and LA groups on the PRE and POST are shown in Table 4.

There were significant differences between HA and LA on EXAM1 ($t(17) = 3.07, p < .01$), and on EXAM2, ($t(28) = 2.13, p < .05$). The differences between the groups on the FINAL were not significant ($t(28) = 1.69, p > .01$).

Table 4
Means and Standard Deviations of HA and LA Groups PRE, POST,
PRWO, PREM, POWO, POEM, EXAM1, EXAM2, and FINAL

	N	MEAN	STANDARD DEVIATION
PRE			
LA	16	26.44	2.10
HA	14	58.64	5.44
POST			
LA	16	30.06	10.26
HA	14	52.64	12.79
PRWO			
LA	16	9.81	1.38
HA	14	22.21	2.97
PREM			
LA	16	11.00	2.03
HA	14	25.50	3.88
POWO			
LA	16	11.31	4.19
HA	14	20.71	4.75
POEM			
LA	16	12.56	4.66
HA	14	21.64	6.25
EXAM1			
LA	16	32.63	3.50
HA	14	25.64	7.85
EXAM2			
LA	16	31.38	5.46
HA	14	26.50	7.05
FINAL			
LA	16	41.13	6.67
HA	14	36.07	9.62

The preceding results add to an ever growing body of research documenting the relationship between test anxiety and academic achievement. High anxious subjects scored lower across all three exams over the course of the semester than did low anxious subjects.

The negative correlation between test anxiety and academic performance is consistent with the majority of previous research findings.

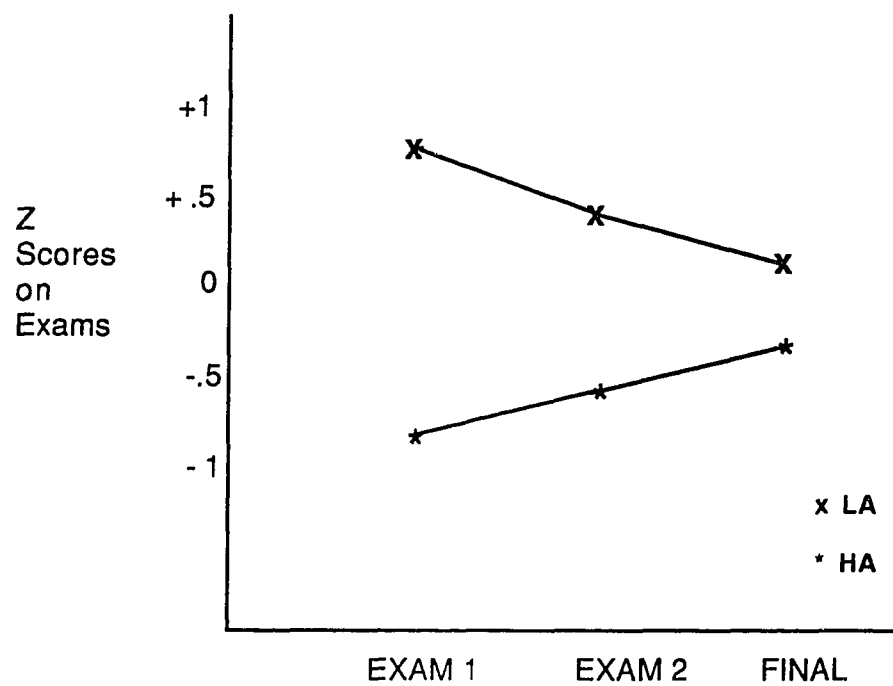
Men and women were evenly distributed between HA and LA groups. There were no significant differences in the class makeup (i.e., Freshmen, Sophomore, Junior, Senior) of the two groups ($\chi^2(3, N = 26) = 3.76$ $p > .05$). Although there were more full-time students in the HA group this difference was not statistically significant ($\chi^2(1, N = 28) = 2.16$, $p > .05$).

Only one subject in the HA group reported not being test anxious and only one subject in the LA group reported having test anxiety. Results indicate that subjects know if they are anxious or not and are willing to acknowledge it.

The HA and LA groups differed significantly in TGPA ($F(1,24) = 6.51$, $p < .05$). The mean GPA for the HA group was 2.2 compared to 3.1 for the LA group. When TGPA is used as a measure of academic performance it again provides additional support for the hypothesis that HA provides a negative correlation with academic performance. Z scores for both HA and LA groups on EXAM1, EXAM2 and FINAL are shown in figure 1.

Figure 1.

Academic Performance as a Function of Time and Anxiety Grouping.



EXAM scores increased slightly for the HA group and decreased slightly for the LA group. The two groups tended to converge over the course of the semester.

Sex Differences

Sex differences in responding to self report anxiety measures have been the source of some discussion in past research. The norms published for the TAI (Spielberger, et.al., 1976) and Lusk (1981) indicate that women typically have a higher self-reported anxiety score. Women in the present study scored slightly lower than males on both PRE and POST measures of TA. However, there was no significant difference between men and women PRE ($t(51) = .32, p < .05$) and POST ($t(51) = .51, p < .05$). The TGPA for women was slightly but not significantly higher than men ($F(1,46) = 1.87, p > .05$.) with women earning a 2.96 TGPA and men a 2.63 TGPA. The women were also older ($M = 25.26, SD = 7.30$) than the men ($M = 21.14, SD = 4.02$) and age was positively correlated with TGPA ($r(48) = .35, p < .01$) and negatively correlated with PRE ($r(53) = -.18, p > .05$).

Subjects Not Completing Study

Students who did not complete the experiment were compared to students who did on SEX, CLASS, PT/FT, TA, HA/LA, PRE, and GPA. No significant differences were found between the two groups.

Of the 40 subjects that did not complete the study, 9 were classified as HA (on the basis of their score on the PRE measure). Of the 53 subjects completing the study, 14 were classified as HA. Of the total 23 HA subjects, 2 subjects dropped the course and 21 subjects (91%) received a final grade. Of the 27 subjects in the LA group 3 subjects

dropped the class and 24 (89%) received a final grade. This is not consistent with Spielberger (1962) who found that more than 20% of the HA students were classified as academic failures (drop outs) as compared to fewer than 6% of the LA students.

General Discussion

It has been repeatedly demonstrated that persons who are high in test anxiety experience performance decrements during evaluative situations. The basic predictions that there is a relationship between test anxiety and academic performance and that test anxiety has a debilitating effect on academic performance were supported by the results.

The observed negative relationship between test anxiety and exam scores could result from either of two sources. Test anxiety might cause poor examination performance or knowledge that one is likely to do poorly on the examination might cause test anxiety. If high anxiety caused poor performance for the subjects in the present study the correlation between POST and FINAL would be expected to be much higher than the correlation between POST and the previous tests.

The multiple regression of PRE and EXAM scores on POST anxiety does, however, suggest a slight relationship between examination performance and POST even with PRE anxiety scores entered in the equation. This indicates a causal relationship between performance and anxiety (i.e., past performance scores cause anxiety in the next evaluative setting). The result implies that test anxiety may be a symptom rather than, or as well as, a cause of poor academic performance.

Although the present study showed no evidence that test anxiety causes poor performance, other evidence indicates that this is the case.

Most recently Hembree (1988), in an exhaustive review of the literature, determined relationships and effects for test anxiety through the synthesis of 562 studies. His findings state that improved test performance and GPA tend to accompany test anxiety reduction and that significant performance differences were shown between treated and untreated subjects.

Most research in the past has concentrated on treatment techniques and comparisons between these techniques and no-treatment control samples or between the results of different treatment techniques themselves. Several reviews of the literature suggest general evidence of a reduction in anxiety when certain therapeutic interventions are employed. The present study investigated the untreated sample over the course of a semester.

Regarding untreated high anxious subjects' academic performance, the results show a slight but not statistically significant increase in exam scores over the course of the semester. In comparison, the exam scores for the untreated LA groups declined. One possible explanation for this convergence is the motivating, or facilitating, effect of anxiety.

Overall, the results (no difference in PRE and POST anxiety scores) demonstrated that test anxiety will not automatically decrease or "spontaneously improve" over the course of a semester for a non-treatment group.

Test anxiety is a "near-universal" experience as Sarason, Davidson, Lighthall, Waite, and Ruebush (1960) point out especially in this country, which is a "test giving and test-conscious culture." Test performance has great significance for the individual; not infrequently, it may seriously affect the course of one's life.

Further research using a longitudinal design needs to investigate the cumulative detrimental influence of test anxiety on college students. It would appear that the loss to society of the full contributions of potentially able students through underachievement or failure due to test anxiety constitutes a problem in education and society. It is possible and necessary to identify test anxious students and the variables that influence test anxiety so that appropriate therapeutic opportunities can be designed.

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Appendix A

Sample Items from the Test Anxiety Inventory

1. Almost Never
2. Sometimes
3. Often
4. Almost Always

I feel confident and relaxed while taking tests.

Thinking about my grade in a course interferes with my work on tests.

I freeze up on important exams.

Even when I'm well prepared for a test, I feel very nervous about it.

Appendix B

CONSENT FOR RESEARCH PARTICIPATION
UNIVERSITY OF NEVADA, LAS VEGAS

Title of study: Relationship Between Test Anxiety and
Academic Performance of Untreated Test
Anxious College Students

You are being asked to participate in a study of test anxiety. We hope to learn more about the academic performance of untreated test-anxious students. If you agree to participate, you will be asked to complete a Test Attitude Inventory at the beginning and end of the Fall '89 semester; supply the investigators with written permission to obtain and analyze your three (3) test grades in Psy. 101; and if necessary obtain your G.P.A. and/or College Entrance Test Scores.

The data you generate in this study will not be associated with your identity in any way. The purpose of this project is to evaluate the performance of entire groups of people, not specific individuals.

Your participation in the study is voluntary and you are free to withdraw your consent and discontinue participation at any time. If at any time during the project (or after it is completed) you have questions about the procedures, feel free to ask the investigator to clarify these points. If you have any questions about the experiment, you can contact Joanmarie C. Kolesar (principal investigator) at 739-3781 or Dr. Don Diener (faculty advisor) at the Psychology Dept. (739-3127).

YOUR SIGNATURE BELOW INDICATES THAT YOU HAVE DECIDED
TO VOLUNTEER AS A RESEARCH SUBJECT, THAT YOU HAVE
GIVEN WRITTEN PERMISSION TO THE INVESTIGATORS TO OBTAIN
NECESSARY GRADES/SCORES AND THAT YOU HAVE READ THE
INFORMATION PROVIDED ABOVE.

Date

Signature of participant

Date

Signature of investigator

Appendix C

PERSONAL DATA SHEET
(This information will remain confidential)

Age_____ Sex M F Social Security #_____

Year in college: Fresh._____ Soph._____ Junior _____
Senior_____ Other_____ No. of credits completed_____

Are you a full-time student? Yes_____ No_____

Current GPA_____ Major_____

If you suffer from test anxiety OR think you suffer from test anxiety
please answer the following questions:

How long have you thought you may suffer from test anxiety?
Years_____ Months_____

Have you sought help to reduce this test anxiety? Yes___ No___

If yes - what kind of treatment?_____

What were the results?_____

If no - would you consider treatment?_____

Do you do anything to try to reduce the anxiety before or during a
testing situation (e.g. relaxation techniques etc.). Yes_____ No_____

If yes - what do you do?_____

I dedicate this thesis
to myself.