The Impact of Cognitive and Affective Components of Test Anxiety on the High-Stakes Exam Performance in 12th Grade Students

Yusuf Ziya Kültür[i]
Ministry of National Education

Bahadır Özcan [ii]
Adıyaman University

Abstract

The high-stakes exams are administered to the candidates to determine their placement into university programs. One of the variables that can influence the performance of high-stake exams is test anxiety. The current study aimed to examine the associations between the cognitive and affective components of test anxiety with the performance of the high-stakes exam (University Entrance Exam [UEE}) in low-achiever, mid-achiever, and high-achiever groups after controlling for gender. The study participants were 264 12th-grade students from schools representing low-, mid-, and high-achievement groups. The findings showed that the cognitive and affective components of test anxiety did not account significantly for the variance of test performance on the UEE controlling for gender in the three groups. However, test anxiety's cognitive and emotional components had negative significant but weak relationships with test performance in only the high-achiever group. Appropriate implications for practitioners, policymakers, and researchers are discussed.

Keywords: test anxiety, test performance, high school, affective, cognitive

----

[i] **Yusuf Ziya Kültür,** Dr., Ministry of National Education, ORCID: 0000-0001-9082-7316

Correspondence: yusufziyakultur@gmail.com

[ii] **Bahadır Özcan,** Assist. Prof. Dr., Faculty of Education, Adıyaman University, ORCID: 0000-0003-4278-8417

INTRODUCTION

Standardized tests have a crucial potential to determine the transition of individuals from high school to university education. The high school period is a critical one for students to prepare for the exam to continue their university education in their preferred programs (Kapıkıran, 2020). In the transition from high school to university education, standardized achievement tests with a more weighted effect are used in addition to school grades. Consequently, an individual's academic achievement is the most crucial determinant of his/her career and socioeconomic status (Spinath, 2012). In other words, an individual's performance on academic tests has important academic, social, and professional consequences (Knoll et al., 2019).

Recently, the importance of university education has increased in Turkey (Güler & Çakır, 2013). In 2019, 1,880,800 candidates took the Field Qualification Test-Alan Yeterlilik Testi (AYT) part of the University Entrance Exams (UEE), and according to the exam results, 409,587 candidates were placed in undergraduate programs (OSYM, 2019). On the other hand, students who want to enroll in prestigious universities or programs equal approximately 5% of exam candidates; this puts pressure on students and causes stress and anxiety (Barlas et al., 2010). The concept that includes negative emotional reactions accompanying situations in which performance is measured or evaluated is test anxiety (Mcdonald, 2010). A student's performance measurement may reflect the student's ability or achievement on the exam or indicate his/her ability to cope with stress and anxiety as a result of the assessment experience; thus, the measurement of any unique ability or proficiency here can be confused with anxiety (Zeidner, 2007). In this context, the importance of revealing the relationship between the students' test anxiety and achievement on the UEE becomes apparent.

Anxiety is frequently described as an unpleasant emotional mood characterized by feelings of stress, fear and worry, and stimulation of the central nervous system (Spielberger, 1972). When anxiety is mild, it acts as a warning signal for individuals; the accompanying physiological and psychological arousal can help the person maintain alertness and eventually embodies a threat that can perform adaptive coping actions (Spielberger, 1972). Although anxiety can be advantageous if it promotes alertness, when it cannot be handled correctly and is spread over a long period of time, it negatively affects students (Barrows et al., 2013).

According to cognitive load theory, in test anxiety some part of the executive memory capacity is allocated to the anxiety; as a result, the individual underperforms due to the inability to use all of his/her executive memory resources, which can lead to poor academic performance (Grimley & Banner, 2008; Mavilidi et al., 2014). On the other hand, in control value theory, test anxiety refers to universal and species-specific characteristics of the human mind that include an individual's emotional reactions to success or failure due to evaluation processes (Pekrun, 2006). More specifically, Liebert and Morris (1967) described two dimensions of test anxiety: affectivity and delusion, which is the cognitive dimension of test anxiety, including negative evaluations and thoughts about the individual's own performance. The affective dimension of test anxiety refers to the individual's emotional reactions to situations such as success or failure in the evaluation process (Pekrun, 2006). It also refers to biological reactions such as increased heart rhythm, sweating, chills, stress, tension, and nervousness when the individual is tested (Bal-Incebacak et al., 2019). These emotional reactions are closely related to the subjective control over the evaluation process and the importance one attributes to the results of an evaluation (Ringeisen et al., 2016). In other words, test anxiety arises from an interaction between low subjective control and high subjective value attributed to performance outcomes and is the result of low control over outcomes (Boehme et al., 2017).

The cognitive components of test anxiety are negatively related to academic performance (Cassady & Johnson, 2002; Crişan & Copaci, 2015; Eum & Rice, 2011; Gibbons et al., 2018; Hancock, 2001; Putwain & Symes, 2018; Zeidner, 1998). On the other hand, high anxiety in individuals with a strong working memory capacity has positive results on test performance (Owens et al., 2014). Individuals with high anxiety can also use compensatory strategies to achieve reasonable performance (Eysenck & Derakshan, 2011). However, high-risk tests are significantly associated with

higher test anxiety than classroom tests (Mcdonald, 2010; Segool et al., 2013). When test anxiety in education was examined, it was associated with academic achievement (Ergene, 2011), motivation (Elliot & McGregor, 1999), low test performance (Chapell et al., 2005), and gender (Chapell et al., 2005; Ergene, 2011; Erturan & Jansen, 2015; Eum & Rice, 2011; Güler & Çakır, 2013; Kocabıyık & Bacıoğlu, 2020; Núñez Peña et al., 2016; Zeidner, 1990). Considering the relationship between gender and test anxiety in the studies, gender was used as a control variable in this study.

Present Study

As stated in our review, there is a negative relationship between test anxiety and performance. Moreover, test anxiety and its components accounted for the variance of achievement, which ranged from 2% to 7% (von der Embse & Witmer, 2014). Test anxiety and its components explain a low part of the variance of test performance. However, the research did not examine the extent to which certain aspects of test anxiety explained variance of test performance in different achievement groups in the Turkish sample. The current study examined relationships between test anxiety's cognitive and emotional components with subsequent test performance on the UEE in low-achiever, mid-achiever, and high-achiever groups after controlling for gender. Specifically, this study addressed the following questions:

1. What is the relationship between the cognitive components of test anxiety and high-risk test performance in three different achievement groups (high-, mid-, and low-achievers) after controlling for gender?

2. What is the relationship between the affective components of test anxiety and high-risk test performance in three different achievement levels after controlling for gender?

METHOD

The current study was correlational research. A correlational study is a research design in which the researcher attempts to understand the kinds of naturally occurring variables that relate to each other (Fraenkel et al., 2012). The criterion variables of the study were test performance on the UEE in low-achiever, mid-achiever, and high-achiever groups. Test anxiety's affective and cognitive components were the predictor variables, and gender was the control variable.

Participants

In this study, we used the purposive sampling method to select participants. Participants in the study were students studying in 12th-grade high schools located in a mid-sized city center in Turkey with about 85,000 inhabitants. Seven academic high schools provide academic education in the city center. The criteria that determined the high schools were the UEE results. Schools were categorized into three groups, taking into account their achievement in this exam; high-achievers, mid-achievers, and low-achievers. We chose one of the schools to represent each achievement group. These three schools' performances on the UEE out of 120 questions were $M = 26.13$, $SD = 9.05$ for low-achievers, $M = 39.80$, $SD = 9.92$ for mid-achievers, and $M = 75.95$, $SD = 14.72$ for high-achievers. When one considers the mean and standard deviation scores of the UEE performances of each group, the three selected schools represented the three achievement groups.

In the study, 264 12th-grade high school students participated. The participants consisted of 88 (40.5%) students in the low-achiever group, 80 (28.8%) students in the mid-achiever group, and 96 (30.7%) students in the high-achiever group. There were 163 male (59.1%) and 101 female (40.9%) participants in the study.

Instruments

Test Anxiety Inventory

The Test Anxiety Inventory (TAI) is a 20-item self-report instrument developed by Spielberger (1980) to measure individual differences in test anxiety as a situation-specific personality trait. It examines how often a test taker reports the experience of specific symptoms of anxiety before, during, and after examinations, using a 4-point Likert scale ranging from 1 (almost never) to 4 (almost always). Higher scores indicate higher levels of test anxiety. The TAI has two subscales: (1) "worry," which includes cognitive concerns about the consequences of failure (e.g., "I believe I am going to fail the test") and (2) "emotionality," which includes the different reactions of the autonomic nervous system resulting from stress experienced during an evaluative process (e.g., "my heart beats faster when I am taking a test"). The TAI has adequate psychometric properties with three-week test-retest reliability, $r = .80$, and concurrent validity with other test anxiety measures, $r = .82$ (i.e., Sarason's TAS) (Spielberger, 1980). Internal consistency was $\alpha = .88$ for worry and $\alpha = .90$ for emotionality.

The TAI was adapted to Turkish by Albayrak-Kaymak (1987). The test-retest reliability of the scale ranged from $r = .70$ to $r = .90$. The internal consistency coefficient for the "worry" subscale was $\alpha = .83$, while that for the "emotionality" subscale was $\alpha = .84$ (Albayrak-Kaymak, 1987). We used the worry and emotionality subscales of the TAI in the current study.

Test Performance on the UEE

A national two-stage examination system determines access to tertiary education and places students into different programs. The first stage is the Basic Proficiency Test-Temel Yeterlilik Testi (TYT), previously known as the Transition to Tertiary Education Examination – Yükseköğretime Geçiş Sınavı (YGS). It is a multiple-choice assessment of core subjects such as Turkish, social sciences, mathematics, and science. Passing the TYT is sufficient to access the short-cycle tertiary programs in which most students are enrolled. Students' preferences and results in the YGS and their average classroom marks during high school are used to determine their placement in short-cycle tertiary and bachelor's programs through a centralized system that automatically assigns applicants to study programs (Kitchen et al., 2019; OSYM, 2018).

YKS is a three-session exam: Session 1 TYT, Session 2 AYT, and Session 3 Foreign Language Test (YDT). All applicants applying to YKS must take the TYT. Other sessions are optional. TYT is held on the first day, AYT on the second day, and YDT on the afternoon of the second day (OSYM, 2018). TYT consists of four parts and 120 questions, including 40 questions in Turkish, 40 questions in Basic Mathematics, 20 questions in Social Sciences, and 20 questions in Science. Each multiple-choice question has five choices, only one of which is the correct answer. The total time allowed for taking the test is 135 minutes.

From the students' correct answers provided to 120 TYT questions, the total answer numbers were calculated by subtracting 0.25 lines of 1 wrong answer (MoNE, 2018). In this study, we considered test performance as the total number of calculated true answers by subtracting 0.25 lines of 1 wrong answer over 120 questions of the TYT in which all the students participated. We used the TYT exam as the test performance of the UEE.

Participants were informed about the research process, and the study's informed consent was signed by those students who wished to participate. In the informed consent, participants gave a contact mobile number to the researchers so that they could get the UEE results. The researchers contacted the participants using the phone number provided in the informed consent and received the UEE test performance results.

Data Analysis

We conducted a multiple linear regression analysis with the SPSS 23 program. The multiple regression analysis was run to predict test performance on the UEE from the worry and emotionality components of test anxiety, controlling for gender. The variables in the regression analysis are normally distributed according to skewness, with kurtosis values ranging between -1 and +1 (see Table 1). There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1. If the tolerance value is less than 0.1, there might be a collinearity problem (Hair et al., 2014). In this analysis, all the tolerance values are higher than 0.1 (the lowest is 0.301) and there is no collinearity problem between the study's dependent variables.

RESULTS

We used multiple regression analyses to examine the relationship between the worry and emotionality components of test anxiety and test performance on the UEE, controlling for gender. Descriptive statistics and correlation values of variables entering into regression equality are in Table 1.

Table 1. Descriptive statistics and correlations related to predictor and criterion variables

Groups	Variables	N	M	SD	Skewness	Kurtosis	1	2	3
Low-achiever	Test performance (1)	88	26.13	9.05	.319	.262			
	Worry (2)	88	17.67	5.66	.178	-.834	-.10		
	Emotionality (3)	88	27.80	8.16	-.018	-.686	-.06	84**	.
Mid-achiever	Test performance (1)	80	39.80	9.92	.034	-.175			
	Worry (2)	80	15.66	5.28	.540	-.567	.10		
	Emotionality (3)	80	25.63	7.47	.229	-.444	.05	.79**	.
High-achiever	Test performance (1)	96	75.95	14.72	.118	-.454			
	Worry (2)	96	17.34	5.54	.663	.027	-.18*		
	Emotionality (3)	96	27.80	8.30	.347	-.095	-.17*	.83**	.

Note. N = 264, *p < .05, **p < .001

There were significant negative but weak correlations between test performance on the UEE and worry ($r = .18$, $p < .05$) and emotionality ($r = .17$, $p < .05$) in the high-achiever group. These findings indicated that in the high-achiever group, as students' test performance increased, their worry and emotionality decreased. On the other hand, test performance on the UEE did not have significant correlations with worry and emotionality in the low- and mid-achiever groups (see Table 1).

The results of the multiple regression analyses used on test performance on the UEE in the three groups (low-, mid-, and high-achievers) from the worry and emotionality components of test anxiety, controlling for gender, are presented in Table 2.

Table 2. Hierarchical linear regression predicting test performance from worry and emotionality

Model	Variable	Low-achiever (N = 88)				Mid-achiever (N = 80)				High-achiever (N = 96)			
		B	SEB	β	t	B	SEB	β	t	B	SEB	β	t
1	Constant	24.00	1.49		16.14	40.46	1.47		27.58	78.84	3.38		23.34
	Gender	3.60	1.93	.197	1.86	-1.55	2.25	-.077	-.69	-3.61	3.77	-.098	-.96
2	Constant	28.57	3.43		8.34	38.23	4.12		9.29	86.76	5.82		14.91
	Gender	4.72	2.17	.258	2.17	-1.33	2.30	-066	-.58	-2.72	3.79	-.074	-.72
	Worry	-.07	.32	-.05	-.23	.31	.35	.164	.87	-.31	.48	-.116	-.64
	Emotionality	-.14	.23	-.13	-.61	-.11	.25	-.079	-.42	-.12	.32	-.067	-.37
	R^2	.063				.019				.040			
	Adj.R^2	.030				-.020				.008			
	F	1.884				.478				1.270			

Note. N = 421, *p > .05, **p > .001

The model of the worry and emotionality components of test anxiety to predict test performance on the UEE was not statistically significant in the low-achiever group, $R^2 = .063$, $F(3, 84) = 1.884$, $p > .05$; adjusted $R^2 = .030$. This finding indicated that the worry and emotionality components of test anxiety, which explained a 3% variance of test performance on the UEE, were not a significant predictor of test performance on the UEE in the low-achiever group. Moreover, in the high-achiever group, the worry and emotionality components of test anxiety did not statistically significantly predict test performance, $R^2 = .040$, $F(3, 95) = 1.270$, $p > .05$; adjusted $R^2 = .008$. This finding indicated that worry and emotionality, which explained a 1% variance of test performance, did not statistically significantly predict the test performance on the UEE of the high-achiever group. Lastly, the worry and emotionality components of test anxiety did not statistically significantly predict the test performance on the UEE in the mid-achiever group, $R^2 = .019$, $F(3, 79) = 0.478$, $p > .05$; adjusted $R^2 = -.020$. This finding indicated that worry and emotionality, which explained a 2% variance of test performance, were not significant predictors of students' test performance in the mid-achiever group (see Table 2).

DISCUSSION

The current study investigates the variance of test performance on the UEE explained for the worry and emotionality components of test anxiety after controlling for gender in low-, mid-, and high-achiever groups. Concerning the first and second research questions, it was found that the worry and emotionality components of test anxiety did not significantly predict the variance of test performance on the UEE in the three achievement groups after controlling for gender. It was also found that the worry and emotionality components of test anxiety were not significantly associated with test performance in the low- and mid-achiever groups. However, the worry and emotionality components of test anxiety had negative significant but weak relationships with students' test performance in the high-achiever group. These findings are not consistent with the results of several other studies that have shown an association between the cognitive and emotional components of test anxiety and test performance (Chapell et al., 2005; Ergene, 2011; Mcdonald, 2010; Segool et al., 2013; Putwain & Symes, 2018). However, test anxiety's cognitive and affective components have a negative significant but weak relationship with test performance on the UEE only in the high-achiever group. These findings are consistent with the results of several other studies that have shown a negative association between test anxiety and test performance (Cassady & Johnson, 2002; Crişan & Copaci, 2015; Eum & Rice, 2011; Gibbons et al., 2018; Hancock, 2001; Putwain & Symes, 2018; Zeidner, 1998).

Although test anxiety's cognitive and affective dimensions do not significantly predict test performance, they account for the variance of test performance between 1% and 3% in the three groups. Test anxiety's components accounted for the variance of achievement ranging from 2% to 7% (von der Embse & Witmer, 2014). The particularly small amount of test performance variance accounted for test anxiety and the results of this study seem to question whether developing an intervention program for test anxiety with a big investment for all students is ambiguous. The relatively small and no relationship between test anxiety and test performance warns against a general intervention program for test anxiety for all students; test anxiety interventions focused on students diagnosed with test anxiety. Moreover, investigating the relationship between test anxiety and test performance, especially in students diagnosed with test anxiety, would provide stronger relationships and account for more variance of test performance. In connection to this, developing a test anxiety intervention program only for students diagnosed with test anxiety would be more functional and economical. Consequently, school administrators can use this information to evaluate the costs and benefits of intervention and prevention programs.

In this study, we did not specifically examine the relationship between test anxiety and test performance in the high-risk group of students who may be especially vulnerable to test anxiety. Therefore, researchers should conduct test anxiety and test performance research with the group that has high test anxiety. In addition, examining the variables (e.g., self-efficacy, previous achievement)

that have a stronger relationship with high-stakes examination performance would contribute more to understanding and promoting test performance.

One of the limitations of this study is that test anxiety measures were not applied simultaneously to the test; instead, they were applied about 35 days before testing on the UEE. Future research might involve collecting test anxiety data closer to the time of the high-stakes testing. Another limitation of the study is the use of the total points of high-stakes testing as the indicator of test performance. Future research on the relationship between test anxiety and test performance might also use academic subtests (i.e., math, science, Türkish, social studies).

Test anxiety may positively affect test performance; therefore, when diagnosing problematic test anxiety, one should consider whether test anxiety has either a positive or negative effect on test performance. However, when test anxiety does not adversely impact test performance, this test anxiety should not be seen as a problem, even if it is high. In connection with this, school psychologists and school counselors should seek to foster strategies for identifying students with problematic test anxiety by cooperating with teachers, families, and students in their schools.

In conclusion, the cognitive and affective components of test anxiety account for a low variance of test performance between 1% and 3% in 12th-grade students in three achievement groups (i.e., high-, mid-, and low-achievers). Although test anxiety's cognitive and affective components have negative significant but weak associations with test performance in the high-achiever group, they are not significantly associated with test performance in the low- and mid-achiever groups. However, test anxiety's cognitive and affective components do not significantly account for the variance of test performance in the three groups.

REFERENCES

Albayrak-Kaymak, D. (1987). Sınav kaygısı envanterinin Türkçe formunun oluşturulması ve güvenirliği. *Psikoloji Dergisi*, *6*(21), 55-62.

Bal-Incebacak, B., Yaman, S., & Sarisan-Tungaç, A. (2019). The relation between intellectual risk-taking regarding science classes and test anxiety inventory of secondary school. *South African Journal of Education, 39*(1). Retrieved from https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=EJ1210338

Barlas, G., Karaca, S., Onan, N., & Isıl, O. (2010). The relationship between self-perception and psychiatric symptoms in a group of students preparing for the university entrance examination. *Journal of Psychiatric Nurses*, *1*(1), 18-24.

Barrows, J., Dunn, S., & A. Lloyd, C. (2013). Anxiety, self-efficacy, and college exam grades. *Universal Journal of Educational Research*, *1*(3), 204-208. https://doi.org/10.13189/ujer.2013.010310

Boehme, K. L., Goetz, T., & Preckel, F. (2017). Is it good to value math? Investigating mothers' impact on their children's test anxiety based on control-value theory. *Contemporary Educational Psychology*, *51*, 11-21. http://dx.doi.org/10.1016/j.cedpsych.2017.05.002

Cassady, J. C., & Johnson, R. E. (2002). Cognitive test anxiety and academic performance. *Contemporary Educational Psychology, 27*, 270-295. https://doi.org/10.1006/ceps.2001.1094

Chapell, M. S., Blanding, Z. B., Silverstein, M. E., Takahashi, M., Newman, B., Gubi, A., & McCann, N. (2005). Test anxiety and academic performance in undergraduate and graduate students. *Journal of Educational Psychology, 97*(2), 268-274. https://doi.org/10.1037/0022-0663.97.2.268

Crişan, C., & Copaci, I. (2015). The relationship between primary school childrens' test anxiety and academic performance. *Procedia-Social and Behavioral Sciences, 180*, 1584-1589. https://doi.org/10.1016/j.sbspro. 2015.02.311

Elliot, A. J., & McGregor, H. A. (1999). Test anxiety and the hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 76*(4), 628-644. https://doi.org/10.1037/0022-3514.76.4.628

Ergene, T. (2011). The relationships among test anxiety, study habits, achievement, motivation, and academic performance among turkish high school students. *Education and Science*, *36*(160), 320-330.

Erturan, S., & Jansen, B. (2015). An investigation of boys' and girls' emotional experience of math, their math performance, and the relation between these variables. *European Journal of Psychology of Education, 30*(4), 421-435. https://doi.org/10.1007/s10212-015-0248-7

Eum, K., & Rice, K. G. (2011). Test anxiety, perfectionism, goal orientation, and academic performance, *Anxiety, Stress & Coping: An International Journal, 24*(2), 167-178. https://doi.org/10.1080/10615806.2010.488723

Eysenck, M. W., & Derakshan, N. (2011). New perspectives in attentional control theory. *Personality and Individual Differences, 50*(7), 955-960. https://doi.org/10.1016/j.paid.2010.08.019

Fraenkel, J., Wallen, N., & Hyun, H. H. (2012). *How to design and evaluate research in education* (8th ed.). McGraw-Hill.

Gibbons, R. E.,   u,   ., Villafañe, S. M., & Raker, J. R. (2018). Testing a reciprocal causation model between anxiety, enjoyment and academic performance in postsecondary organic chemistry. *Educational Psychology*, *38*(6), 838-856. https://doi.org/10.1080/01443410.2018.1447649

Grimley, M., & Banner, G. (2008). Working memory, cognitive style, and behavioural predictors of GCSE exam success. *Educational Psychology, 28*(3), 341-351. https://doi.org/10.1080/01443410701635058

Güler, D., & Çakır, G. (2013). Lise son sınıf öğrencilerinin sınav kaygısını yordayan değişkenlerin incelenmesi. *Türk Psikolojik Danışma ve Rehberlik Dergisi*, *4*(39), 82-94.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis* (7th ed.). Pearson Education Limited.

Hancock, D. R. (2001). Effects of test anxiety and evaluative threat on students' achievement and motivation. *The Journal of Educational Research, 94*(5), 284-290. https://doi.org/10.1080/00220670109598764

Kapıkıran, Ş. (2020). Ergenlerde ebeveyn akademik başarı baskısı ve desteği ile sınav kaygısı arasındaki ilişkide akademik dayanıklılığın aracılık rolü. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, *48*, 409-430. https://doi.org/10.9779/pauefd.521230

Kitchen, H., Bethell, G., Fordham, E., Henderson, K., & Li, R. R. (2019*). OECD Reviews of Evaluation and Assessment in Education: Student Assessment in Turkey*. OECD Reviews of Evaluation and Assessment in Education, OECD Publishing, Paris. https://doi.org/10.1787/5edc0abe-en

Knoll, R. W., Valentiner, D. P., & Holzman, J. B. (2019). Development and initial test of the safety behaviors in test anxiety questionnaire: Superstitious behavior, reassurance seeking, test

anxiety, and test performance. *Assessment*, *26*(2), 271-280. https://doi.org/10.1177/1073191116686685

Kocabıyık, O. O., & Bacıoğlu, S. D. (2020). Durumluk sınav kaygısını yordamada ruminatif tepkiler ve cinsiyetin rolü. *Kastamonu Eğitim Dergisi*, *28*(5), 2165-2172. https://doi.org/10.24106/kefdergi.4087

Liebert, R. M., & Morris, L. W. (1967). Cognitive and emotional components of test anxiety: A distinction and some initial data. *Psychological Reports, 20*(3), 975-978. https://doi.org/10.2466/pr0.1967.20.3.975

Mavilidi, M. F., Hoogerheide, V., & Paas, F. (2014). A quick and easy strategy to reduce test anxiety and enhance test performance. *Applied Cognitive Psychology, 28*(5), 720-726. https://doi.org/10.1002/acp.3058

McDonald, A. S. (2010). The prevalence and effects of test anxiety in school children. *Educational Psychology, 21*(1), 89-101. https://doi.org/10.1080/01443410020019867

MoNE (2018). *ÖSYM Tarafından 2019 Yılında Gerçekleştirilecek TYT ve AYT Sınavlarına Esas Ortak Derslere Ait Kazanım ve Açıklamalar*, Ministry of National Education, Ankara. Retrieved from:http://ttkb.meb.gov.tr/meb_iys_dosyalar/2018_10/30100127_2019_yuksekogretimegec is_kazanimlar.pdf

Núñez Peña, M. I., Suárez Pellicioni, M., & Bono Cabré, R. (2016). Gender differences in test anxiety and their impact on higher education students' academic achievement. *Procedia-Social and Behavioral Sciences, 228*, 154-160. https://doi.org/10.1016/j.sbspro.2016.07.023

OSYM (2018). *2018 Yükseköğretim Kurumları Sınavı (YKS) Kılavuzu*, Student Selection and Placement Center, Ankara. Retrieved from: https://dokuman.osym.gov.tr/pdfdokuman/2018/YKS/KILAVUZ_28062018.pdf

OSYM (2019). *YKS Değerlendirme Raporu,* Student Selection and Placement Center, Ankara. Retrieved from: https://dokuman.osym.gov.tr/ pdfdokuman /2019/GENEL/yksDegRaporweb03092019.pdf

Owens, M., Stevenson, J., Hadwin, J. A., & Norgate, R. (2014). When does anxiety help or hinder cognitive test performance? The role of working memory capacity. *British Journal of Psychology*, *105*(1), 92-101. https://doi.org/10.1111/bjop.12009

Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review, 18*(4), 315-341. https://doi.org/10.1007/s10648-006-9029-9

Putwain, D. W., & Symes, W. (2018). Does increased effort compensate for performance debilitating test anxiety? *School Psychology Quarterly*, *33*(3), 482-491. https://dx.doi.org/10.1037/spq0000236

Ringeisen, T., Raufelder, D., Schnell, K., & Rohrmann, S. (2016). Validating the proposed structure of the relationships among test anxiety and its predictors based on Control-Value Theory: Evidence for gender-specific patterns. *Educational Psychology, 36*(10), 1826-1844. https://doi.org/10.1080/01443410.2015.1072134

Segool, N. K., Carlson, J. S., Goforth, A. N., Von Der Embse, N., & Barterian, J. A. (2013). Heightened test anxiety among young children: Elementary school students' anxious responses to high-stakes testing. *Psychology in the Schools*, *50*(5), 489-499. https://doi.org/10.1002/pits.21689

Spielberger, C. D. (1972). *Anxiety, current trends in theory and research*. Academic Press.

Spielberger, C.D. (1980). *Test anxiety inventory: Preliminary professional manual.* Consulting Psychologist Press.

Spinath, B. (2012). Academic achievement. In V. Ramachandran (Ed.), *Encyclopedia of human behaviour* (2nd ed., pp. 1–8). Academic Press.

von der Embse, N. P., & Witmer, S. E. (2014) High-stakes accountability: Student anxiety and large-scale testing. *Journal of Applied School Psychology, 30*(2), 132-156, https://doi.org/10.1080/15377903.2014.888529

Zeidner, M. (1990). Does test anxiety bias scholastic aptitude test performance by gender and sociocultural group? *Journal of Personality Assessment, 55*(1/2), 145-160. https://doi.org/10.1080/00223891.1990.9674054

Zeidner, M. (1998). *Test anxiety: The state of the art*. Plenum.

Zeidner, M. (2007). Test anxiety in educational contexts: Concepts, findings, and future directions. In P. A. Schutz, & R. Pekrun (Eds.), *Emotion in education* (pp. 165–184). Academic Press. https://doi.org/10.1016/B978-012372545-5/50011-3