

Comparison of the Effectiveness of Cognitive Restructuring and Systematic Desensitization in Reducing High-Stakes Test Anxiety



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SUMMARY

Objective: This study aimed to compare the effectiveness of systematic desensitization (behavioral therapy and cognitive restructuring (cognitive therapy) in reducing high-stakes test anxiety. We hypothesized that cognitive restructuring would be superior to systematic desensitization in reducing the severity of the cognitive symptoms of anxiety, whereas systematic desensitization would be superior to cognitive restructuring in reducing the severity of the physiological symptoms of anxiety.

Materials and Method: The study included 50 (36 female and 14 male) high school graduates and high school seniors aged 16-22 years (mean:18.3 years) that experienced test anxiety while taking their university entrance exam. Participants were randomly assigned to the behavior therapy or cognitive therapy groups. Participants in both groups received 9 sessions of structured group therapy with the same therapist. Each participant's level of anxiety and depression, psychiatric symptoms, and dysfunctional thoughts were measured throughout the therapy process.

Results: Statistical analysis showed that there was a significant decrease in the score of each outcome measure employed in both groups. There weren't any significant differences in terms of the alleviation of the cognitive symptoms of anxiety, as measured with the Dysfunctional Attitudes Scale, or physiological symptoms, as assessed with the Beck Anxiety Inventory between the 2 groups. The 2 therapy methods resulted in statistically significant reductions in the level of test anxiety, as well as state anxiety, trait anxiety, self-reported depression, and general symptom levels.

Conclusion: The behavioral and cognitive therapies were equally effective in reducing the severity of the cognitive and physiological components of test anxiety.

Keywords: Cognitive therapy, behavior therapy, effectiveness, test anxiety.

INTRODUCTION

Anxiety is among the most common reactions to stress (Sarason 1984). Spielberger (1966 and 1972a, b) posited that anxiety has 2 components—trait anxiety and state anxiety. Trait anxiety is defined as the differences in the perception of threat and is associated with personality characteristics, whereas state anxiety is a transient emotional state that fluctuates in intensity over time and is characterized by such unpleasant emotions as sorrow, and stress, which are the result of central nervous system stimulation. Spielberger (1972a, b) reported that people with high-level trait anxiety tend to perceive situations as more threatening or dangerous than people with low-level level trait anxiety. In addition, those with

high-level trait anxiety are more prone to display state anxiety in situations perceived as threatening than those with low level trait anxiety. Test anxiety is a type of state anxiety, but Dereli (2003) reported that an easily excitable personality is associated with test anxiety. Likewise, Alyaprak (2006) reported that there was a positive correlation between the level of trait anxiety and test anxiety.

Liebert and Morris (1967), Spielberger (1972a), Holroyd et al. (1978), and Sarason (1984) divide test anxiety into cognitive and emotional components. The 2 components were first proposed by Liebert and Morris (1967). Whereas the cognitive component is defined as worry, the emotional component is defined as emotionality (Morris et al 1967). Anxiety, which

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is a cognitive component of test anxiety, involves an internal dialogue concerning negative expectations and probable failure. The emotional component involves physiological reactions related to over stimulation of the autonomic nervous system, such as feeling tense and nervous (Liebert and Morris 1967; Deffenbacher 1978; Morris, Davis, and Hutchings 1981). According to Lazarus and Averill (1972), The cognitive and emotional components of test anxiety are independent of each other, but unlike posited by Liebert and Morris (1967) these components constantly influence each other as a process.

Test anxiety was investigated in many countries, including China, Egypt, Germany, Holland, India, Israel, Italy, Japan, Jordan, Korea, Saudi Arabia, Turkey, the US, and Uruguay, and it is recognized as a concept that transcends culture and geography (Bodas and Ollendick 2005). Öner and Kaymak (1987) studied the level of test anxiety in Turkish youth and reported that they had lower levels than those in Korea, Iran, and Jordan. It is known that the level of test anxiety is directly correlated with the importance attributed to a particular examination (McDonald 2001).

High-stakes tests may negatively affect the psychological state and emotional balance of students due to their perceived importance and the pressure to perform well. Students with test anxiety may be excessively concerned with the consequences of failing a high-stakes test. Testing causes stress, especially when test performance affects future academic and career choices (Peleg and Popko 2004). Students in Turkey consider the high-stakes university entrance exam as a threat to their future and test preparation causes an increase in both cognitive and physiological components of test anxiety. Dereli (2003) reported that 47% of students preparing for the Turkish university entrance exam had a high level of anxiety. Dereli (2003) reported that success in examinations was overstressed in Turkey during primary and high school education. Among students that were preparing for the Turkish university entrance exam, 19% had low-level, 42% had moderate-level, and 39% had high-level test anxiety (Yıldırım 2004a, 2008).

In a study conducted in Turkey 71.7% of students reported that they used more than one method to reduce test anxiety (Şahin, Günay, and Batı 2006). Another Turkish study that investigated the utility of systematic desensitization to reduce test anxiety reported that it significantly decreased the level of test anxiety (Dereboy and Kaynak 2000). The first meta-analysis of intervention techniques for reducing test anxiety established an effect size of $E+ = 1.16$ (DiTomasso 1980), whereas subsequent studies reported a gradual decrease culminating in $E+ = 0.65$, as reported by Ergene (2003). Ergene (2003) attributed the decrease in the effect size of to improved study designs and statistical techniques. Behavioral and cognitive methods were observed to be effective in reducing test

anxiety, with effect sizes calculated as $E+ = 0.80$ and $E+ = 0.60$, respectively. Systematic desensitization and other behavioral techniques were reported to be effective ($E+ = 0.90$ and $E+ = 1.01$, respectively) (Ergene 2003). Among cognitive therapies, cognitive restructuring had the strongest effect ($E+ = 1.11$) (Ergene 2003). Neuderth et al. (2009) reported that in randomized controlled studies cognitive-behavioral treatment methods were effective for the management of test anxiety.

A review of cross-cultural studies by Bodas and Ollendick (2005) reported that although cognitive behavioral interventions were effective in reducing test anxiety, the effect might be specific to individualistic Western cultures. According to them, as in collectivist cultures worry component is not predominant, other therapy approaches may be more effective in such cultural contexts. It was reported that effect size was significant, both for individual and group interventions ($E+ = 0.84$), whereas for group therapy the effect size was moderate ($E+ = 0.67$) and for individual treatment the effect size was smaller ($E+ = 0.34$) (Ergene 2003).

Kazdin (1991) reported that in terms of evaluating psychotherapeutic strategies when attempting to determine which treatment is more or most effective for a given problem or population, comparison of 2 different treatment modalities for that problem is basic. This method is known as the comparative outcome strategy. The aim of the present study was to use the comparative outcome strategy to compare the effectiveness of systematic desensitization and cognitive restructuring in decreasing the level of test anxiety in a group of Turkish students preparing for their high-stakes university entrance exam (Liebert and Morris 1967, Lazarus and Averill 1972). The reason why anxiety related to high-stakes testing was considered here is the assumption that this test is an important social phenomenon and that emotional component of test anxiety, which includes physiological symptoms and anxiety, which is the cognitive component, can be differentiated from each other more readily and be observed by measurement tools.

MATERIALS AND METHODS

Participants

The study included 50 volunteer high school graduates and high school seniors that were referred to the Adnan Menderes University Hospital Psychiatry Clinic. Participants were sought through notices sent to test preparation centers in the city center of Aydın. In total, 72% of the students ($n = 36$) were female and 28% ($n = 14$) were male; mean age was 18.28 ± 1.25 years (range: 16-22 years). Among the students that were referred, those who reported that they did not think they could pass the university entrance exam and preparation tests

were included in the study. Students with a chronic physical disease or DSM-IV Axis I psychiatric disorder other than test anxiety and who were receiving psychiatric treatment (drug or therapy) were excluded from the study, but although care was taken in this respect 4 students with mild depression 1 of whom was on antidepressants, were included in the study, as there was no other therapy option at the time. Three of the above mentioned students with depression were undergoing cognitive therapy and the other was in a behavioral therapy group. Informed consent was obtained for audio visual recording of all practices and therapy sessions from the participants aged ≥ 18 year and from the legal guardians of students aged < 18 years. As this study was performed as part of a master's thesis, the study protocol was approved by the Health Sciences Institute Ethics Committee of Adnan Menderes University.

ASSESSMENT INSTRUMENTS

General Information and Variables of Test Form (GIVTF)

This form was completed during each participant's first interview and data were collected concerning complaints of test anxiety, the number of university entrance exams previously taken, and self-perceptions concerning their performance at school and test preparation centers.

Beck Anxiety Inventory (BAI)

The BAI is a self-report inventory that measures the frequency of physiological and other symptoms of anxiety experienced during the previous week (Beck, Epstein, and Brown 1988). The BAI was adapted for use in Turkey by Ulusoy (1993). The BAI has 21 items scored between 0 and 3. This inventory was used in the present study to determine the emotional component of test anxiety.

Dysfunctional Attitudes Scale (DAS)

DAS is a self-report scale that measures the prevalence of dysfunctional attitudes and the extent to which an individual shares patterned beliefs (Weissman and Beck 1978). The DAS was adapted for use in Turkey by Şahin and Şahin (1992). Each of the scale's 40 items is scored between 1 and 7. The DAS scale was used in the present study to measure the worry component of test anxiety.

State and Trait Anxiety Scale (STAI-1 and STAI-2)

STAI-1 and STAI-2 are self-report scales that measure the level of state and trait anxiety (Spielberger, Gorsuch, and Lushene 1970). The trait anxiety scale aims to measure how an individual feels himself at certain moments and under specific conditions, whereas the state anxiety scale measures how an individual feels himself independent of the present conditions, i.e. it is a general psychological state. The STAI-1

cut-off for high school students is 40. The scale includes 20 items scored between 1 and 4, and was adapted for use in Turkey by Öner and Le Compte (1985).

Beck Depression Inventory (BDI): The BDI is a self-report inventory that measures the severity of the somatic, emotional, cognitive and motivational symptoms in depression (Beck 1961). The BDI, which includes 21 items scored between 0 and 3, was adapted for use in Turkey by Hisli (1989).

Symptom Check List (SCL-90): SCL-90 is a self-report scale that measures psychiatric symptoms and difficulties experienced by an individual, and the level of negative stress reaction to these (Derogatis 1977). The scale includes 90 items scored between 0 and 4, and was adapted for use in Turkey by Dağ (1991).

PROCEDURES

First interview

Students were administered the GIVTF at referral and for those who meet inclusion criteria, cognitive or behavioral anxiety steps table was formed in order to develop the infrastructure of the study.

Therapy groups

Students were then randomly assigned to behavioral or cognitive therapy groups. In the investigation, overall eight group therapies were performed, four of which was behavioral and four of which was cognitive. Treatment groups included 4-8 people. Of the participants, 26 (52%) were in the cognitive treatment group and 24 (48%) were behavioral treatment group. Females were distributed evenly among the treatment groups, whereas 6 males were in the cognitive treatment group and 8 were in the behavioral treatment group.

Therapy sessions

All participants had 9 therapy sessions in each therapy group. Four therapy groups (2cognitive, 2 behavioral) had 1 session weekly ($n = 28$) in November-January and another 4 therapy groups ($n = 22$) in March-May. To determine if administering treatment during the 2 different periods (November-January and March-May) caused any differences in outcome post-therapy scale scores were compared between these periods and significant differences were not observed. Mean pre-therapy scale scores and those in the cognitive and behavioral therapy groups did not differ.

Therapy process

The first therapy session was reserved for introductions, sharing experiences of test anxiety, and providing information about the therapy process and the methods employed (systematic desensitization or cognitive restructuring). In the second session, parallel cognitive or behavioral university test

Table 1. University entrance test parallel anxiety steps* (from lowest to highest).

	Behavioral anxiety steps	Cognitive anxiety steps
1	Thinking that the date of the exam is approaching even one month before test.	The date of the test is coming closer. I will be excited and unable to answer the questions.
2	The day when the official document for taking test arrives.	The date of test is very close. What if I perform poorly? Will I be able to adjust time? Will I be able to answer all the questions?
3	Seeing the place where the test will be taken.	What if I cannot get a test score enough to get a place at a university.
4	The day when working for test is quitted.	I will get excited again. All my efforts will be in vain. I will shame my family and other close friends.
5	Talking with friends and relatives on the night before the test.	What if my friends pass the test and I can not pass? How will I be able to face my family?
6	Waking up on the morning of the test.	The test day has arrived: I am finished. What I am I going to do now? What if I cannot answer the questions I know.
7	Seeing other students in the garden of the school where the test will be carried out.	So many people in the garden. How will I pass the exam among so many people? I will score lower than they do. I am not ready for the test.
8	Entering the test hall and sitting on the desk.	In a few minutes, test will start. I am very excited. What if I cannot finish on time? What if I can not answer all the questions?
9	Distribution of test booklets.	Alas, we are about to start test.
10	The time when the exam starts.	I must answer very rapidly. I must finish on time.
11	Looking at questions.	Questions appear to be very difficult. I am finished. I will not be able to answer the questions.
12	Encountering a question one does not know.	Alas, I do not know the answer to this question.
13	Encountering unknown questions in succession.	There are many questions I do not know. I will not . I do not understand what I am reading. The questions are very difficult, I cannot do it.
14	Seeing someone sitting nearby in the test room is answering questions rapidly.	He/she answers more questions than I do. So, the questions are not difficult, but I find it hard, I can't answer the questions as fast as he/she does.

*This table may be used by referring to the source.

anxiety steps were developed in view of individual data obtained at first interview (Table 1). Those in the behavioral treatment groups were taught deep muscle relaxation. In both methods, cognitive or behavioral test anxiety steps developed by authors were used. In table 14 step main frames are shown. During each therapy session at most 3 steps were considered, and the pace of desensitization and restructuring of cognition was adjusted according to the pace of the slowest learning member of the group. Systematic desensitization was performed according to the classical method (Spiegler and Guevremont 2003) and cognitive restructuring was performed via evaluating the cognition of each participant, and learning about the adverse impact negative thoughts have on behavior and replacing them with more rational and suitable cognitions (Rose 1998; Corey 2000; Gazda, Ginter, and Horne 2001).

In the cognitive restructuring group homework was given at the end of each session, which was then discussed at the next session. All therapy sessions were video recorded. All therapy sessions were conducted by the first author (PBC), who was trained and is experienced in cognitive-behavioral methods.

Administration of the scales

In order to evaluate the efficacy of the therapies all participants were administered the BAI, DAS, STAI-1 STAI-2,

BDI, and SCL-90 at the start of the first therapy session and at the end of last session. In order to evaluate the efficacy of each therapy session the BAI and STAI-1 were administered at the beginning of each therapy session and STAI-1 was administered at the end of each session.

Statistical analysis

In order to evaluate the effect of therapy (cognitive and behavioral), on scale scores, and the interaction of these variables (i.e. scores and groups), 2 × 2 repeated measurements ANOVA was used for each scale. The t-test and Cohen's d (Cohen 1988) were used to calculate the effect size of the therapy process. Difference between scores of cognitive and behavioral therapy groups before therapy and the effect of test preparation center success on scale scores before treatment and on benefiting from therapy were the parameters evaluated with t-test. Since Shapiro-Wilks and Lilliefors (Norusis 1999) tests showed that the above mentioned variables were normally distributed, parametric analyses were used. However, as the number of participants (Table 3) in the analyses conducted to examine the effect of sex and self-perceived school performance was not even, non-parametric Mann-Whitney U test was used. The relationship between the number of university entrance exams taken, and scale scores before treatment and changes in scale scores after treatment was calculated using

Table 2. Differences between the therapies and the effect of the therapy process on scale scores (ANOVA).

Scales	Therapy process main effect		Therapy method main effect		Interaction	
	F(1,48)	P	F(1,48)	P	F(1,48)	P
BDI	24.65	P < 0.01	1.97	n.s.	0.00	a.d.
BAI	56.48	P < 0.01	2.95	n.s.	0.51	a.d.
STAI-1	30.86	P < 0.01	0.49	n.s.	0.10	a.d.
STAI-2	14.86	P < 0.01	0.43	n.s.	0.39	a.d.
DAS	28.79	P < 0.01	1.32	n.s.	0.00	a.d.
SCL-90	33.25	P < 0.01	2.26	n.s.	0.10	a.d.

Pearson's correlation coefficient. SPSS v.11.5 was used for all analyses.

RESULTS

Difference between the therapies and the effect of the therapeutic process on scale scores

The group effect and group process interaction did not have any significant effect on any of the scale scores in the present study (Table 2).

Changes in scale scores post treatment

ANOVA analysis showed that the effect of the therapeutic process on all scale scores was significant (Table 2). The comparison of scale scores before and after therapy, and the effect size of each therapy on scale scores are shown in Table 3.

Weekly changes

Mean BAI scores (cut-off point: 20) in both therapy groups prior to each session are shown in Figure 1.

Post therapy changes during each session

Comparison of STAI-1 scores between therapy groups before and after each session, and changes in scores is shown in Figure 2.

Variables related to test anxiety

The effects of variables regarding test anxiety are given in Table 4.

Sex

Females had higher STAI-2, BDI, and SCL-90 scores than males before therapy (STAI-2: $z = -2.46$, $P < 0.05$; BDI: $z = -2.33$, $P < 0.06$; SCL-90: $z = -2.21$, $P < 0.05$). But after therapy, decreases in scores of BDI and SCL-90 were found to be greater in the females than males (BDI $z = -2.07$, $P < 0.05$; SCL-90: $z = -1.99$, $P < 0.05$).

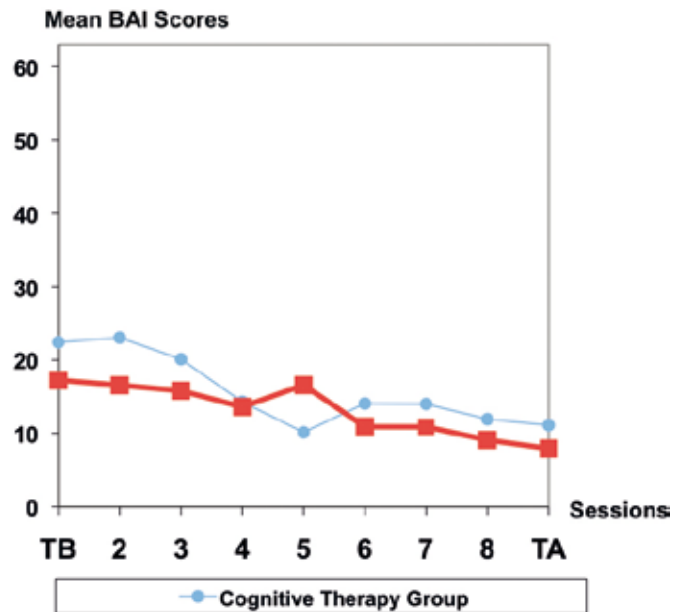


Figure 1. Mean BAI scores during therapy.

Self-perception of school and test preparation center performance

Pre-therapy scale scores did not differ between those that had the self-perception of academic success and those that had the self-perception of academic failure. Participants with the self-perception of test preparation center performance success had lower pre-therapy BAI, SCL-90, and STAI-2 scores (BAI $t_{(48)} = -2.40$, $P < 0.05$; SCL-90: $t_{(48)} = -2.19$, $P < 0.05$; STAI-2: $t_{(48)} = 3.05$, $P < 0.01$). When the effect of self-perceived test preparation center success on pre- and post-therapy scale scores was evaluated, a significant difference between those with the self-perception of success and those with the self-perception of failure was not observed.

The number of university entrance exams taken

There was positive correlation between the number of university entrance exams taken and all scale scores, except for DAS (BDI: $r = 0.31$, $P < 0.05$; BAI: $r = 0.32$, $P < 0.05$; STAI-2: $r = 0.37$, $P < 0.05$; SCL-90: $r = 0.31$, $P < 0.05$). As the number of tests taken increased, all scale scores increased. In terms of the relationship between the number of university entrance exams taken and the difference between pre- and post-treatment scores, there was a positive correlation between the number of exams taken and changes in STAI-2 scores (STAI-2: $r = 0.37$, $P < 0.05$).

DISCUSSION

The difference between therapies and the effect of the therapy process on scale scores

Table 3. The effect of the therapy process on scale scores and the size of the effect (Cohen's d).

Scales	Cognitive therapy				Behavioral therapy			
	Before x ± sd	After x ± sd	Student's t(25)	Cohen's d	Before x ± sd	After x ± sd	Student's t(23)	Cohen's d
BDI	17.42 ± 10.61	10.84 ± 8.19	3.80**	1.09	14.50 ± 9.01	7.88 ± 6.73	3.25*	0.95
BAI	22.4 ± 12.81	11.1 ± 8.10	5.39**	1.63	17.25 ± 10.99	7.91 ± 6.12	5.38**	1.82
STAI-1	48.07 ± 12.23	37.04 ± 10.52	3.95**	1.10	46.79 ± 14.79	34.42 ± 11.60	3.89**	1.14
STAI-2	51.00 ± 10.12	46.23 ± 8.62	2.34	0.66	50.33 ± 11.01	43.71 ± 10.56	3.09*	0.90
DAS	180.69 ± 32.79	197.38 ± 34.47	-5.56**	-1.57	170.25 ± 31.50	187.46 ± 34.00	-3.01*	-0.89
SCL-90	121.81 ± 64.70	82.15 ± 47.39	4.28**	1.27	99.33 ± 57.33	63.83 ± 39.29	3.89**	1.21

*P ≤ 0.01 **P ≤ 0.001

The common effect of scale scores before and after both behavioral and cognitive therapy was not significant, but the difference between pre- and post-therapy scale scores in both groups was statistically significant (Table 2). The efficacy of both therapies in reducing test anxiety was proven (Ergene 2003), as was expected.

When the efficacy of behavioral therapy aimed at the physiological component of test anxiety (emotionality) was compared with that of cognitive therapy directed towards the cognitive component (worry) (the results of ANOVA showed that both therapies were equally effective in decreasing test anxiety; however, when the effect of both therapies on scale scores was evaluated (Table 3), cognitive therapy was observed to have had a stronger effect on DAS and BDI scores than behavioral therapy, which supports the hypothesis of the study, whereas behavioral therapy had a stronger effect on BAI and STAI-2 (trait anxiety) scores. In the present study both therapies yielded significant positive changes in state and trait anxiety scores (STAI scores), the severity of depressive symptoms (BDI), and general psychiatric symptoms (SCL-90 score), in addition to the levels of anxiety

As the therapies used in the present study directly targeted test anxiety, it may be possible that the observed decreases in test anxiety had a positive impact on the participants' general psychological status as well. The studies reported in the literature support the above findings. Whereas behavioral and cognitive therapy decreased the level of state and trait anxiety of students (Snyder and Deffenbacher 1977; Deffenbacher and Shelton 1978; Goldfried, Linehan, and Smith 1978; Hembree 1988); behavioral therapy decreased the level of state anxiety during testing as well (Hembree 1988). The fact that both therapies used in the present study decreased the level of general anxiety, as well as the cognitive and physiological components of test anxiety, indicates the therapies' effects can be generalized to coping skills.

Three previous studies compared systematic desensitization and cognitive restructuring for decreasing test anxiety. The results of a study in which individual therapy was provided (Finger and Galassi 1977) were the same as those obtained in the present study, whereas 2 controlled studies on behavioral and cognitive group therapy (Holroyd 1976; Kaplan, McCordick, and Twitchell 1979) reported that cognitive therapy was more effective. Although this result seems to be contradictory, given the similar effect of individual and group therapies in decreasing test anxiety (Ergene 2003), it does not suggest that the difference between results are dependent on the type of therapy preferred. Bozanoğlu (2005) reported that cognitive and behavioral group therapy contributed to permanent decreases in the level of test anxiety of students. Wine (1971) was the first to report that the cognitive approach decreases test anxiety. According to Wine (1971), a treatment process combining the main principles of the therapeutic approach of Albert Ellis and using only cognitive restructuring may be beneficial and yield a decrease in test anxiety (Goldfried, Linehan, and Smith 1978). Numerous controlled studies on behavioral therapy reported that it was efficacious in decreasing test anxiety (Ergene 2003). The findings of the present study support the utility of both the cognitive approach of Wine (1971) and behavioral techniques.

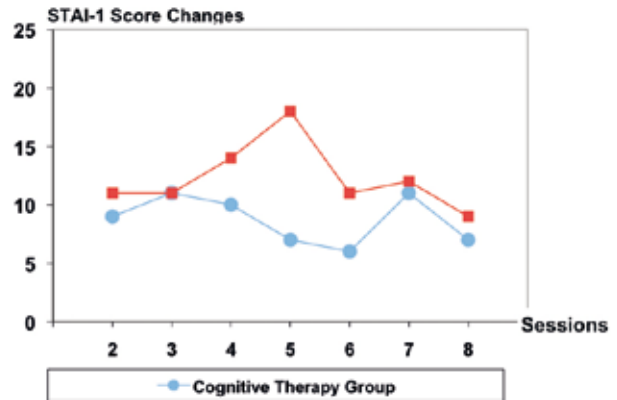
In the present study behavioral and cognitive therapies had comparable effects on the emotional and worry components of test anxiety. Cognitive therapy, as expected, decreased the level of test anxiety by controlling the cognitive symptoms of anxiety and had as significant an impact on physiological symptoms as did behavioral therapy. Likewise, behavioral therapy decreased the level of test anxiety by controlling the physiological symptoms of anxiety as well as decreasing severity of cognitive symptoms to the same extent as did cognitive therapy. It may be suggested that different interventions to one of the two different components of test anxiety also affect

Table 4. Distribution of the variables associated with test anxiety.

	n	%
Sex		
Female	36	72
Male	14	28
Self-perception of school performance		
Successful	33	66
Not successful	17	34
Self-perception of test preparation center performance		
Successful	25	50
Not successful	25	50
Number of university exams taken		
None	18	36
2	9	18
3	16	32
4	4	8
5	3	6

the other component strongly, illustrating the interaction between the cognitive, emotional, and physiological aspects of anxiety. Additionally, the present findings appear to partially support the test anxiety theory of Lazarus and Averill (1971). According to their theory, cognitive and emotional components of test anxiety are independent of each other, but in contrast to Liebert and Morris these components influence each other as a process in test anxiety. Consistent with this theoretical interaction, in different interventions directed at 2 different components of test anxiety, the component that was not targeted may also be affected at equal degree. Although the present findings are in support of this general effect, when the effect size was examined more thoroughly, it can be seen that therapy methods may exert stronger effects on the scales measuring targeted components especially in short term.

Some studies that investigated the effect of therapy on the components of test anxiety (Finger and Galassi 1977; Snyder and Deffenbacher 1977; Crowley, Crowley, and Clodfelter 1986), reported that cognitive and behavioral therapies were equally effective on the 2 components, whereas other studies (Sud and Sharma 1990; Sapp 1993; Bauman and Melnyk 1994) reported that cognitive and behavioral therapies had different effects on the components of the test anxiety. In the aforementioned studies, test anxiety was evaluated using the Liebert and Morris Emotionality and Worry Scale, whereas in the present study the worry component was evaluated using the DAS and the emotionality component was evaluated using the BAI.

**Figure 2.** STAI-I score changes.

Weekly changes

As the therapy sessions progressed BAI scores were found to be decreased. Those in the cognitive therapy group had a higher mean level of anxiety at baseline, but post treatment changes in anxiety scores in both groups were the same (Figure 1).

Differences between pre- and post-therapy scale scores

In terms of the changes in the STAI 1 scores (Figure 2), it was seen during all the therapy sessions that change in state anxiety scores were greater in those undergoing behavioral therapy and systematic desensitization involving relaxation practices resulted in greater change in state anxiety during the sessions. Among those in the behavioral therapy group, the level of state anxiety increased during the 5th session and during the following sessions there was consistent decrease. During the 5th session, the participants directly encountered the university entrance exam (the beginning of the test—looking at the questions), which caused a sudden increase in the level of anxiety levels that decreased by the end of the session.

The relationship between test anxiety and the related variables

Sex

Many studies that investigated gender differences in test anxiety established that females have higher levels of test anxiety than males, as in the present study (Holroyd 1978; Hembree 1988; Cassady and Johnson 2001; Kapıkıran 2002; Popko 2004; Chapell 2005; Egbochuku and Obodo 2005; Alyaprak 2006; Şahin, Günay, and Batı 2006), which suggest that females tend to express their emotions more than males, and more often perceive situations as threatening. Females with test anxiety evaluate their test performance negatively, in contrast to their actual performance (Holroyd et al. 1978). Males perceive tests as a personal challenge rather than a threat, and interpret the excitation caused by testing as positive (Peleg and Popko 2004). It is also stated that there are more girls

participating in the studies, which may influence the findings (Peleg and Popko 2004).

The present study included more females than males, which may have played a role in the observation that the females were more anxious than the males. A search of the literature concerning the efficacy of cognitive and behavioral therapies based on gender showed that there weren't any studies concerning cognitive therapy, but there were 2 on behavioral therapy (Katahn, Strenger, and Cherry 1966; Egbochuku and Obodo 2005), which reported that systematic desensitization reduced test anxiety equally well in males and females.

Self-perception of school and test preparation center performance

There wasn't a significant difference in the scale scores of the students with a positive self-perception of school performance and those with a negative self-perception, i.e. a negative self-perception of school performance did not increase anxiety; however, Kapıkıran (2002) reported that there was a significant relationship between test anxiety scores and self-perception of school performance. In another study lower level school performance increased the level of test anxiety (Dereli 2003). When the effect of self-perceived test preparation center performance on scale scores was evaluated, it was observed that those with a positive self-perception had significantly lower levels of anxiety and general psychiatric symptoms than those with a negative self-perception. Students think that university entrance exam performance and test preparation center performance are closely related. Dereli (2003) reported that obtaining lower scores than expected at test preparation centers resulted in higher levels of test anxiety, which be due to the fact that test preparation center tests and university entrance exams are similar in structure.

The number of university entrance exams taken

In the present study it is seen that as the number of university exams taken increased, all scale scores and the level of anxiety increased. Alyaprak (2006) reported that students that take a test ≥ 2 times have higher levels of test anxiety than other students. It may be that the level of anxiety increases as the number of tests taken increases, because students' perception of the test as a threat to their future increases as they fail subsequent entrance exams. When the relationship between the number of entrance tests taken and the changes in scores was evaluated, it was seen that there was positive change in test anxiety in students who entered the test more times, which may have been due to the fact that students that experienced the negative effects of anxiety on test performance may had a strong desire to decrease test anxiety.

Post therapy, 48(96%) of the 50 students passed their university entrance exam, and 2 failed (4%). Among the students that passed the exam, 32 previously failed. The negative impact of

test anxiety on test performance has been proven in controlled studies (Deffenbacher 1978; Hembree 1988; Hong 1998). A limitation of the present study is the lack of a matched control group for comparing performance, which limits interpretation of causality; yet we think there was an improvement in test performance compared to past. Post therapy there was a significant improvement in scale scores however, the actual benefit of the therapy was during university entrance tests and whether or not the benefit was permanent could not be determined within the scope of this study. Another limitation of the present study is that the same researcher conducted all the therapy sessions and administered all the scales. Self-report scales were chosen to overcome this limitation; however, the risk of bias in interpreting the findings remains.

REFERENCES

- Alyaprak I (2006) Üniversite sınavına hazırlanan öğrencilerde sınav kaygısını etkileyen faktörlerin incelenmesi. Yayınlanmamış yüksek lisans tezi. Ege Üniversitesi Sosyal Bilimler Enstitüsü, İzmir-Türkiye.
- Bauaman W, Melnyk WT (1994) A Controlled comparison of eye movements and finger tapping in the treatment of test anxiety. *J Behav Ther Exp Psychiar*, 25: 29-33.
- Beck AT (1961) An inventory for measuring depression. *Arch Gen Psychiatry* 4: 561-71.
- Beck AT, Epstein N, Brown G (1988) An Inventory for measuring clinical anxiety: Psychometric properties. *J Consul Clin Psychol*, 56:893-97.
- Bodas J, Ollendick T H (2005) Test Anxiety: A Cross-cultural perspective. *Clin Child Fam Psychol Rew*, 8:65-8.
- Bozanoğlu I (2005) Bilişsel davranışçı yaklaşıma dayalı grup rehberliğinin güdülenme, benlik saygısı, başarı ve sınav kaygısı düzeylerine etkisi. *Ankara University Journal of Faculty of Educational Sciences*, 38: 17-42.
- Cassady JC, Johnson RE (2001) Cognitive test Anxiety and academic performance. *Contemp Educ Psychol*, 27: 270-95.
- Chapell MS, Blanding ZB, Silverstein ME, Takahashi M, Newman B, Gubi A, Mccann N (2005) Test anxiety and academic performance in undergraduate and graduate students. *J Educ Psychol*, 97: 268-74.
- Cohen J (1988) *Statistical Power Analyses for the Behavioral Sciences*. USA: Lawrence Erlbaum Inc.
- Corey G (2000) *Theory & practice of group counseling*. U.S.A: Brooks/ Cole Cooper Company.
- Crowley C, Crowley D, Clodfelter C (1986) Effects of a self- coping cognitive treatment for test anxiety. *J Counsel Psychol*, 33: 84-6.
- Dağ I (1991) Belirti Tarama Listesi'nin (SCL-90-R) üniversite öğrencileri için güvenilirliği ve geçerliği. *Türk Psikiyatri Derg*, 2: 5-12.
- Deffenbacher JL (1978) Worry, emotionality and task-generated interference in test anxiety: An empirical test of attentional theory. *J Educ Psychol*, 70: 248-54.
- Deffenbacher JL, Shelton JL(1978) Comparison of anxiety management training and desensitization in reducing test and other anxieties. *J Counsel Psychol*, 25: 277-82.
- Dereboy Ç, Kaynak H (2000) ÖSS' ye yönelik sınav kaygısının grupta sistematik duyarsızlaştırma yöntemi ile tedavi süreci. XI. Ulusal Psikoloji Kongresi, Özet Kitabı, p: 23.
- Dereli A(2003) Üniversite sınavına hazırlanan öğrencilerde sınav kaygısını nasıl azaltabiliriz? Yöret Postası. 02.02.2010, <http://www.yoret.org.tr/download/posta/68.doc>
- Derogatis LR (1977) *SCL 90: Administration, scoring and procedure manual-1 for the revised version*. Baltimore, MD: John Hopkins Univ., Clinical Psychometrics Unit.

- DiTomasso RA (1980) A Meta-analysis of therapy outcome research with test anxious college students (Doctoral dissertation, University of Pennsylvania, 1981). *Dissertation Abstracts International* 41: 3884.
- Egbochuku EO, Obodo BO (2005) Effects of systematic desensitization therapy on the reduction of test anxiety among adolescents in Nigerain schools. *J Instruct Psychol*, 32: 298-304.
- Ergene T (2003) Effective Interventions on test anxiety reduction: a meta-analysis. *School Psychology International*, 24:313-28.
- Finger R, Galassi JP (1977) Effects of modifying cognitive versus emotionality responses in the treatment of test anxiety. *J Consult Clin Psychol*, 45: 280-7.
- Gazda GM, Ginter EJ, Horne AM (2001) Group counseling and group psychotherapy: Theory and Application. U.S.A: Allyn & Bacon Education Company.
- Goldfried MR, Linehan MM, Smith JL (1978) Reduction of test anxiety through cognitive restructuring. *J Consult Clin Psychol*, 46 (1): 32-9.
- Hagtvet KA, Man F, Sharma S (2001) Generalizability of self- related cognitions in test anxiety. *Pers Individ Differ*, 31: 1147- 1171.
- Hembree R (1988) Correlates, causes, effects and treatment of test anxiety. *Rev Educ Res*, 58: 47-77.
- Hisli N (1989) Beck Depresyon Envanterinin üniversite öğrencileri için geçerliği, güvenilirliği. *Psikoloji Derg*, (7): 3-13.
- Holroyd KA (1976) Cognition and desensitization in the group treatment of test anxiety. *J Consult Clin Psychol*, 44: 991-1001.
- Holroyd KA, Westbrook T, Wolf M, Badhorn E (1978) Performance, cognition and physiological responding in test anxiety. *J Abnorm Psychol*, 87: 442-51.
- Hong E (1998) Differential stability of individual differences in state and trait test anxiety. *Learn Indiv Differ*, 10: 51-69.
- Kapıkıran Ş (2002) Üniversite öğrencilerinin sınav kaygısının bazı psiko-sosyal değişkenlerle ilişkisi üzerine bir inceleme. *Pamukkale Üniversitesi Eğitim Fakültesi Derg*, 11: 34-43.
- Kaplan RM, Mccordick SM, Twitchell M (1979) Is the cognitive or the behavioral component which makes cognitive- behavior modification effective in test anxiety. *J Counsel Psychol*, 26: 371-7.
- Katahn M, Strenger S, Cherry N (1966) Group counseling and behavior therapy with test-anxious college students. *J Counsel Psychol*, 30 (6): 544-9.
- Kazdin AE (1991) Treatment research: The investigation and evaluation of psychotherapy. *The Clinical Psychology Handbook*, 2. Press, M Hersen, AE Kazdin, AS Bellack (Ed), New York. Pergamon, s. 293-312.
- Lazarus AA (1971) Behavior therapy and beyond. New York: McGraw – Hill.
- Liebert RM, Morris LW (1967) Cognitive and emotional components of test anxiety: A distinction and some initial data. *Psychol Re*, 20: 975-8.
- McDonald AS (2001) The prevalence and effects of test anxiety in school children. *Educ Psychol*, 21: 89-101.
- Morris LW, Davis MA, Hutchings CH (1981) Cognitive and emotional components of anxiety: Literature review and a revised worry-emotionality scale. *J Educ Psychol*, 73: 541-55.
- Neudert S, Jabs B, Schmidtke A (2009) Strategies for reducing test anxiety and optimizing exam preparation in German university students: A prevention-oriented pilot project of the University of Würzburg *J Neural Transm*, 116:785-90.
- Norusis MJ (1999) SPSS 9.0 Guide to data Analysis. USA Prentice-Hall Inc.
- Öner N, Le Compte A (1985) Durumluk- Sürekli kaygı envanteri elkitabı. İstanbul:Boğaziçi Üniversitesi Yayınları.
- Öner N, Kaymak DA (1987) The transliteral equivalence and the reliability of the Turkish TAI. Unpublished manuscript, University of Missouri-Columbia.
- Peleg-Popko O (2004) Differentiation and test anxiety in adolescents. *J Adolescence*, 27: 645-62.
- Rose SD (1998) Group therapy with troubled youth (A Cognitive- Behavioral Interactive Approach). U.S.A: Sage Publications.
- Sapp M (1993) Test anxiety: Applied research, assessment and treatment interventions. University Press of America, Lanham.
- Sarason IG (1984) Stress, anxiety and cognitive interference: Reactions to tests. *J Person Soc Psychol*, 46: 929-38.
- Spiegler MD, Guevremont DC (2003) Contemporary behavior therapy, USA: Wadsworth, Thomson Learning, s. 204-216; 332-3
- Spielberger CD (1966) Theory and research on anxiety. *Anxiety and behavior*, CD Spielberger (Ed). NY: Academic Press, s. 3-20.
- Spielberger CD (1972a) Anxiety as an emotional state. *Anxiety, current trends in theory and research*, CD Spielberger (Ed).
- Spielberger CD (1972b) Conceptual and methodological issues in anxiety research. *Anxiety, current trends in theory and research*, CD Spielberger (Ed).
- Spielberger CD, Gorsuch RL, Lushene RE (1970) Manual for State- Trait anxiety inventory. California: Consulting Psychologist Press.
- Spielberger CD, Vagg RR (1995). Test anxiety, theory, assessment and treatment. Washington, DC: Taylor & Francis.
- Sud S, Sharma S (1990) The differential effect of attentional skills training on worry and emotionality components of test anxiety. *Psychol Stud*, 35: 143-50.
- Synder AL, Deffenbacher JL (1977) Comparison of relaxation as self- control and systematic desensitization in the treatment of test anxiety. *J Consult Clin Psychol*, 45: 1202-3.
- Şahin NH, Şahin N (1992) Reliability and validity of the Turkish version of the automatic thoughts questionnaire. *J Clin Psychol* (48): 334-40.
- Şahin H, Günay T, Batu H (2006) İzmir ili Bornova ilçesi lise son sınıf öğrencilerinde üniversiteye giriş sınavı kaygısı. *STED*, 15 (6).
- Ulusoy M (1993) Beck Anksiyete Envanteri- geçerlik ve güvenilirlik çalışması (Yayınlanmamış uzmanlık tezi). İstanbul; Bakırköy Ruh ve Sinir Hastalıkları Hastanesi.
- Weissman AN, Beck AT (1978) Development and validation of the Dysfunctional Attitude Scale: A preliminary investigation. Paper presented at the Annual Meeting of the American Educational Research Association, Toronto.
- Wine J (1971) Test anxiety and direction of attention. *Psychol Bull*, 76: 92-104.
- Yıldırım I (2004) Depresyonun yordayıcısı olarak sınav kaygısı, gündelik sıkıntılar ve sosyal destek. *Hacettepe Üniversitesi Eğitim Fakültesi Derg*, 27: 241-50.
- Yıldırım I, Gençtanırım D, Yalçın I, Baydan Y (2008) Sınav kaygısının yordayıcıları olarak akademik başarı, mükemmeliyetçilik ve sosyal destek. *Hacettepe Üniversitesi Eğitim Fakültesi Derg*, 34: 287-96.
- Zeidner M (1998) Test anxiety: the state of the art. New York: Plenum Press.