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Correlation among high school senior students' test anxiety, academic performance and points of university entrance exam

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Test anxiety seems like a benign problem to some people, but it can be potentially serious when it leads to high levels of distress and academic failure. The aim of this study is to define the correlation among high school senior students' test anxiety, academic performance (GPA) and points of university entrance exam (UEE). The study group of the research was composed of 194 high school senior students in Turkey. To specify students' test anxiety, "Test Anxiety Inventory" developed by Spielberge et al. and adopted into Turkish by Oner was used. The data on students' UEE points and GPA were obtained from school administration. In the result of pearson correlation analysis, it was found significant reverse correlation between students' test anxiety and points of UEE. It was also seen significant positive correlation between students' GPA and scores of UEE. Besides, in the analysis done according to gender, the result showed that although there was a significant reverse correlation between female students' test anxiety and points of UEE, it was seen a significant positive correlation between their points of UEE and their GPA. According to data analysis done for male students, significant positive correlation between male students' GPA and points of UEE occured. Following t-test results, it was found significant difference in test anxiety and GPA in favor of female students and in points of UEE in favor of male students. These findings extend the previous studies carried out on test anxiety and its reflections and encourage further studies.

Key words: Test anxiety, academic achievement, and university entrance exam.

INTRODUCTION

Anxiety is an occurrence that human beings normally encounter within their daily experiences. It is considered to be one of the most widespread and persistent human emotions, with a physiological arousal and cognitive functions affected by anxiety. In addition to being subjectively unpleasant, anxiety has outlays in contend for bodily (physiology) and cognitive resources (Kalisch et al., 2005). Anxiety can also be beneficial when it leads to

excitement and enthusiasm, and has negative effects when it causes worry, confusion, fear, and lowering of self-esteem (Arch, 1987).

One of the broadest research areas in recent years has been test anxiety and its dimensions. Nowadays, test anxiety is more observed among students, and it might be due to a more prominent role of tests in the educational system than some decades ago. According

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to all attempts that have already been done on test anxiety and students' performances, it is clear that studying different dimensions of anxiety can be effective in the way we organize the plans we have for the educational system. The purpose of the present study is to assess what correlation, if any, test anxiety may have with academic performance and points of university entrance exams.

Test anxiety

Test anxiety refers to the "phenomenological, physiological and behavioral responses" (Zeidner, 2007) that accompany testing. It is a subjective emotional state experienced before or during a specific evaluation relating to the act of completing the evaluation itself, the threat of failing, and perceived negative consequences. Modern views of test anxiety conceptualize it as having two major components: Worry and Emotionality (Cassady and Johnson, 2001; Spielberger and Vagg, 1995; Liebert and Morris, 1967). Worry is the cognitive component of test anxiety reflecting the debilitating thoughts and concerns the test-taker has before or during the test. The Emotionality component (sometimes called Tension) refers to the heightened physiological symptoms stemming from arousal of the autonomic nervous system and associated affective responses. Liebert and Morris (1967) operationally defined *worry* as "cognitive concerns about the consequences of failure" and *emotionality* as the "physiological reactions of the autonomic nervous system to stress". However, they can be distinguished since the component "Worry" is more correlated with academic performance than the component "Emotionality" (Liebert and Morris, 1967).

Birenbaum and Nasser (1994) claimed that test anxiety is a widespread problem in school, and Shaked (1996) estimated that 30% of all students suffer from some level of test anxiety. Test anxiety begins in childhood, and as testing experiences increase, an individual's test anxiety levels may also increase because of compounding episodes of poor performance. Test-anxious students report the inability to recall information when in a testing situation (Mueller, 1980). According to Spielberger et al. (1978), test anxiety is a "situation-specific personality trait" that occurs before, during, and after a testing session. Nicholls (1967) noted that "test-anxiety represents a tendency to expect failure in test situations" and is therefore more closely related to cognitive school performance than is general anxiety. Test-anxious individuals respond to the testing situation with a worry reaction and irrelevant thoughts that interfere with effectiveness on their tasks (Liebert and Morris, 1967).

Several meta-analyses have documented that self-reported test anxiety correlates negatively with test performance (Ackerman and Heggestad, 1997; Hembree,

1988; Seipp, 1991). As mentioned, the negative correlation between test anxiety and various evaluative outcomes has been found across several domains. For example, Hembree's (1988) meta-analysis showed negative correlations between test anxiety and performance on IQ, aptitude, memory and problem-solving tests. He also found negative correlations for several school-related outcomes such as overall grades, and performance in language and mathematics tests, among other outcomes. Similar results are comprehensively reviewed by Zeidner (1998, 2007).

Test anxiety and academic performance

Understanding students' emotional experiences during the testing process, in particular test anxiety, has long been a prime concern for researchers, educators, and counselors as test anxiety may have a deleterious impact on test performance, academic success, and overall well-being (Bonaccio and Reeve, 2010). Test anxiety undeniably plays an important role in students' performance. Sarason (1978) believed test anxiety is a kind of self-preoccupation that is shown with low self-esteem and it leads to negative cognitive evaluation, lack of concentration, unpleasant physiological reactions, and low proficiency in test performance. Test anxiety and in particular the cognitive component is widely believed to negatively impact performance through occupying working memory resources (Derakshan and Eysenck, 2009; Eysenck et al., 2007; Owens et al., 2008). Some scholars found a negative correlation between test anxiety and students' performances (Hong and Karstensson, 2002). They also believe that a high level of anxiety creates intrusive thoughts which do not associate with tests and do not let students concentrate on the test. The cognitive component of test anxiety is the factor most consistently found to be associated with declines in performance (Hembree, 1988). In addition to evidence available from traditional correlational studies and meta-analyses, path analyses have confirmed that cognitive test anxiety has the strongest connection with performance. Whereas path analyses have not shown significant influence for the emotionality component, the path from worry to academic achievement has been found to be significant for adolescents (Williams, 1991) and postsecondary students (Bandalos et al., 1995). Researchers have found an indication that a high level of anxiety affects academic performance (Soler, 2005; McCraty, 2007; Vitasari et al., 2010a). Researchers have also demonstrated that students with a higher level of anxiety obtain lower marks in examination (Sena et al., 2007). Some others expressed the opinion that high level of anxiety will be associated with low academic performance (Luigi et al., 2007).

In the research of Hunsley (1985)'s results it is

indicated that test anxiety was related to poor test performance, both in early and late terms. Chapell et al. (2005) found a significant inverse relationship between test anxiety and grade point average in students. Indeed, several meta-analyses demonstrate that self- reported test anxiety correlates negatively with test performance in educational and employment settings (Ackerman and Heggestad, 1997; Hembree, 1988; Seipp, 1991).

Studies on test anxiety have provided evidence that test anxiety has a negative effect on performance (Calvo et al., 1994; Hembree, 1988; Kivimaki, 1995; Seipp, 1991), is a multidimensional construct (Liebert and Morris, 1967; Sarason, 1984) and could be treated with appropriately developed cognitive or behavioral treatments (Anup, 1994; Nicaise, 1995; Sapp, 1993; Sud and Sharma, 1990). Continuous efforts have been made to understand better the dimensional structure of test anxiety, differential effects of its components on performance, and anxiety treatments (Sapp, 1996; Williams, 1996).

Among high school and college students, test anxiety is a common and potentially serious problem. Debilitating test anxiety affects 10-30% of all students, with a disproportionately higher prevalence in learning-disabled and minority students (Nicaise, 1995; Strumph and Fodor, 1993). Twenty- percent of test-anxious students quit school before graduating because of repeated academic failure (Tobias, 1979). High test anxiety is also associated with low self esteem, poor reading and math achievement, failing grades, disruptive classroom be-havior, negative attitudes toward school, and unpleasant feelings of nervousness and dread that stem from an intense fear of failure (Bryan et al., 1983). Because test anxiety has many adverse effects on the lives of students, and the accurate assessment of their academic achievement, it is an important topic for research.

University entrance exam (UEE)

In Turkey, as in most other countries, the demand for higher education far exceeds the places available. In view of this fact, the Student Selection Examination (ÖSS) has two objectives: (a) to assure a balance bet-ween the demand for higher education and the places available in higher education institutions; (b) to select and place students with the highest probability of success in all the available higher education programs, taking into consideration their preferences, and performance on UEE.

Every year, students for undergraduate programs (Bachelors and Pre-bachelors) of the universities were selected and placed by a centrally administered exami-nation system. The basis of this system is The Student Selection Examination, and the organization responsible for its administration is The Student Selection and Placement Center which is affiliated to The Higher Education Council. Candidates are placed in higher education programs by using two different methods: Central Placement and selection through a Special Skills Examination. The aim of the Central Placement is to place the candidates in the higher education programs highest on their list of preferences, as is compatible with their scores. The final selection and placement of students in higher education institutions is dependent on the candidates' scores, on the personal preferences they have listed, and on the quotas and prerequisites of the higher education programs. The central placement procedure in the higher education programs admitting students on the results of the examination is carried out through an iterative computing routine. Each candidate can be placed in one program only (http://www-db.in.tum.de/teaching/ws0708/hsufg/oss.html,26.01.201). UEE is an only way for high school students to have an opportunity to study at universities. Therefore, it causes a great deal of anxiety for the students preparing to enter this exam.

The research questions of this study are as the follows;

1. What is the correlation among high school senior students' test anxiety, academic performance (GPA) and points of university entrance exam (UEE)?
2. Are there any significant differences in terms of gender among high school senior students' test anxiety, academic performance (GPA) and points of university entrance exam (UEE)?

METHODOLOGY

Research design

The research methodology applied in this study is quantitative design (Creswell, 2012). In this research with the aim of specifying the correlation among high school senior students' test anxiety, academic performance and points of UEE, descriptive method was used. Also, the purposive sampling technique was adopted while choosing proper sampling group for this research. This sampling technique, also called judgment sampling, is the deliberate choice of an informant due to the qualities the informant possesses (Bernard 2002, Lewis and Sheppard 2006). It is a non-random technique that does not need underlying theories or a set number of informants. Simply put, the researcher decides what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience (Bernard, 2002; Lewis and Sheppard, 2006).

Participants

The study group of the research was composed of 194 high school senior students. The mean age of the participants was 17.5. Slightly more than half of the students (50.51%) were males. Data from the samples of high school senior students (twelfth graders) were collected from a high school in Istanbul, Turkey. All the students of the study group were trying to prepare to take UEE.

Table 1. The findings of Pearson correlation analysis among high school senior students' TA, GPA and the points of UEE.

		GPA	UEE	TA
GPA	r	1	.58	-.00
	p		.00	.90
UEE	r	.58	1	-.22
	p	.00		.00
TA	r	-.00	-.22	1
	p	.90	.00	
	N	194	194	194

p<0.01.

Table 2. The findings of Pearson correlation analysis among high school senior female students' TA, GPA and points of UEE..

		GPA	UEE	TA
GPA	r	1	.66	-.14
	p		.00	.15
UEE	r	.66	1	-.28
	p	.00		.00
TA	r	-.14	-.28	1
	p	.15	.00	
	N	96	96	96

p<0.01.

Procedure

Test anxiety ınventory was applied two weeks before UEE. All the students completed TAI in their classes at a scheduled time. Each student was seated individually in their desks and was given ten minutes to complete the inventory. GPA of the students was obtained from school administration at the end of the academic term. In this study, GPA is the mean of the points students got from the courses in that academic term. The points of UEE were obtained from the Students' Guidance Office of the high school after the results of UEE was announced officially. The content of UEE consists of the courses relating to science and math.

Measure

At the stage of selecting the proper data collecting instrument, the researchers carried out on test anxiety and also the inventories having been developed and used frequently up to that time were analyzed In this study to specify students' test anxiety, "Test Anxiety Inventory" (TAI) developed by Spielberger et al. (1978) and adopted into Turkish by Oner (1990) was used. Test anxiety inventory consists of 20 items and total points students got from those items were accepted as students' test anxiety points. The TAI is a 5-point Likert type scale. Minimum and maximum points students got from TAI are 20 and 100. Internal consistency and homogeneity coefficient for the original form of the inventory was .92 and item-total correlation coefficient was .60. Test retest and the Pearson product moment correlation coefficients ranged between .62 and .81. Relationships between scores on the TAI and those on measures of anxiety and personality were examined. The TAI had positive correlations with trait anxiety (.48), prior to testing state anxiety (.51), anxiety scale of the MMPI (.27-.46) and with issues on the student problem check list (.27-.60). It had moderate-negative correlations with self-concept (.31-.56). KR-20 formula was used to determine internal consistency and homogeneity of the items. These coefficients ranged between .73 and .89 (Oner, 1990). Given this evidence on psychometric properties of the inventory, its use for assessing test anxiety of high school students was considered justifiable.

Analysis of Data

The high school senior students were given 10 minutes to answer the Test Anxiety Inventory. The analyses related to high school senior students' TA, GPA and the points of UEE were accounted with Pearson Correlation Coefficient. To determine whether there is a significant difference among scores of test anxiety, GPA, and the points of UEE according to gender, an independent t-test was applied. The statistics obtained were transferred into the tables by grouping and then interpreted.

FINDINGS

In this research carried out to define the correlation among high school senior students' test anxiety (TA), academic achievement (GPA), and points of university entrance exam (UEE), the answers of the following questions were found out; (a) what is the direction of correlation, if it was, among high school senior students' TA, GPA and the points of UEE? (b) was there a significant difference among high school senior students' TA, GPA and the points of UEE according to gender? The correlation among high school senior students' TA, GPA and the points of UEE was analyzed using Pearson Correlation Coefficient. The findings relating to the correlation are given in Table 1.

The findings in Table 1 show that there is a significant positive correlation between students' GPA and the points of UEE (r=.58, p<.01). The finding of a positive correlation between students' GPA and points of UEE suggests that GPA and points of UEE are related constructs and are not independent of each other. As is also seen in Table 1, despite not having strong relation, a significant negative correlation was found between students' test anxiety and points of UEE (r=-.22, p<.01).

As it is viewed in Table 2, it was found significant positive correlation between female students' GPA and points of UEE (r=.66, p<0.01). This finding reveals that female students' GPA and points of UEE affect each other in the same direction. It could be also reported that there was a significant negative correlation between female students' test anxiety and points of UEE (r=-.28, p<0.01). The fact that negative correlation was observed

Table 3. The findings of Pearson correlation analysis among high school senior male students' TA, GPA and points of UEE.

		GPA	UEE	TA
GPA	r	1	.57	.04
	p		.00	.64
UEE	r	.57	1	-.10
	p	.00		.32
TA	r	.04	-.10	1
	p	.64	.32	
	N	98	98	98

p<0.01.

between female students' test anxiety and points of UEE means that female students' test anxiety and points of UEE are in contrast with each other. On the other hand, there was no significant correlation between female students' TA and GPA (r=-.14, p>0.05).

As can be observed in Table 3, it could be seen that there was a significant correlation between male students' GPA and points of UEE (r=.57; p<0.01). Based on this finding, it can be reported that male students' GPA and points of UEE go in line with each other positively. A significant correlation between male students' test anxiety and GPA was not found (r=.04, p>0.05). Accordingly, it was also seen that there was no significant correlation between male students' test anxiety and points of UEE (r=-.10, p<0.01).

Based on the research findings in Table 4, it was observed that female students' GPA ($\overline{X}$ =72.74) is higher than males' ($\overline{X}$ =69.93) and that there was a significant difference between both GPAs in favor of female students (t=2.20, p<0.05). It is displayed that male students' points of UEE ($\overline{X}$ =386.07) is higher than female students' ($\overline{X}$ =374.26) and that there was a significant difference between both gender's points of UEE in favor of male students (t=1.97, p<0.05). Female students' test anxiety ($\overline{X}$ =41.01) is higher than male students' ($\overline{X}$ =35.32) and it is revealed that significant difference was found between female and male students' test anxiety in favor of female students (t=3.87, p<0.05).

DISCUSSION AND CONCLUSION

Test anxiety has been one of the most challenging concepts among researchers due to many factors. This study was conducted to determine the correlation among high school senior students' test anxiety (TA), academic performance (GPA) and points of university entrance

exam (UEE). Based on the results of the study, it is reported that there was a significant positive correlation between students' GPA and the points of UEE. The finding of a positive correlation between students' GPA and points of UEE suggests that GPA and points of UEE are related constructs and are not independent of each other. Also, despite not having strong relation, a significant negative correlation was found between students' TA and points of UEE. From this finding it might be said that as students' TA increases, their points of UEE decrease correlatively. UEE in Turkey is an only way for high school students to have an opportunity to study at universities. Therefore, it may cause even a little anxiety for the students preparing to enter this exam.

The findings of these studies are consistent with previous researches, such as Ackerman and Heggestad (1997), Hembree (1988), Seipp (1991), Chan et al. (1997) and Putwain and Best (2011). Indeed, several meta-analyses demonstrate that self-reported test anxiety correlates negatively with test performance in educational and employment settings Several researches including Wine (1971), Sarason (1984) and Meichenbaum (2007) showed that people, who suffer from test anxiety, have negative self-estimations about themselves, which confuse them at the time of testing. While test anxiety during the test decreases, test takers' attention increases the number of errors (Cassady and Johnson, 2002; Sarason, 1980, 1986). It was reported that test anxiety component indicates consistent and strong inverse relationship with performance (Kim and Rocklin 1994; Morris and Engle, 1981; O'Neil and Abedi 1992; Zeidner and Nevo 1992).

Besides, test anxiety and in particular the cognitive component is widely believed to negatively impact on performance through occupying working memory resources (Derakshan and Eysenck, 2009; Eysenck et al., 2007; Owens et al., 2008). The hypothesis of a negative relation between academic self- efficacy and test anxiety (controlling for task importance) is supported by the regression results and is generally consistent with the findings reported in the literature (Meece et al., 1990; Pintrich and Degroot, 1990; Putwain and Daniels, 2010; Wigfield and Meece, 1988). In the research of Hunsley (1985)'s results, it is indicated that test anxiety was related to poor test performance both early and late in the term. A similar finding was observed in a study by Chapell et al. (2005).

In this research it was found a significant inverse relationship between test anxiety and grade point average in students. Low-test-anxious undergraduates averaged a B+, whereas high-test-anxious students averaged a B. Studies on test anxiety have provided evidence that test anxiety has a negative effect on performance (Calvo et al., 1994; Hembree, 1988; Kivimaki, 1995; Seipp, 1991). Some scholars found a negative correlation of between test anxiety and students'

Table 4. The t-test results regarding test anxiety, points of UEE and GPA according to gender.

Gender	N	Sd	GPA				UEE				TA			
			$\overline{X}$	S	t	p	$\overline{X}$	S	t	p	$\overline{X}$	S	t	p
Female	96	192	72.74	8.94	2.20	.02	374.26	38.96	1.97	.04	41.01	10.65	3.87	.00
Male	98		69.93	8.88			386.07	44.41			35.32	9.82		

p<0.05.

performances (Hong and Karstensson, 2002). Several studies have been acknowledged about factors allied with academic performance. Researchers have found an indication that high level of anxiety affects academic performance (Parks-Stamm et al., 2010; Nejad et al., 2011; Soler, 2005; McCraty, 2007; Vitasari et al., 2010a). Others expressed the opinion that the high level of anxiety will be associated with low academic performance (Luigi et al., 2007). Test-anxious students cannot concentrate entirely on the test and thus they get lower scores, because they feel insecure about their own capabilities throughout the test (Pintrich and De Groot, 1990; Pintrich et al., 1993). They also believe that high level of anxiety creates intrusive thought which does not associate with test and does not let them concentrate on test. Test anxiety refers to a situation-specific form of anxiety that accompanies concern about possible negative consequences or poor performance on an examination (Spielberger and Vagg, 1995; Zeidner and Matthews, 2005). These results are in line with the outputs of this research, as well.

In terms of gender it was found significant positive correlation between female students' GPA and points of UEE. This finding reveals that female students' GPA and points of UEE affect each other in the same direction. It could be also reported that there was a significant negative correlation between female students' test anxiety and points of UEE. The fact that negative correlation was observed between female students' test anxiety and points of UEE means that female students' test anxiety and points of UEE are in contrast with each other.

As can be observed, it could be seen that there was a significant correlation between male students' GPA and points of UEE. Based on this finding, it can be reported that male students' GPA and points of UEE go in line with each other positively. In accordance with the research findings, it was observed that female students' GPA is higher than that of the males and that there was a significant difference between both GPAs in favor of female students. It is displayed that male students' points of UEE is higher than that of female students and that there was a significant difference between both gender's points of UEE in favor of male students. Female students' TA is higher than that of male students and it revealed that significant difference was found between female and male students' TA in favor of female students. The results of this research are parallel with those of previous researches. One of the researches done before shows that older students feel more stressed than younger students and female students experience more anxiety than male students (Ginter et al., 1982). In literature about test anxiety significant difference between boys and girls is reported. It seems girls' experience of test anxiety is more than that of boys. Females have repeatedly been found to report higher levels of overall test anxiety than males (Altermatt and Kim, 2004; Bandalos et al., 1995; Hembree, 1988; Volkmer and Feather, 1991; Zeidner, 1990).

In addition to increasing the comprehensiveness of test anxiety theories, a better understanding of students' perceptions of the sources of test anxiety and their relative importance can have benefits. Similarly, by increasing our understanding of students' perceived sources of test anxiety, educators and school counselors may be better able to develop effective anxiety-reduction interventions. Specifically, different interventions may be required to address different perceptions. It is recommended that in future researches the factors that affect test anxiety positively should be examined elaboratively. Moreover, follow up researches may increase the numbers of participants to enable a more powerful analysis, and use various measures of test anxiety.

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