Pakistan Journal of Psychological Research, 2009, Vol. 24, Nos. 3-4, 97-114

Test Anxiety in High and Low Achievers

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The study examined the level of test anxiety in high and low achievers and its relationship with academic achievement. Gender differences in test anxiety for high and low achievers and interactive effect of gender and academic achievement on test anxiety were also looked into. A purposive sample of 187 undergraduate students (126 high and 61 low achievers) was obtained. Test anxiety was measured through Spielberger's Test Anxiety Inventory (Spielberger, 1980b). Results showed high achievers experience less test anxiety as compared to low achievers. Female high achievers experienced more test anxiety as compared to male high achievers whereas male low achievers experienced more test anxiety than female low achievers. A significant interactive effect of gender and academic achievement on test anxiety was also found.

Keywords: Test anxiety, academic achievement, high achievers, low achievers

Test anxiety has been identified as an important variable influencing academic achievement adversely. Test anxiety has often been associated with low academic achievement as it inhibits the students' performance in achievement situations. Sarason (1984) reported that empirical studies have indicated test anxiety as a major debilitating factor affecting the students' performance at all academic

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levels. Tobias (1985) reported that test anxiety is one of the disruptive factors associated with underachievement. It interferes with the retrieval of prior learning and reduces the cognitive capacity which could otherwise have been utilized for solving task in testing situations. King and Ollendick (1989) reported that every student experiences anxiety at some time but for some students' anxiety seriously inhibits learning and performance particularly on tests. Similarly, Gonzalez (1995) reported that most of the anxious students experience emotional reactions which not only lowers their academic performance but also contrasts with their expected performance determined on the basis of their intellectual aptitude.

Test anxiety refers to "psychological, physiological, and behavioral responses to stimuli that an individual associates with the experience of testing or evaluation" (Corsini, 1984, p. 1113). Emotionality and worry are the two components of test anxiety. Emotionality consists of autonomic reactions evoked by evaluative stress such as panic, nervousness, excessive heart beat, and perspiration whereas worry is "primarily a cognitive concern about the consequences of failure" (Libert & Morris, 1967, p. 975). Emotionality produces task-irrelevant thoughts which interfere with student's attention and concentration whereas worry cognitions adversely affects his retrieval of information in testing situations (Vagg & Spielberger, 1995).

Concerns about evaluation and performance in different formal subjects produce anxiety among students. The question that has been a matter of concern for the educationists is "Can evaluation system be the cause of test anxiety". Recent study by Rafique, Ghazal, and Farooqi (2007) reported nonsignificant differences in the state-trait anxiety level of students studying under annual and semester system. According to MeichenBaum and Butler (1980) there are several factors which are associated with test anxiety such as cognitions of student in testing situations, the importance of academic evaluations for a student, his study skills, and his previous course grades.

It has been observed that both high and low achievers experience test anxiety. High achievers experience test anxiety because they usually want to be the best and strive to maintain their image as good students. On the other hand, inadequate preparation of exams, poor study skills of the low achievers makes them anxious to the extent that they are unable to concentrate in testing situations (Crowl, Kaminsky, & Podell, 1997).

A series of early studies showed that college students with high test anxiety performed poorly in evaluative situations than low

anxious students. Morris and Libert (1969) found that it was the worry component of test anxiety that reduced performance on cognitive and intellectual tasks whereas emotionality was unrelated with task performance. This was supported by Wine's (1971) attention interpretation model of test anxiety. According to Wine high test-anxious individuals divide their attention between the task demands and task irrelevant cognitions such as worry and self-criticism. The worry cognitions during examination distract the attention of the student from the task and result in performance decrement. Spielberger (1972) explained test anxiety as a situation specific trait anxiety with worry and emotionality as its major components. Spielberger's Trait-State anxiety theory emphasizes on the significance of the affective and cognitive processes in eliciting test anxiety. Spielberger, Ritterband, Sydeman, Reheiser, and Unger (1995) described the state anxiety as "consciously perceived feelings of tension, apprehension, nervousness, worry, and associated with the activation or arousal of the autonomic nervous system which vary in intensity and fluctuate over time as a function of perceived physical or psychological danger". In contrast trait anxiety is conceptualized in terms of "relatively stable individual differences in anxiety proneness" (p. 44).

Sarason (1972) stated that less test-anxious individuals are fully absorbed in the task when evaluated whereas high test-anxious individuals retreat inwardly. Spielberger (1972) reported that during examinations high test-anxious students respond to evaluative threat present in test situations with the greater elevations in state anxiety, which in turn stimulate worry cognitions adversely affecting the task performance. Zeidner (1998) is also of the same view that high levels of state anxiety experienced by the test anxious individuals in testing situations activate the worry cognitions already stored in their memory which in turn interfere with their performance.

Speilberger (1980a) reported that test-anxious students are generally high in trait anxiety, tend to perceive examinations as more threatening and experience more intense levels of state anxiety while taking tests than students low in trait anxiety. Wine (1971) and Speilberger et al., (1995) described emotionality as a transitory and fleeting state. Heckhausen (1982) also believes that it is self-concern and not emotionality that negatively correlates with performance. He concluded that emotionality is only high during examinations whereas self-concern exists before and after the examination. Similarly, Covington (1984) attributed the poor performance of test-anxious students to their worry cognitions in testing situations. His point of view was that in testing situations test-anxious students worry about

lagging behind, scold them for forgetting answers and they recall previous disastrous test situations. The pioneering theory of test anxiety by Sarason and Mandler (1952) also indicate that it is the worry component which is negatively related to test performance. Similarly Koegh, Frank, French, Richards, and Davis (2004) found that worry and proneness to be distracted negatively affects the academic performance. Previous review regarding the relationship of emotionality and worry components of test anxiety with academic achievement indicate negative relationship between worry and academic achievement, whereas emotionality has been found to be unrelated with academic achievement.

Studies have consistently shown that high test-anxious students experience decrements in performance. Many studies have shown inverse relationship between test anxiety and academic performance. Test anxiety literature review by Hill and Wigfield (1984) indicated that about 25% of American primary and secondary students' academic performance is adversely affected by test anxiety. They reported studies which indicated a correlation of -.60 between test anxiety and academic achievement. Hembree (1988) conducted a meta-analysis based on 562 studies of American elementary school, and college students. He found that test anxiety reduced academic performance at every educational level. Another meta-analysis based on 126 American and European studies indicated a negative correlation of between test anxiety and academic performance (Seipp, 1991).

Recent studies have also shown an inverse relationship between test anxiety and academic achievement. Smith and Smith (2002) reported a negative relationship between examination anxiety and examination performance. Findings also indicated significant main effects of test anxiety, test performance, and test motivation on the consequent test scores. The significant interactive effect between test anxiety and the test performance were also found. Chapell et al., (2005) found a significant inverse relationship between test anxiety and GPA for undergraduate students. The sample consisted of 4000 undergraduates and 1,414 graduate students. Results showed that low test-anxious male and female undergraduates had cumulative GPA averaging 3.55 and 3.22, respectively, whereas high test-anxious male and female undergraduate student had a GPA of 3.12 and 2.97 respectively. The study also reported a weak negative relationship between test anxiety and GPA for graduate students.

Inconsistent findings have been reported regarding the differences in test anxiety level of high and low achievers. Some

studies showed that high and low achievers differ significantly in anxiety, while some studies reported nonsignificant differences. Sinha (1966) found that high achievers had higher intelligence, overall better adjustment and moderate level of anxiety as compared to low achievers. Van-Boxtel and Monks (1992) reported that gifted underachievers have a very low self-concept, high test anxiety and an external locus of control than the gifted achievers. Batumulu and Erden (2007) reported that unsuccessful students experience more anxiety than successful students. Conversely, the Tewari and Rai (1976), and Molly and Lakshminaryanan (1988) studies reported nonsignificant difference in the anxiety level of high and low achievers.

Controversial findings have also been reported for gender differences in test anxiety. Most of the studies report that females consistently score high on test anxiety than males. Hembree (1988) conducted meta-analysis based on 154 studies of test anxiety and gender found that females experienced high levels of test anxiety than males. These findings are consistent with the recent studies which report that females experience significantly higher level of anxiety sensitivity and are fearful of anxiety symptoms. Women score high on implicit and explicit measures of anxiety than males (Egloff & Schmukle, 2004; Khawaja & Armstrong, 2002; Stewart, Taylor, & Baker, 1997). Chapell et al., (2005) found that female undergraduate high achievers experience significantly higher test anxiety than males. Females score high on emotionality component of test anxiety than worry (Speilberger, 1980b). The higher level of test anxiety may be attributed to their traditional feminine traits that females are gentle, sensitive, sympathetic, affectionate, and compassionate whereas males are forceful, ambitious, assertive, dominant, and aggressive and defend their beliefs (Martin, 1987). On the other hand Sipos, Sipos, and Speilberger (1987) reported stronger negative correlation between test anxiety and test performance for males than for females.

Research in this area has been conducted mostly on students in the west. The socio-cultural/academic atmosphere of western educational institutions is different than our educational system. Little research has been conducted on the occurrence of test anxiety and its impact on Pakistani students' performance. The present study examines whether the high and low academic achievers differ significantly in emotionality and worry components of test anxiety. It attempts to identify the relationship of test anxiety with academic achievement for Pakistani students. It also explores the gender differences in test anxiety for high and low academic achievers and

the interactive effect of gender and academic achievement on test anxiety. In the light of the literature review it was hypothesized that:

1. High academic achievers would experience lesser test anxiety as compared to low achievers.
2. There would be a negative relationship between test anxiety and academic achievement.
3. There would be significant gender differences in test anxiety for high and low academic achievers.

Method

Sample

The sample was drawn from the three successive academic sessions i.e., 2002-2003, 2003-2004, and 2004-2005 of B.Sc IV year. The total population consisted of 560 students enrolled in 2002-2005 sessions. Out of 560 students, 159 students were identified as high and 75 as low academic achievers. Finally, a sample of 187 undergraduate B.Sc IV year students with a distribution of 126 high achievers (45 males and 81 females) and 61 low achievers (44 males and 17 females) participated in the study. The total population consisted of 28% high and 14% low academic achievers. The age of high and low academic achievers ranged from 18-21 years with a mean age of 20 years. The GPA of high achievers ranged from 3.2 to 3.7 with a mean GPA of 3.4. The GPA of low achievers ranged from 1.40 - 2.18 with a mean GPA of 1.79. Following is the sample distribution for present study:

Table 1

Sample Distribution of High and Low Academic Achiever (N = 187)

Session	High achievers	Low achievers	Total
2002-2003	36	26	62
2003-2004	47	13	60
2004-2005	43	22	65
Total	126	61	187

Instruments

Test Anxiety Inventory (TAI). The inventory was developed by Spielberger (1980b) used to measure test anxiety. The inventory consists of 20 statements. These statements were about how often an individual experiences anxiety symptoms before, during, and, after the test. Responses were elicited on 4-point scale i.e., Almost Never = 1, Sometimes = 2, Often = 3, and, Almost Always = 4. The respondents indicated how often they experience the feelings described in each statement.

The inventory provides a measure of total test anxiety inventory as well as measures of two subscales i.e., worry and emotionality. Scoring of item no. 1 is reversed. Item no. 2, 8, 9, 10, 11, 15, 16, and 18 measure the emotionality component of the test anxiety. A description of the few items is as follows: While taking test I have an uneasy, upset feeling; I feel very jittery when taking an important test; and I feel my heart beating very fast during important tests. Items no. 3, 4, 5, 6, 7, 14, and 20 measure the worry component of test anxiety. The description of the few items is as follows: Thinking about my grade in a course interferes with my work on tests; Thoughts of doing poorly interfere with my concentration on tests; and I seem to defeat myself while working on important tests. To obtain the total score of the test anxiety, scores on all the items are added. The test retest reliability for Test Anxiety Inventory-Total (TAI-T) for two weeks to one-month period is .80 to .81 for male and female college students respectively. The relationship between the TAI and its subscales with Sarason's Test Anxiety Scale (TAS; 1978) and Libert and Morris's Worry and Emotionality Questionnaire (1967) provide the evidence of construct validity. The correlation between Test Anxiety Inventory-Total (TAI-T) score and Test Anxiety Scale (TAS) score was high (.82 to .83), suggesting that the two scales measure essentially the same construct (Speilberger, 1980b).

Procedure

A purposive sample of high and low undergraduate academic achievers was drawn from an educational institution. Undergraduate B.Sc IV year students were classified into high and low achievers on the basis of their GPA obtained in the previous annual examination. All students who had a GPA one standard deviation above the mean of their normative group were categorized as high achievers while all students who had a GPA one standard deviation below the mean of the

normative group were categorized as low achievers. Subject combination of the students helped in their identification and accessibility through the concerned teachers. Test anxiety inventory was administered to the students. All the participants were asked to read the instructions carefully and encircle the options which describe how they generally feel. After the collection of data scores on the subscales measuring worry and emotionality were calculated. The total score indicating the level of test anxiety was also worked out.

Results

Table 2

Means, Standard Deviations and t–value of High and Low Achievers on Test Anxiety Inventory (TAI) and its Subscales of Emotionality and Worry

Scales	High Achievers (n = 126)		Low Achievers (n = 61)		
	M	*SD*	*M*	*SD*	*t*
Emotionality	17.08	5.48	18.00	4.80	1.11
Worry	14.92	4.38	17.11	4.27	3.22**
TAI Total	40.58	10.81	43.88	10.04	2.01*

df = 185. *p < .05, **p < .01.

The Table 2 shows significant differences in test anxiety of high and low achievers. The result shows low achievers experience more test anxiety. It also shows that high and low achievers differ significantly on worry component of test anxiety but high and low achievers do not differ significantly on emotionality component of test anxiety.

Table 3

Relationship of Grade Point Average (GPA) with Test Anxiety Inventory (TAI) and its Subscales

	TAI	Emotionality	Worry
GPA	-.15*	-.08	-.22**

*p < .05. **p < .01.

The Table 3 shows a significant negative correlation between GPA, test anxiety, and worry component of test anxiety. Results also indicate that a non significant inverse relationship exists between GPA and emotionality component of test anxiety.

Table 4

Means, Standard Deviations, and t-value of Male and Female High Achievers on Test Anxiety Inventory (TAI) and Its Subscales

	High Achievers				
Scales	Male high achievers ($n = 45$)		Female high achievers ($n = 81$)		
	M	*SD*	*M*	*SD*	*t*
Emotionality	15.09	5.04	18.19	5.43	3.15**
Worry	14.16	4.01	15.35	4.53	.14
Test anxiety	36.46	9.13	42.86	11.04	3.31**

df = 124. $^{**}p < .01$.

The Table 4 shows significant gender differences in test anxiety for high achievers. Female high achievers experience more test anxiety as compared to male high achievers. This difference in test anxiety is due to significantly high emotional arousal of female high achievers in testing situations than male high achievers. It also shows that high achieving male and female students do not differ significantly with regard to worry component of test anxiety.

Table 5

Means, Standard Deviations, and t-value of Males and Female Low Achievers on Test Anxiety Inventory (TAI) and its Subscales of Emotionality and Worry

	Low Achievers				
Scales	Male Low Achievers ($n = 44$)		Female Low Achievers ($n = 17$)		
	M	*SD*	*M*	*SD*	*t*
Emotionality	18.63	4.83	16.35	4.83	1.69
Worry	17.77	4.38	15.41	3.55	1.98*
Test Anxiety	45.61	10.2	39.41	8.35	2.23*

df = 59. $^{*}p < .05$.

The Table 5 shows significant gender differences in test anxiety for low achievers. Male low achievers experience more test anxiety as compared to female low achievers. This gender difference is because male low achievers experience significantly more worries cognitions in testing situations as compared to female low achievers. Result shows nonsignificant gender differences in terms of emotional arousal in testing situations for low achievers.

Factorial ANOVA indicated that gender and academic achievement level has a significant interactive effect on test anxiety F (3, 184) = 13.53, $p < .01$. The results are presented in following figure.

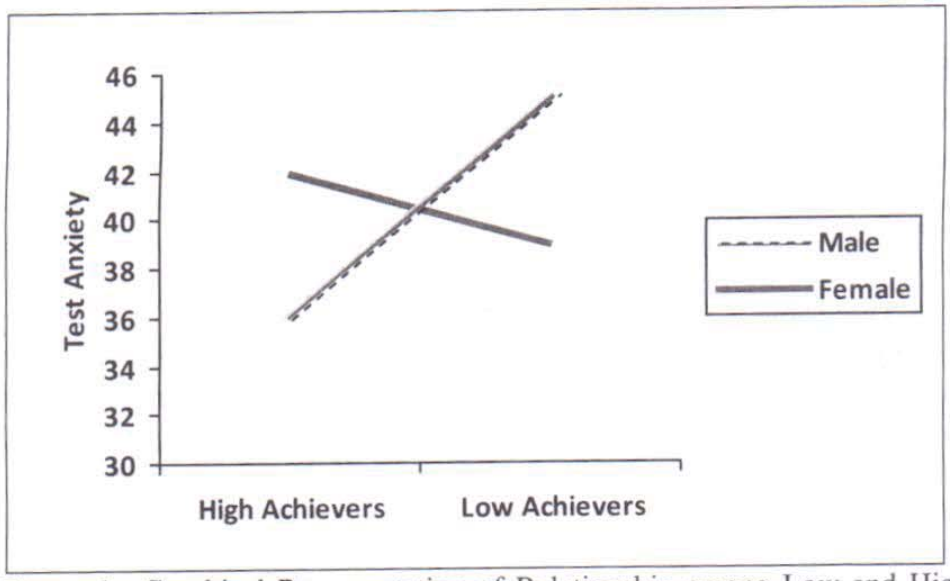

Figure 1. Graphical Representation of Relationship among Low and High Achievers, Gender, and Text Anxiety Scores.

The figure 1 shows that low achieving females experience less test anxiety than high achieving females whereas low achieving males experience more test anxiety than the high achieving males.

Discussion

The results support the hypothesis that high academic achievers experience lesser test anxiety than low academic achievers. The findings are consistent with the Chapell et al., (2005) which showed that low test- anxious male and female undergraduates had high GPA as compared to high test-anxious male and female students. The

findings also strongly support Van-Boxtel and Monks (1992) study that gifted underachievers have a very low self-concept, high test anxiety, and have an external locus of control than gifted achievers. The findings also support the Batumulu and Erden (2007) study that unsuccessful students experience more anxiety than the unsuccessful students. It also partially supports the findings reported by Sinha (1966) that high achievers had higher intelligence, overall better adjustment, and moderate level of anxiety as compared to low achievers. The findings are inconsistent with Tewari and Rai (1976) and Molly and Lakshminaryanan (1988) who reported no significant difference in the anxiety level of high and low achievers.

Comparison of high and low academic achievers on the subscale of emotionality indicated that high and low achievers do not differ significantly on emotionality component of test anxiety. Findings have indicated that both high and low achieving students experience more or less the same intensity of emotional reactions such as feeling upset, uneasy, jittery, nervous, tense, panicky, worrying a lot before exam, and changes in the heart beat during the testing situations. The study strongly supports the view points of the Wine (1971) and Spielberger et al., (1995) about the emotionality component of test anxiety. They described emotionality as a transitory and fleeting state. The findings also strongly support the Heckausen (1982) who believed that it is the self-concern and not the emotionality that correlate negatively with the performance. The findings support the Sarason (1972) point of view in case of low achievers that high levels of emotional arousal makes test-anxious individuals to plunge inwardly, thus activating worry cognitions which distract them from the task and affects their performance adversely.

The high emotionality in high academic achievers may be because they always want to be the best and want to maintain their self image as good students. The findings also indicate that emotional arousal of high academic achievers did not activate worry cognitions in testing situations. The findings support Vagg and Spielberger (1995) assumption that emotionality is a fleeting state and there is a possibility that high achievers may have experienced emotional arousal in the beginning of the test but later became composed on finding that they know the answers. The positive reappraisal of test situation may have reduced their emotional arousal and thus did not evoke the worry cognitions. On the other hand, it can be assumed that the emotional arousal of low academic achievers have resulted in negative re-appraisal on knowing that they did not know the answers, thus evoking worry cognitions in testing situations.

Results have indicated highly significant differences between high and low academic achievers on the worry component. Low academic achievers significantly experience more worry thoughts in testing situations as compared to high academic achievers. The analysis of the worry component strongly supports the extensive findings regarding worry component of test anxiety. This study shows that undergraduate low academic achievers experience more worry cognitions during testing situations which interfere with their performance. We can infer from the results that low academic achievers as compared to high achievers more often think about the grade in a course, they freeze up on important exams, think whether they would be able to get through the exam, feel confused, experience self-defeating thoughts, thoughts of doing poorly interferes with their performance and get so nervous that they forget the facts that they really know. These worry cognitions arouse negative appraisals of themselves and cause performance decrements.

The findings strongly supports the Sarason and Mandlers' (1952) conceptual frame work of test anxiety theory that test anxious subjects experience negative self-centered responses which interfere with good performance. The findings are also consonant with Morris and Libert (1969) who reported that worry was associated with performance decrements on cognitive and intellectual tasks whereas emotionality was unrelated with task performance. It also supports Wine (1971) model of cognitive attentional interpretations of the adverse effects of worry on test performance and worry cognitions cause poor performance.

The analysis of the worry component is consistent with the Covington (1984) view point that the poor performance of test-anxious students can be attributed to the negative effects of worrying in testing situations. Students worry that they are lagging behind, scold themselves for forgetting answers and recall previous disastrous testing experiences during examination.

Analysis has clearly indicated that high and low academic achievers differ significantly on test anxiety mainly due to worry cognitions. Results showed that high and low academic achievers experienced the more or less the same level of emotionality but differed significantly in their worry cognitions. The results showed that high achievers experience less worry cognitions because they are well prepared and there is no question of thinking that they are performing poorly or failing in testing situations. On the other hand, worry cognitions in testing situations by the low achievers supports the deficit model by Desiderato and Koskein (1969) that perhaps, poor

study orientation and poor understanding of the course content of low academic achievers are responsible for eliciting worry cognitions in testing situations. In addition, it supports the MeichenBaum and Butler (1980) views that many other factors such as cognitions during testing situations, the importance of academic evaluations, study skills, and previous course grades of the students are associated with test anxiety and test performance. It has been observed that poor study orientation, inadequate preparation engage the students in self – defeating thoughts and their low probability of success makes them worry about the consequences of failure.

The study suggests that high achievers need to manage their emotional reactions during examination whereas low achievers need to modify their worry cognitions and their emotional arousal in testing situations as well. There is a high possibility that inadequate study habits of low achievers cause worry cognitions. Lin and McKeachie (1970) attributed the poor performance of test anxious students to their in adequate study habits. Vagg and Spielberger (1995) reported that relaxation techniques and systematic desensitization techniques have been very effective in reducing the emotional reactions during examinations. For the treatment of worry cognitions cognitive behavior therapy along with the study counseling has been effective.

The results also showed as predicted, a significant negative correlation between test anxiety and academic achievement for undergraduate students. These findings are in line with Hill and Wigfield (1984) studies which reported a negative correlation of -.60 between test anxiety and academic achievement and also support the meta-analysis conducted by Seipp (1991) and Hembree (1988) indicating a negative correlation between test anxiety and academic achievement. Correlation analysis also indicated a significant inverse relationship between academic achievement and worry component of test anxiety whereas a negative but not significant relationship between emotionality component of test anxiety and academic achievement was found.

Significant gender differences in test anxiety for high and low academic achievers were found. Female high academic achievers experience more test anxiety than male high academic achievers. They differ significantly on the emotionality component of test anxiety whereas they do not differ significantly on the worry component of test anxiety. Female high academic achievers reported significantly high level of emotional arousal in testing situations as compared to male high academic achievers. The findings are consistent with the extensive literature that females experience more test anxiety and

anxiety symptoms than males (Chapell et al., 2005; Egloff & Schmukle, 2004; Khawaja & Armstrong, 2002; Stewart et al., 1997). It also supports Speilberger (1980b) findings that females score high on emotionality scale than on worry scale. Female high achievers differ in test anxiety mainly due to high emotionality level which may be attributed to their traditional feminine traits that females are sensitive, affectionate and sympathetic (Martin, 1987).

On the other hand, gender differences in the test anxiety for low achievers have also been observed. Interestingly, male low academic achievers experience more test anxiety than female low academic achievers. The difference is mainly due to more worry cognitions experienced by males in testing situations as compared to female low academic achievers. Male low academic achievers are more worried and concerned about their performance because parents in our culture have more expectations from their sons than daughters. Their negative cognitions that poor performance would definitely disappoint the significant others could be the cause of worry in testing situations. Secondly, other factors such as poor study skills, fun seeking behavior, and lack of time management skills may be responsible for the worry cognitions of male low academic achievers. On the other hand, female low academic achievers spent most of the time after college at home and have less peer oriented culture and therefore have more time to study. However, the high test anxiety level of male low achievers challenges and threatens their traditional masculine concept that they are ambitious, forceful, and dominant. The findings of the study partially support Smith and Smith (2002) for the significant interactive effect between test anxiety and test performance. The findings of the present study have also indicated a significant interaction between academic achievement and test anxiety.

The findings of the study have indicated that low achievers experience more test anxiety and worry cognitions in testing situations than high achievers. Test anxiety has a significant negative relationship with the academic achievement. Gender differences in test anxiety for high and low achievers were observed. It also provides explanation for gender differences in test anxiety keeping in view the culture and stereotype feminine and masculine traits. This study has also indicated a significant interactive effect of gender and academic achievement level on test anxiety.

Limitations and Suggestions

This study has identified the serious problem of test anxiety among low achieving students resulting in lack of academic success. It

does not examine the efficacy of therapeutic interventions for the treatment of test anxiety. It therefore strongly recommends that future studies should assess the efficacy of relaxation techniques and cognitive behavioral interventions in the reduction of emotional arousal and worry cognitions of test anxious students. The findings of this study also suggests that academicians and policy makers should keep in mind that test anxiety adversely affects the academic performance and they should take effective measures to deal with this serious problem. This study provides guide lines to test-anxious students to seek professional assistance from the college counselors to cope with their test anxiety problem.

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Received December 3, 2007
Revision received August 4, 2009