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Original Article

Comparison of guided and unguided internet-based cognitive behavioral therapy for test anxiety

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Abstract

This study aims to compare the effectiveness of guided and unguided internet-based cognitive behavioral therapies (iCBT) in reducing test anxiety. A total of 64 participants were included in the study, with 32 in the guided group and 32 in the unguided group. Test anxiety levels before and after the intervention were measured using the Test Anxiety Inventory (TAI), and adherence was assessed based on the completion percentage of the iCBT program. Data were analyzed using repeated measures analysis of variance. A significant main effect was found for the time factor ($F(1, 62) = 108.046$, $p < .001$), but the time × group interaction was not significant ($F(1, 62) = 1.153$, $p = .287$). Holm-adjusted post hoc analyses revealed significant and large effect size reductions in test anxiety scores in both groups (unguided group: $d = 1.562$; guided group: $d = 1.922$). No significant difference was observed between the groups' final test scores ($p = .832$, $d = 0.153$), and the effect size difference was also not significant ($z = 0.63$, $p = .528$). Furthermore, the percentage of guided group members using iCBT was significantly higher than that of the unguided group ($U = 336.000$, $p = .017$), but no significant relationship was found between the percentage of use and the change in test anxiety ($r = .127$, $p = .317$). The findings indicate that guided intervention has the potential to increase user adherence, while unguided iCBT may also be an effective and independently applicable intervention option. In conclusion, both intervention formats offer effective, accessible, and flexible psychological support options for reducing test anxiety.

Keywords

Test anxiety

Internet-based cognitive behavioral therapy

Cognitive behavioral therapy

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Introduction

It is a natural reaction for individuals to experience a certain level of stress and anxiety in any situation where they are required to perform in their daily lives. Exams that assess academic achievement are one such situation where these types of emotional responses are commonly observed. Under intense expectations and performance pressure, individuals' anxiety levels may increase, preventing them from effectively utilizing their current abilities and fully demonstrating their potential

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(Doherty & Wenderoth, 2017). In this context, test anxiety is considered a type of performance anxiety. Test anxiety shares common characteristics with other types of performance anxiety, such as sports and public speaking anxiety (American Psychiatric Association [APA], 2021).

Test anxiety is a type of anxiety that causes a decline in academic performance because of emotional, behavioral, and physiological responses arising from the individual's cognitive processes during the test preparation process or during the test itself. Evaluations of test anxiety in the literature are consistent with our definition and support the view that this condition can negatively affect an individual's academic success (Dusek, 1980; Spielberger & Vagg, 1995; Zeidner, 2020).

Studies on the prevalence of test anxiety report that a significant proportion of students experience intense anxiety about exams. While the prevalence of test anxiety in Western societies ranges between 25-40% (Thomas et al., 2018; Zeidner, 2020), studies conducted in different cultures show that the prevalence of test anxiety among students is around 25-30% (Yıldırım, 2008). Research conducted in Turkey, however, reports higher levels of test anxiety. Yıldırım (2007) stated that 42% of students preparing for exams in Turkey experienced high test anxiety, while Kavakci et al. (2014) reported this rate to be 48%. Furthermore, it is stated that approximately 18% of students with high test anxiety have their academic achievement negatively affected by high anxiety levels (Adana & Kaya, 2005).

Interventions implemented to improve test anxiety are generally based on cognitive behavioral therapy (CBT) (Ergene, 2003). CBT is an evidence-based therapy method that combines cognitive and behavioral techniques and has been shown to be effective in reducing students' test anxiety (Larson et al., 2010; Neuderth et al., 2009; Putwain & von der Embse, 2021; Ramirez & Beilock, 2011; von der Embse et al., 2013). However, some studies suggest that cognitive interventions may be effective in reducing test anxiety even without behavioral techniques (Ulusoy et al., 2016). Nevertheless, Ergene's (2003) comprehensive meta-analysis shows that combining skill-focused interventions with cognitive and behavioural techniques is more effective in alleviating test anxiety.

Internet-based cognitive behavioral therapy (iCBT) is an intervention method that provides clients with the structured content of face-to-face CBT sessions, making it easy to use (Andersson, 2016). iCBT teaches cognitive behavioral techniques to its users through interactive software that can be used on devices such as mobile phones, tablets, or computers, and encourages users to apply these techniques regularly (Carlbring et al., 2018). The effectiveness of iCBT has been researched on various psychological disorders, and successful results have been obtained in many studies. Studies on diagnoses such as depression (Clarke et al., 2005; Cuijpers et al., 2010; Melling & Houguet-Pincham, 2011), anxiety (Dryman et al., 2017; Jakobsen et al., 2017; Nordgren et al., 2014), and social anxiety (Kampmann et al., 2016; Klein et al., 2010) have shown that iCBT is effective in treating these disorders.

This study examines two types of iCBT programs (guided and unguided iCBT). In guided iCBT programs, the therapist interacts with the client through face-to-face, live video sessions, phone calls, or messaging to guide the process (Titov et al., 2010). The therapist monitors progress, while the software takes on the tasks of teaching new CBT techniques and providing practical exercises (Andersson & Titov, 2014). On the other hand, unguided iCBT programs offer a structure that does not require the therapist's direct participation and can be completed by users without professional support (Baumeister et al., 2014).

A recent meta-analysis including randomized controlled trials has shown that guided and unguided iCBT are equally effective in treating anxiety and related disorders (Oey et al., 2023). The results indicate that guided and unguided interventions lead to similar clinical outcomes, but guided interventions may be more effective in the short term. However, follow-up studies have observed that the advantages of guided interventions diminish over time. Furthermore, it was determined that the number of sessions in guided interventions increased the effect size, while reminders and intervention duration had no significant effect in unguided interventions (Oey et al., 2023).

Another meta-analysis comparing guided and unguided iCBT indicated that severity of distress is also an important determinant (Karyotaki et al., 2021). This study indicated that guided iCBT was more effective than unguided iCBT, but this difference was particularly pronounced in individuals with moderate to severe depression. In contrast, unguided iCBT was found to have similar levels of effect in individuals with mild depressive symptoms. Furthermore, both guided and unguided iCBT were found to be more effective than control treatments in the short and long term, but the superiority of guided iCBT decreased significantly at 6- or 12-month follow-ups.

Looking at studies applying iCBT for test anxiety, it is seen that research in this area is quite limited compared to other psychological disorders. Orbach et al. (2007) conducted the first randomized controlled trial involving iCBT interventions in the modern sense. The results of the study show that the iCBT program can significantly reduce test anxiety. Compared to the control group, a significant decrease in test anxiety levels was observed in the intervention group. In the literature, a guided iCBT study involving limited therapist intervention (one written message per week) found that students in the experimental group showed a significant decrease in test anxiety. Furthermore, it has been reported that students participating in the intervention experienced a significant decrease in their overall psychological distress and anxiety levels (Warnecke et al., 2020). These findings suggest that iCBT may be an effective intervention method for improving test anxiety among university students. One of the limited number of studies conducted in Turkey examined the effect of an unguided iCBT program on students preparing for high school and university exams (Avcil & Herdi, 2023). The study found that students who used the iCBT program experienced a significant decrease in their test anxiety levels, and their state and trait anxiety levels also decreased significantly compared to the control group.

The limited number of studies in the literature on iCBT interventions for test anxiety and the recommendations in existing studies for further research necessitate the expansion of scientific knowledge in this area. Accordingly, this study aims to evaluate the effect of an iCBT program developed for test anxiety and to compare guided and unguided applications. It is expected that a guided iCBT study conducted specifically with a Turkish sample will reveal whether it offers an alternative approach to traditional CBT and whether iCBT is an effective tool for reducing test anxiety.

Within this scope, two main hypotheses were tested in the study: (H1) The reduction in test anxiety among students using the guided iCBT program will be greater than that among students using the unguided iCBT program; (H2) Both types of intervention are predicted to provide a significant reduction compared to the initial levels of test anxiety. To evaluate these hypotheses, changes in test anxiety among students who used the iCBT program through face-to-face sessions guided by a therapist were compared with changes in test anxiety scores among students who used the iCBT program on their own without guidance.

Method

This study examined the effectiveness of guided and unguided implementation of an iCBT program developed for test anxiety. A 2x2 experimental design was used in the study. The first factor represents the independent treatment groups (guided and unguided iCBT), while the second factor represents repeated measurements of the dependent variable (pre-test, and post-test). The dependent variable of the study was test anxiety level, while the independent variable was the guided or unguided iCBT intervention program applied to the participants.

Participants

Participants in the guided iCBT group were individuals who sought help at a private psychiatric clinic in Antalya for test anxiety complaints, had no psychiatric diagnosis other than test anxiety complaints, and did not require medication. Participants in the unguided iCBT group registered on a website (psikademi.com) designed to offer iCBT programs free of charge and used the test anxiety program (No More Test Anxiety) on their own. Participants were asked the questions, "Have you ever received a psychiatric diagnosis?" and "Are you taking any psychiatric medication?". All participants answered these questions and stated that they did not have any psychiatric diagnoses and were not

taking any medication. Based on these statements, they were included in the study. The inclusion criteria for the study were; being a student, scoring above 40 on the Test Anxiety Inventory (TAI), volunteering to participate in the study, not having any psychiatric diagnosis, not using psychiatric medication, and having used at least 60% of the iCBT program (14 days). Informed consent forms were obtained from all participants over the age of 18 and from both the participants themselves and at least one parent for participants under the age of 18.

Participants were assigned to groups based on their preferred condition (face-to-face, online). A total of 64 participants were included in the study: 32 in the guided iCBT group and 32 in the unguided iCBT group. A total of 98 individuals registered for the program before being included in the unguided iCBT group, but 66 of these participants were excluded from the analysis because they did not meet the criterion of completing at least 60% of the program. On the other hand, no exclusions were made in the guided iCBT group because all participants who applied for the study met the inclusion criteria. The average age of the guided group was 17.40, and the group consisted of 24 girls and 8 boys. The average age of the unguided group was 16.90, and the group consisted of 24 girls and 8 boys. Of the participants in the guided iCBT group, 26 were preparing for the Higher Education Institutions Exam (YKS), 5 for the High School Transition Exam (LGS), and 1 for the Vertical Transition Exam (DGS). Of the participants in the unguided iCBT group, 20 were preparing for the YKS, 10 for the LGS, and 1 for the DGS (Table 1). The equalization of participant numbers and gender distribution in the groups occurred not as a planned intervention but as a natural consequence of the data collection process.

Table 1. Participants' sociodemographic data

		Guided iCBT Group		**Unguided iCBT Group**	
		M	**sd**	**M**	**sd**
Age		17.406	2.448	16.906	2.787
		n	**%**	**n**	**%**
Gender	Female	24	75	24	75
	Male	8	25	8	25
School	Middle School	5	15.62	10	31.25
	High School	26	81.25	20	62.50
	University	1	3.12	2	6.25
Prepared Exam*	LGS	5	15.62	10	31.25
	YKS	26	81.25	20	62.50
	DGS	1	3.12	1	3.12
Total		32		32	

*LGS: High School Transition Exam, YKS: Higher Education Institutions Exam, DGS: Vertical Transfer Exam

Data Collection Tools

Demographic Information Form: The demographic information form consists of questions designed to collect basic information about participants, including their age, gender, city of residence, school, the exam they are preparing for, and whether they have received any psychological/psychiatric treatment.

Test Anxiety Inventory: Test anxiety was measured in this study using the Test Anxiety Inventory. The inventory was developed by Spielberger in 1980 and adapted into Turkish, with validity and reliability studies conducted (Öner, 1990). The scale consists of 20 Likert-type items, and total scores range from 20 to 80. High scores indicate high test anxiety, while low scores indicate low test anxiety. The Cronbach's alpha coefficient for the internal consistency of the scale was found to be 0.87 in the Turkish sample (Öner, 1990). In this study, the Cronbach's alpha coefficient for the TAI was calculated as .94.

Treatment Procedure

The iCBT procedure (No More Test Anxiety) developed for test anxiety is primarily a 21-day web-based program consisting of online videos, online tests, and exercises aimed at changing thoughts. The program includes psychoeducation, cognitive restructuring, cognitive and behavioral exercises aimed at creating study habits and increasing and maintaining motivation, exercises aimed at changing attention and thinking focus, breathing and relaxation exercises, and exposure content related to test anxiety. The first 14 days of the program introduce participants to new methods and skills, while the last 7 days are dedicated to reinforcing these skills. Therefore, a minimum completion threshold of 60% (14 days) has been set as the criterion for inclusion in the study. Users can access the program via smartphone, tablet, or computer and complete the daily content in approximately 15 minutes. Appendix 1 details the program's daily content and flow.

Prior to the intervention, participants in the unguided iCBT group did not undergo any face-to-face psychological or psychiatric assessment. This choice was based on the assumption that, in an online and voluntary intervention structure, referring participants to a healthcare facility could create access difficulties and lead to sample loss. Participants were informed that they would use the program on their own and were encouraged to participate in the process without receiving any guidance in person, online, via email, or text message. Participants' progress throughout the program was monitored solely through the website's administrator panel. However, no additional assessment was made at any stage of the process regarding whether participants received other psychological support.

Participants in the guided iCBT group underwent an individual assessment interview before starting the process, and situations in which they experienced test anxiety were assessed through face-to-face interviews. After the initial measurements were completed, participants were included in the intervention for test anxiety using the iCBT program. Throughout this process, the guidance service was provided solely by a clinical psychologist, and all sessions with participants were conducted one-on-one. The first author of the study took on the guidance role. The first author holds a master's degree in clinical psychology and a doctorate in psychology and also has training and clinical practice experience in cognitive behavioral therapy. Although involved in the program's development phase, standard procedures were adhered to throughout the counseling process to minimize the risk of bias. Sessions were conducted using structured content, and measurements were collected via an independent, automated online system. The role of the counselor was not to directly provide psychotherapy but to inform participants about the techniques and methods included in the iCBT program and to support the effective use of the program. During the sessions, explanations were provided about the cognitive behavioral therapy techniques used to cope with test anxiety, but the applications were not provided directly during the sessions; rather, they were provided through exercises that participants completed via the iCBT program. Between sessions, participants were given homework assignments that included cognitive restructuring, relaxation techniques, motivation enhancement exercises, and exposure exercises included in the program. Participants' completion rates and progress were monitored through the website's administrator panel. The number of face-to-face sessions for participants in the guided iCBT group varied according to individual needs. The average number of sessions was 6, with a minimum of 3 and a maximum of 18 sessions conducted. Session duration and frequency were determined based on the participant's commitment to the process and individual needs. The average intervention duration for participants was 13 weeks, with the shortest duration being 3 weeks and the longest being 32 weeks.

Participants in the guided group completed an average of 89.46% of the iCBT program (range: 60%-100%), and half of the participants (n=16) completed the program 100%. In contrast, participants in the unguided iCBT group participated in the program without any therapist or guide support. Participants completed the program on their own over 30 days, with a fixed 30-day interval between the initial and final measurements. It was determined that the unguided group completed an average of 83% of the iCBT program (range: 60%-100%), with half of the participants (n=16) completing more than 85% of the program and 3 participants completing 100%.

The final measurements for all participants in both groups were taken before they took the exam they had prepared for, and no additional measurements were taken after they took the exam. Therefore, variables such as exam results and exam performance were not evaluated in the study.

During the study, care was taken to apply the same iCBT intervention to participants in both groups. The intervention consisted of standard components such as cognitive restructuring, relaxation techniques, motivation enhancement exercises, and exposure exercises, and was presented in the same format for both groups. Participants in the guided iCBT group received additional guidance from a clinical psychologist while using the program, but no direct psychotherapy was administered during this process. The role of the guide was limited to informing participants about the techniques included in the iCBT program, increasing their adherence to the process, and guiding the use of the program. Accordingly, although the same intervention content was offered to both groups, there were some structural differences between the groups apart from the guidance support. The guided group consisted of participants identified through clinical referral and undergoing a preliminary assessment process, while the unguided group was determined based on online application and included in the process without any face-to-face assessment. This adds an additional dimension to the study in terms of comparing the applicability of intervention types in real-life conditions.

Findings

The study included a total of 64 participants, 32 in the guided iCBT group and 32 in the unguided iCBT group. Before proceeding to the analyses of Test Anxiety Inventory (TAI) scores, the assumptions of normal distribution and variance homogeneity were evaluated. The Shapiro-Wilk normality test results were W = 0.974, p = .186 for the first measurement of the TAI and W = 0.969, p = .108 for the final measurement, indicating that the assumption of normal distribution was met for both measurements. Levene's test results were F(1, 62) = 0.019, p = .890 for the first TAI measurement and F(1, 62) = 3.600, p = .062 for the final measurement, confirming that the variances were homogeneous. The iCBT usage percentage data were found to be non-normally distributed, and the differences between groups were analyzed using the non-parametric Mann-Whitney U test. To evaluate the effect of the intervention on test anxiety, a two-factor analysis of variance with repeated measures was applied, with time (pre-test - post-test) as the first factor and group (guided - unguided) as the second factor.

The Mann-Whitney U test was applied to assess whether the iCBT usage percentage differed between the guided and unguided iCBT groups (Table 2). The analysis results show that the usage percentage of the guided iCBT group is significantly higher than that of the unguided group (U = 336.000, p = .017). The mean usage percentage was calculated as 83.44 (SD = 12.09) for the unguided group and 89.47 (SD = 13.48) for the guided group. Figure 1 shows each participant's individual usage percentages (dots), the median and quartile values for each group (box plot), and the distribution densities (curves) together. The guided group generally exhibits a higher and more stable usage rate. The effect size of this difference was found to be r = .344 using the rank-biserial correlation coefficient and was assessed as corresponding to a medium effect size. However, since no significant relationship was observed between the usage percentage and the change in test anxiety (r = .127, p = .317), this variable was not included as a control variable in subsequent analyses.

Table 2. Comparison of iCBT usage percentage between groups

Measure	Group	N	M	Standard Deviation	Standard Error	Coefficient of Variation	U	p
iCBT Usage Percentage	Unguided	32	83.438	12.091	2.137	0.145	336.000	.017
	Guided	32	89.469	13.484	2.384	0.151		

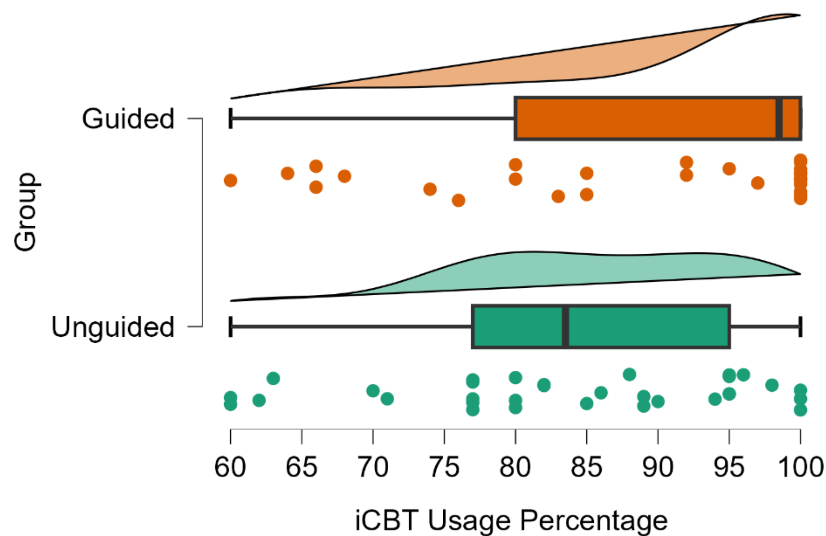

Figure 1. Distribution of iCBT usage percentage among groups

Repeated measures analysis of variance results (Table 3) indicates that the intervention program (pre-test - post-test) had a significant effect on test anxiety levels ($F(1, 62) = 108.046$, $p < .001$). This finding indicates that test anxiety decreased significantly in all participants after the intervention. However, the time × group interaction is not statistically significant ($F(1, 62) = 1.153$, $p = .287$), suggesting that the decrease in anxiety levels after the intervention occurred similarly in the guided and unguided groups. Furthermore, there was no significant difference in overall test anxiety levels between groups ($F(1, 62) = 0.021$, $p = .884$).

Table 3. Repeated measures ANOVA results

Measurements	**Group**	**N**	**M**	**Standard Deviation**	**Standard Error**	**Coefficient of Variation**
TAI Pre-Treatment	Unguided	32	54.281	9.247	1.635	0.170
	Guided	32	56.188	9.386	1.659	0.167
TAI Post-Treatment	Unguided	32	39.906	10.858	1.919	0.272
	Guided	32	38.500	6.886	1.217	0.179
Residuals		**Sum of Squares**	**df**	**Mean Square**	**F**	**p**
Time		8224.031	1	8224.031	108.046	**<.001**
Time × Group		87.781	1	87.781	1.153	0.287
Residuals		4719.188	62	77.116		
Groups		2.000	1	2.000	0.021	0.884
Residuals		5786.875	62	93.337		

*TAI: Test Anxiety Inventory

Holm-adjusted post hoc comparisons (Table 4) showed no significant difference between the initial measurement scores of the guided and unguided groups ($p_{holm} = .832$, $d = -0.207$, 95% CI = [-0.899, 0.484]). On the other hand, a significant decrease was observed between the initial and final measurement scores of both groups. In the unguided group, this difference was $M_{difference} = 14.375$, $p_{holm} < .001$, $d = 1.562$, 95% CI = [0.811, 2.312], while in the guided group, $M_{difference} = 17.688$, $p_{holm} < .001$, $d = 1.922$, 95% CI = [1.123, 2.721]. When the final measurement scores of the groups were compared, no significant difference was observed ($p_{holm} = .832$, $d = 0.153$, 95% CI = [-0.521, 0.827]). A z test comparing the effect sizes (Cohen's d) indicated that the difference was not statistically significant ($z = 0.63$, $p = .528$). These results indicate that both interventions were effective in reducing test anxiety,

but no significant difference emerged between the groups after treatment. The distribution of TAI scores for guided and unguided iCBT groups is shown in Figure 2.

Table 4. Post hoc analysis results

Measurements		Mean Difference	Standard Error	t	Cohen's d	95% CI for Cohen's d		pholm
						Low	High	
Unguided Initial	Guided Initial	-1.906	2.329	-0.818	-0.207	-0.899	0.484	0.832
	Unguided Final	14.375	2.181	6.591	1.562	0.811	2.312	**<.001**
	Guided Final	15.781	2.301	6.858	1.714	0.914	2.515	**<.001**
Guided Initial	Unguided Final	16.281	2.301	7.075	1.769	0.962	2.576	**<.001**
	Guided Final	17.688	2.181	8.109	1.922	1.123	2.721	**<.001**
Unguided Final	Guided Final	1.406	2.273	0.619	0.153	-0.521	0.827	0.832

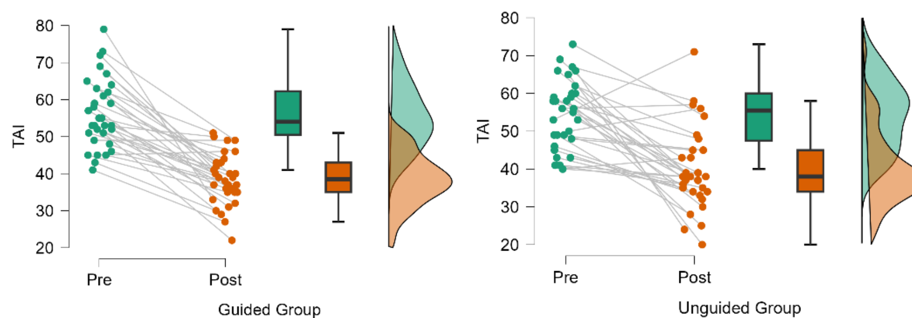

Figure 2. Distribution of TAI scores for guided and unguided iCBT groups

Finally, the relationships between the total number of sessions spent with the therapist, the weekly duration of the intervention, and the percentage of iCBT platform usage for participants in the guided iCBT group and the change in test anxiety (difference in TAI scores) were examined using Pearson correlation analysis. The analyses revealed that these variables did not show a significant relationship with the change in test anxiety ($p > .05$ for all correlations). Similarly, no significant correlation was found between the percentage of use and the change in test anxiety in the unguided iCBT group ($p > .05$).

Discussion

This study aimed to compare the effectiveness of guided and unguided iCBT in reducing test anxiety. Repeated measures analysis of variance results showed that the time factor (pre-treatment - post-treatment) had a significant effect on test anxiety scores, but the time × group interaction was not significant. This finding indicates that both intervention forms are effective in reducing test anxiety, but that guidance support does not provide a statistically significant additional contribution to anxiety levels after the intervention. Comparing the findings with other studies in literature, evaluating the original contributions of the study, discussing possible limitations, and presenting suggestions for future research are addressed in this section.

This study demonstrated that both guided and unguided iCBT are effective in reducing test anxiety. These findings are consistent with previous studies showing that CBT-based interventions are successful in reducing test anxiety (Ergene, 2003; Putwain & von der Embse, 2021; Ramirez & Beilock,

2011). It is known that CBT components such as cognitive restructuring, relaxation techniques, and exposure are effective on cognitive distortions and physiological responses, which are the core components of test anxiety (von der Embse et al., 2013). An iCBT study on test anxiety (Orbach et al., 2007) showed that this form of intervention could significantly reduce test anxiety compared to the control group. Consistent with these preliminary findings, the current study once again confirms that internet-based interventions can be an effective method for test anxiety. When examining the effects of guided and unguided iCBT on reducing test anxiety, it was found that both intervention methods significantly reduced test anxiety. According to repeated measures ANOVA results, the effect of iCBT was statistically significant, but the interaction between iCBT and group was not significant. Holm-adjusted post hoc comparisons indicated marked pre- to post-treatment reductions in test anxiety in both groups, yet no significant between-group difference at post-test. Furthermore, the z-test conducted to assess the significance of the difference between these two effect sizes was not statistically significant. This finding indicates that assumptions regarding the contribution of guidance support to the effect of the iCBT intervention are not statistically supported, at least in the sample of this study.

Previous studies have examined the effectiveness of guided and unguided iCBT in different ways. Warnecke and colleagues' (Warnecke et al., 2020) study showed that guided iCBT is effective in reducing test anxiety and general psychological distress. However, in the study, the guided iCBT intervention was administered over six weeks with regular therapist support. In this study, the duration of guided iCBT varied based on individual differences, and therapist support was limited to providing guidance and direction rather than direct psychotherapy. These differences may explain the contrasting results between the two studies. Correlation analyses revealed no significant relationship between the number of sessions, duration, and percentage of use and changes in test anxiety. Furthermore, it was observed that unguided iCBT also significantly reduced test anxiety. This finding is consistent with previous studies showing that unguided iCBT can be effective on its own (Baumeister et al., 2014; Titov et al., 2010). Indeed, a recent study also reported that unguided iCBT significantly reduced test anxiety and that there was a significant negative correlation between program adherence (usage rate) and final test anxiety scores (Avcil & Herdi, 2023). These findings suggest that unguided iCBT can be effective even without therapist support and that user adherence may play a decisive role in clinical outcomes.

In this study, the guided iCBT group completed the program at a higher rate. The higher completion/adherence observed in guided formats aligns with prior literature (Andersson & Titov, 2014; Karyotaki et al., 2021) and may be attributable to process-level components such as regular feedback, motivational check-ins, and problem-solving support. These adherence differences may reflect process-level support effects rather than superiority in symptom reduction. Accordingly, even in the absence of a statistically significant between-group post-test difference, guided delivery may enhance implementation fidelity and sustainability in routine clinical practice. Furthermore, it has been reported that dropout rates are generally high in unguided iCBT applications and that this may be related to individual variables such as age, education level, relationship status, and initial symptom severity (Karyotaki et al., 2015). The fact that our study mainly included young participants at the high school level may help explain the high dropout rate observed in the unguided group. However, since participants' initial anxiety levels were already high due to inclusion criteria, it was not possible in this study to assess the effect of symptom severity on program dropout. Nevertheless, this study found no significant relationship between usage percentage and change in test anxiety. This finding suggests that user adherence alone may not be sufficient to determine therapeutic gains.

This study contributes significantly to the literature by comparing the effectiveness of guided and unguided internet-based cognitive behavioral therapies (iCBT) in reducing test anxiety. Using a comparative experimental design and repeated measures ANOVA, effects related to both intervention type (guided/unguided) and time (pre-treatment/post-treatment) were systematically evaluated. Furthermore, adherence levels to the intervention process were measured through the percentage of iCBT usage, and a significant effect of guided intervention on adherence was demonstrated. However, the lack of a significant relationship between usage rate and change in test anxiety suggests that the role

of adherence in therapeutic outcomes may be more complex. Studies directly comparing guided and unguided iCBT, analyzing both program usage rates and symptom change, are quite limited. This experimental study conducted with a Turkish sample is also important in that it contributes to the limited number of studies examining the effect of guided iCBT in particular. In this respect, the current study provides empirical data on different forms of iCBT in the field of test anxiety and guides practitioners in developing flexible options in line with individual differences and intervention preferences. From the practitioners' perspective, when choosing between online intervention formats, it should be considered that unguided iCBT can yield effective results with fewer resources.

However, the study has some limitations. First, this study examined only post-intervention effects. To draw conclusions about long-term outcomes, the effects of guided and unguided iCBT should be measured in the following months. In this context, not only symptom reduction but also broader outcomes such as the persistence of acquired cognitive and behavioral skills, relapse rates, and functionality should be evaluated. It is known that CBT-based interventions provide sustainable long-term benefits by equipping individuals with coping strategies. However, it is not yet clear to what extent these strategies are durable when delivered online, whether guided or unguided. Second, since neither group in this study received traditional face-to-face therapy, the findings are based on a direct comparison of online therapy formats. Guided iCBT does not fully reflect the traditional therapeutic process but instead involves limited guidance and directional support. Therefore, the nature of the relationship and the forms of support involved when the guided group had contact with the guide for a longer period have not been evaluated in detail. Future studies should comprehensively investigate the relationship between the quality and content of time spent with the guide and symptom change. Third, individual psychological characteristics that could affect adherence to the intervention and therapeutic gains were not measured in this study. This is a limitation that should be considered when interpreting the findings. Fourth, the counseling service was provided by one of the researchers. Although the researcher's expertise in clinical psychology and experience in applying CBT increased the objectivity of this process, this situation can be considered a potential source of bias. Finally, the sample of this study is limited to students preparing for national high-stakes central examinations. This limits the generalizability of the findings to other age groups, academic levels, or cultural contexts. Similar studies with populations with different characteristics will provide broader and more reliable results regarding the effects of iCBT on test anxiety.

This study demonstrated that both guided and unguided iCBT are effective in reducing test anxiety. Although the findings revealed that guided intervention had a higher effect size, there was no statistically significant difference between the two methods. This indicates that unguided iCBT can also be considered a powerful alternative for reducing test anxiety. Furthermore, the higher completion rate among participants in the guided iCBT group highlights the positive effect of therapist support on user adherence. However, considering that participants in the unguided iCBT group also achieved significant gains, it is thought that unguided iCBT could be promoted as a self-help-based intervention.

The findings of this study provide important contributions to interventions aimed at managing test anxiety; however, further research is needed to evaluate the effects of guided and unguided iCBT in a broader context. The findings obtained in this study indicate that online applications are used more intensively and regularly by users when conducted with guidance. Therefore, it would be beneficial to consider the guidance element in the design of programs to be developed in the future. Developing strategies to increase user engagement and integrating new technological support to sustain the effect of unguided iCBT should be one of the focal points of future studies. In conclusion, while this study demonstrates that iCBT is an effective tool for reducing test anxiety, it emphasizes the need for a more in-depth examination of how individual differences are shaped depending on the type of intervention.

Conclusion

This study has demonstrated that guided and unguided internet-based cognitive behavioral therapies (iCBT) are effective intervention methods in reducing test anxiety. Significant reductions in test anxiety levels were observed in both groups; however, no statistically significant difference was found between the groups in terms of final test scores. Although the effect size was higher in the guided iCBT group, this difference was not statistically significant.

Analyses of the program usage level indicated that the guided intervention form may increase user adherence; however, no significant relationship was found between the usage percentage and the decrease in test anxiety. These findings suggest that unguided iCBT may also be effective and may offer a cost-effective intervention option, especially in conditions where resources are limited. Although guided iCBT has positive effects on user engagement, the role of engagement in therapeutic outcomes appears to be more complex.

Future studies are recommended to focus on more comprehensive and follow-up research designs aimed at monitoring the long-term sustainability of guided and unguided iCBT applications and their varying effectiveness according to individual differences.

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Appendix 1. Content of the iCBT Program for Test Anxiety (No More Test Anxiety)

The "No More Test Anxiety" program is a 21-day program that includes cognitive restructuring, changing and organizing study behaviors, thought and behavior exercises to increase and maintain motivation, attention and thought focus exercises, breathing and relaxation exercises, and imaginary exposure exercises. Students log into the program daily via mobile phone, tablet, or computer and complete the assigned exercises for that day in approximately 15 minutes. The program's web address is www.psikademi.com.

The detailed structure of the program is as follows:

Day 1: In addition to providing information about the use of the iCBT program, the results of the test anxiety inventory are explained. Then, what test anxiety is, and its causes are explained through psycho-educational videos based on the cognitive model.

Day 2: Cognitive training videos explaining the relationship between anxiety and thoughts based on the cognitive model and the anxiety avoidance relationship are provided. Detailed information is then given about automatic thoughts and cognitive distortions, and participants are taught how to identify and record automatic thoughts.

Day 3: Begins with an interactive quiz based on identifying cognitive distortions through common thoughts seen in test anxiety. After this exercise, users are informed about generating alternatives to automatic thoughts and how to counter them, and forms are provided for them to complete this exercise. The final activity of the day involves psychoeducation about breathing exercises and their implementation.

Day 4: Begins with an interactive quiz that starts to generate alternatives to common automatic thoughts in test anxiety. Then, access is provided to thought forms that the person can use on their own, explaining how to change these thoughts and how to achieve realistic and functional outcomes. The day ends with psychoeducation on ways to cope with avoidance and a video on homework.

Day 5: Begins with an interactive exercise requiring the generation of realistic and functional thoughts. This is followed by a video explaining effective study methods for exams. The final exercise of the day concludes with an explanation and practice of progressive relaxation exercises.

Day 6: Begins with an exercise involving written work aimed at generating realistic thoughts. This is followed by psychoeducation on study planning. The final activity of the day is the explanation and practice of relaxation and guided imagery exercises.

Day 7: Includes refilling the exam anxiety inventory and explaining what observed or unobserved changes mean. Finally, what has been done up to this stage is summarized, and subsequent homework assignments are explained.

Day 8: Begins with psychoeducation on motivation and ways to overcome motivation problems. This is followed by an explanation and application of mindfulness-based sensory focus exercises.

Day 9: Begins with psychoeducation on coping with not enjoying work. This is followed by an attention-focusing exercise using visual stimuli that distracts the person from physical stimuli.

Day 10: Begins with psychoeducation explaining solutions for indecision between doing other things or working. This is followed by a written daily planning exercise. The day's final activity concludes with exercises to shift thought focus.

Day 11: There is psychoeducation explaining daily behaviors such as nutrition, physical exercise, and sleep that are effective in reducing anxiety. Then, psychoeducation is provided on how to use the work done up to this stage when anxiety occurs.

Day 12: Common mistakes students make during exams and their solutions, along with exam tactics, are discussed. Afterwards, there is a video on what to do to cope with anxiety the night before the exam.

Day 13: The day begins with a video explaining what to do to cope with anxiety on the morning of the exam. Afterwards, it explains how to use the methods studied so far during the exam.

Day 14: The most important activity of the day is explaining what exposure through imagination is and performing an exposure. The scenario created for this exposure has a flow like the central high school and university entrance exams in Turkey. This day also includes filling out the exam anxiety inventory and explaining the results.

Day 15: It begins with an informative video explaining what will happen in the next phase. This is followed by an interactive quiz aimed at identifying cognitive distortions and a breathing exercise application.

Day 16: Includes an interactive quiz based on generating alternatives to automatic thoughts and a progressive relaxation exercise.

Day 17: Includes an interactive quiz aimed at achieving realistic and functional outcomes and a guided imagery exercise for relaxation.

Day 18: Includes a written exercise based on producing realistic and functional outcomes and a mindfulness exercise based on focusing on the senses.

Day 19: Includes exercises to shift the person's attention and thought focus away from thoughts and physical stimuli.

Day 20: Includes an exposure exercise involving an imagination exercise with an exam scenario.

Day 21: Includes videos on completing the exam anxiety scale one last time and interpreting the results. Finally, there is a psycho-educational video containing information on what students can do in cases where the program is insufficient in reducing exam anxiety or in cases of recurrence.