Original paper

Test-anxiety in Iranian students: cognitive therapy *vs.* systematic desensitisation

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Abstract

Introduction: Test anxiety has been regarded as a main school problem. The present research compared the effect of the cognitive therapy (CT) with systematic desensitisation (SD) on reducing test anxiety in high school students. The two main questions of the study were as follows: 1) do the CT and SD reduce test anxiety?, and 2) do these techniques have similar effects on reducing test anxiety or do they reveal significant differences?
Material and methods: Sixty students who had higher mean scores on an anxiety questionnaire and without any marked psychological or physical problems were selected from a girls high school as subjects and were divided into three similar groups. The subjects were divided into three matched groups, including two case groups and a control group. The first case group received the cognitive therapy for a period of 12 weeks, while the second one received systematic desensitisation.
Results: The results revealed that for both case groups test anxiety mean scores were significantly lower than those for the control group. However, no significant differences were found between the cognitive and desensitisation techniques. Moreover, the effects of both techniques were stable in the three month follow-up period.
Conclusions: The results revealed that both psychotherapy techniques have positive and significant effects on reducing the test-anxiety level of students.

Key words: test anxiety, cognitive therapy, systematic desensitisation, students.

Introduction

Recent research has regarded anxiety as one of the most common problems in communities. The majority of studies revealed that anxiety disorders had a high frequency among psychological disorders in main community populations [1]. Test anxiety is a common educational problem, referring to a situation when people do not feel confident about their educational abilities and therefore show weak coping strategies in specific situations, especially in educational performance and tests. Two main review studies [2, 3] have supported the idea that test anxiety causes lower test performance. Some researchers believe that test anxiety can only make students ready for studying harder. In fact, people with test anxiety know the educational content and have a suitable knowledge of the required subjects, but due to the severity of their anxiety level, they are not able to apply them and give correct responses to questions [4-6]. It means that an individual freezes up during a test situation and cannot recall his/her previous learning [7]. In addition, some researches found that test anxiety was associated with lower ability levels and lower intelligence [2].

Furthermore, the more threatening a given test is in students' evaluation, the more stressing responses they show before and during the exam. This situation leads to a lower self-esteem and a lower self-confidence. It seems that a test-anxious student tends to establish correct responses for test demands. Moreover, during the exam, such students may demonstrate a preoccupation of thoughts, such as blocking, lack of appropriate perception of questions and key words, rereading of questions, distraction, panic state and a wide range of psychosomatic reactions [8-11]. In fact, it appears that test anxiety as an emotional reaction causes that test-anxious students imagine that they have inadequate abilities in giving correct responses to questions. Therefore, the interference technique helps the student to recognise his/her emotions and teaches how to manage them in order to provide good educational performance [12, 13]. In essence, the majority of researches support the thesis that there is a positive association between test anxiety and school achievement [6, 14-18].

In order to ameliorate educational performance, different psychotherapy approaches have been applied that can be classified into two major groups, including cognitive and behavioural psychotherapies. The main aim of the cognitive therapy approach is reducing the level of anxiety to a degree that a given person is able to tolerate, while the main aim of the behavioural therapy approach focuses on the instruction of coping skills related to stress situations in which the person can handle anxiety situations [12, 17]. However, some studies suggest that combined psychotherapy techniques reveal a more significant effect on educational performance. That is, the anxiety level, coping skills and learning methods are the main targets of the combined models [19-21]. Some researches conclude that a combination of psychotherapy techniques is more suitable in reducing test anxiety rather than only one single technique [22] and some studies indicate that test anxiety is more important than negative thoughts during a test situation [23]. Thus, the psychotherapy technique should focus more on test anxiety rather than negative thoughts.

The present study mainly attempted to suggest an appropriate method to reduce test anxiety. More particularly, this study compares the cognitive therapy method with the systematic desensitisation as a behavioural therapy technique. Based on the cognitive model, anxiety disorders were considered as disorders which initially arise from thinking processes. Cognitive therapists believe that anxious persons experience a wide range of dysfunctional thoughts or imaginations before their anxiety attacks [15]. This approach is focused on the cognitive processing role of emotions and behaviours. Based on this assumption, an individual's emotional and behavioural responses to a situation are mainly derived from his/her perceptions, as well as their meaning and interpretation. In other words, when individuals find that their values are being threatened, they become anxious and distressed. In this situation, it is more possible that their perceptions and interpretations of events are selective, rigid and egocentric. This state has negative effects on the individual's cognitive processing and, consequently, he/she may not able to control his/her distressing thoughts. Moreover, some cognitive components, such as concentration, recalling and judgment will be weakened. The main aim of the cognitive therapy is to make the individual able to correct his/her information processing so that he/she can adjust his/her behaviour and emotion in his/her life. Based on systematic desensitisation, initial responses which contradict the individual's anxiety responses are identified. Then, the individual is instructed to reveal the contradictory responses to anxiety situations as he/she confronts them. It is found, using this technique, that anxious persons become able to reinforce, as well as transfer their imaginary coping abilities to normal situations in their lives [24]. Some researches support the effectiveness of the cognitive therapy in reducing the anxiety level [25], while other investigators claim that both techniques provide a similar significant enhancement and. finally [18], yet other researches suggest that a combination of both techniques is preferable to applying any one alone [15, 25].

As we found, few studies have been conducted on test anxiety in Iran. Therefore, the present study attempts to focus on the effectiveness of the cognitive and behavioural therapy techniques in order to suggest some practical guidelines for students suffering from test anxiety and their teachers. In order to achieve this aim, the effects of these techniques were investigated in two groups of students and the results were compared with those of the control group. More precisely, the study aimed to test the following hypotheses; 1) The cognitive therapy and systematic desensitisation techniques reduce test anxiety in students. 2) There are significant differences between the effects of the two therapy techniques on reducing test anxiety. 3) There are significant differences between the case groups and the control group in reducing test anxiety levels, and 4) In following up phase, there are significant differences between the effects of the two therapy techniques and the control group.

Material and methods

This study was carried out using a quasi-experimental method. The target population consisted of girl students (178 people), aged (M=17.24, SD=0.79), attending the third grade of a high school in Tehran. Sampling occurred in two stages. At first, all students with physical or

psychiatric problems were identified and excluded from the study, and then the remaining students filled out Sarason anxiety scale tests [26]. In the second stage, based on an objective-oriented sampling, 60 students with the highest test anxiety scores were selected. After an individual interview, signing the informed consent form and learning the conditions and hours of meetings, they were randomly divided into three 20-person groups (two case groups and one control group). In one of the case groups, three students discontinued their cooperation, so 17 students remained. One of the case groups started the cognitive therapy and the other one started the systematic desensitisation.

The following tools were used in this research:

- Sarason test anxiety scale: the scale is a short questionnaire which the subject fills out in a self-report manner. So, it is possible to learn about the subject's psychological state and physiological experiences before and after the exam. This procedure was carried out in three stages of a pre-test, post-test and follow-up test (3 months after the post-test) for two case groups (cognitive therapy and systematic desensitisation) and the control group. The validity of the test was measured at 0.87 using the test-retest method with a few weeks' interval [26].
- Cognitive therapy: due to the presence of dysfunctional thoughts in anxious people, they

Table I. Cognitive therapy protocol for the treatment of test anxiety

Sessions	Interventional program
First session	completing the informed written consent, introducing group members to one another, presenting a few points about anxiety and test anxiety, mentioning group rules and the responsibility of each member and the treatment schedule
Second session	instructing how to complete daily activity forms, categorising each member's problems according to their primary diagnostic questionnaire, and preparing for discussing one of the problems raised by members for the next session
Third session	training the way of completing the daily activity form and giving feedback, group discussion about problems raised in the previous session, instructing on completing the dysfunctional thoughts record form, and deciding about the subject of the next session and evaluating the meeting
Fourth session	evaluating the daily activity form and dysfunctional thoughts record forms, resolving problems, giving feedback to each member group, discussion on problems raised in the previous session, training breath control and deciding about the subject of the next session and evaluating the meeting
Fifth session	evaluating the daily activity form and dysfunctional thoughts record forms, practising breath control, giving feedback for resolving problems, group discussion on problems raised in the previous session, training in the recognition of cognitive faults, evaluating one situation of dysfunctional thoughts form by each member, attempting to recognise the kind of cognitive fault, and deciding about the subject of the next session and evaluating the meeting
Sixth session	evaluating the daily activity form and dysfunctional thoughts record forms, resolving problems, giving feedback to each member, evaluating cognitive faults, training role playing and encouraging each member, to play several roles and deciding about the subject of the next session and evaluating the meeting
Seventh session	evaluating the daily activity form and dysfunctional thoughts record forms, resolving problems, giving feedback to each member, answering members' questions, training on how to fill out other aspects of the dysfunctional thoughts formgroup discussion and encouraging members to use the previous session methods to identify their cognitive faults, and deciding about the subject of the next session and evaluating the meeting
Eighth session	evaluating the daily activity form and dysfunctional thoughts record forms, resolving problems, giving feedback to each member and deciding about the subject of the next session and evaluating the meeting
Ninth session	evaluating the daily activity form and dysfunctional thoughts record forms, resolving problems, giving feedback to each member, training on how to analyse profit and loss and group discussion on the subject and deciding about the subject of the next session and evaluating the meeting
Tenth session	evaluating the daily activity form and dysfunctional thoughts record forms, resolving problems, giving feedback to each member, encouraging each member to use the profit and loss method, writing their ideas on a whiteboard and deciding about the subject of the next session and evaluating the meeting
Eleventh session	evaluating the daily activity form and dysfunctional thoughts record forms, resolving problems, giving feedback to each member, training in experimental evidence group discussion and encouraging members to collect experimental evidence from other, members to increase their self-awareness and deciding about the subject of the next session and evaluating the meeting
Twelfth session	evaluating the daily activity form and dysfunctional thoughts record forms, resolving problems, giving feedback to each member, group discussion about function and dysfunction attitudes, evaluating the meeting and inviting members to take a post-test

have to change their beliefs if they want to release themselves from these feelings. As seen in Table I, the cognitive therapy protocol was carried out in 12 ninety-minute group meetings.

- Systematic desensitisation: this procedure was carried out in 12 ninety-minute group meetings, as summarised in Table II.

The data were analysed by means of a one way analysis of variance (ANOVA) and Tukey test.

Results

In order to find whether or not there were significant differences between the three groups in anxiety scores, the pre-test anxiety scores for the three groups were analysed and the results revealed no significant differences among the groups (Table III).

In order to test whether there are significant differences in mean anxiety scores between the pre- and post-test anxiety scores for the groups, the mean differences on anxiety scores of the pre- and post-test of each group were analysed after the training phase and the results indicated significant differences ($p<.001$) among the groups (Table IV).

Further analyses by Tukey revealed that both case groups (CT and SD groups) significantly differed from the control group ($p<0.001$). That is, the mean anxiety scores for both case groups significantly differed from the mean pre-test anxiety scores, but this was not true for the control group.

Table II. Systematic desensitisation protocol for the treatment of test anxiety

Sessions	Interventional program
First session	completing the informed written consent, introducing group members to one another, presenting a few points about anxiety and test anxiety, mentioning group rules and the responsibility of each member, the treatment schedule and training how to make a list of situations that cause anxiety in members
Second session	evaluating the lists, giving feedback to each member to make the list more objective and evaluating the meeting
Third session	reviewing the list and correcting the possible mistakes, merging common items, making a 12-item list for each member, instructing how to sort the items from mild to severe and training relaxation
Fourth session	reviewing and finalising the 12-item list sorted from mild to severe, training relaxation, explaining the registration form before and after the training and evaluating the meeting
Fifth session	training relaxation again, recording the level of tension before relaxation, practising relaxation, recording the level of tension after relaxation, group discussion about the feeling before and after the test and removing possible tensions
Sixth session	recording the level of tension before relaxation, practising relaxation, recording the level of tension after relaxation and training how to use a relaxation cassette at home
Seventh session	reviewing opinions and removing possible problems caused by relaxation at home and giving suitable guidelines to members, recording the level of tension before relaxation, practising relaxation, recording the level of tension after relaxation, controlling level of anxiety in each member to make sure they are ready for systematic desensitisation, removing possible members' tension and instructing how to perform anxiety schedule for desensitisation
Eighth session	reviewing opinions and removing possible problems caused by relaxation at homer, ecording the level of tension before relaxation, practising relaxation, ordering the imagination of the first, second and third situations of anxiety schedule, based on each member's list, recording the level of tension after the relaxation and group discussion about the feeling before and after the test and removing possible tensions
Ninth session	reviewing opinions and removing possible problems and giving suitable guidelines to members, recording the level of tension before relaxation, practising relaxation, ordering the imagination of 6 situations from the anxiety schedule by each member, recording the level of tension after relaxation and group discussion about the feeling before and after the test and removing possible tensions
Tenth session	evaluating advances and obstacles of doing exercises at home, recording the level of tension before relaxation, practising relaxation, ordering imagination of 9 and 12 situations from the anxiety schedule, recording the level of tension after relaxation and group discussion about the feeling before and after the test and removing possible tensions
Eleventh session	evaluating advances and obstacles of doing exercises at home, recording the level of tension before relaxation, practising relaxation, ordering imagination of 12 situations from the anxiety schedule, recording the level of tension after relaxation and group discussion about the feeling before and after the test and removing possible tensions
Twelfth session	evaluating advances and obstacles of doing exercises at home, recording the level of tension before relaxation, practising relaxation, ordering imagination of 12 situations from the anxiety schedule, recording the level of tension after relaxation, group discussion about the feeling before and after the test and removing possible tensions and inviting members to take a post-test

In addition, to determine possible differences between the results of the post-test and the follow-up phase, mean score differences of the post-test with the follow-up (with an interval of three months) anxiety scores were computed and the results showed no significant differences for the CT, SD and control groups, i.e. the mean scores on test anxiety of the post-test and the follow-up phases for each group were similar (Table V).

Discussion

The main aim of the present study was to identify an effective method which provides the most effective educational output for students and schools. This study demonstrated that both the CT and SD techniques have positive effects on reducing students' test anxiety. That is, the students who were instructed by the CT or SD techniques were able to reduce their test anxiety and, furthermore, the techniques enhanced their school achievement. It appears that test-anxious students became able to control their negative emotions and thoughts and, consequently, demonstrate a better performance. The results are in line with previous studies [2, 3, 20]. Moreover, the results indicated that after three months both psychotherapy techniques had a similar stability in reducing test anxiety in female high school students. These results are in accordance with previous studies [18, 24]. In addition, the lack of significant differences between the CT and SD support the results of studies which revealed that both therapeutic techniques have similar effects on reducing test anxiety [25]. With respect to these results, we can cite that a person with test anxiety may experience a wide range of dysfunctional thoughts and imaginations, such as a lack of sufficiency, weak performance, feeling of defeat, social rejection, and a lack of self-control [8]. This process will cause the anxious person to make more mistakes and to believe that he/she does not have enough power to cope with tense situations and therefore he/she is more likely to possess a negative self-esteem [9, 10]. The effectiveness of the CT and SD methods in this study on students' test anxiety can be explained in that these psychotherapy techniques may interfere with students' educational performance by showing positive effects on their sufficiency and enhancing their self-esteem. In other words, we can note that both techniques reduced the students' anxiety level on the one hand, and that they learn how to apply their social skills in order to take control of the situations on the other hand [17]. Both the CT and SD methods help students to develop an appropriate evaluation and understanding of situations, to analyse frustration and select a solution in which they become able to have a positive adjustment. In this way, students may be free of thought occupations, self-criticism and unrelated activities while performing educational tasks. Moreover, they may help themselves by focusing on problem-solving techniques and self-control rather than negative performance imaginations. However, we assume that these techniques can be applied in most of people's life events. More particularly, cognitive therapy techniques can reduce the rate of negative automatic thoughts and an individual finds that

Table III. One way analyses on test anxiety scores of pretest for the groups

Variables	Number of students	Mean	Standard deviation	F test	Sig.
cognitive therapy	20	17.80	2.42	2.051	0.138
systematic desensitisation	17	17.35	2.55	–	–
control	20	16.45	1.32	–	–
total	57	17.19	2.18	–	–

Table IV. The analysis of mean differences score on test anxiety of pre and post test for three groups

Variables	Number of students	Mean diff.	Standard deviation	F test	Sig.
cognitive therapy group	20	-7.9	4.8	24.089	0.001
systematic desensitisation group	17	-6.411	3.792	–	–
control group	20	2.00	2.858	–	–
total	57	-4.614	5.273	–	–

Table V. The analysis of the mean differences score on test anxiety for the post test and follow-up phases

Variables	Number of students	Mean diff.	Standard deviation	F test	Sig.
cognitive therapy group	20	1.050	6.427	1.177	0.315
systematic desensitisation group	17	2.058	4.422	–	–
control group	20	-0.4	3.299	–	–
total	57	0.842	4.930	–	–

there are differences between thoughts and realities, that is, thoughts are our interpretation of realities which in turn have an impact on our feelings and behaviour. It seems that the main effectiveness of the CT is to provide new attitudes for the individual in which he/she develops a suitable perspective toward the reality and the world. In fact, the ability to have a real assessment and perception of situations may provide a logical and appropriate adjustment for the person concerned. We think that the cognitive therapy, by amending attitudes and thoughts, helps people to have a real perception of their life. In addition, in the systematic desensitisation technique it is assumed that impulsive reactions, such as anxiety, may be caused by a range of stimuli and phobic or panic states. When the person recognises his/her negative emotions, he/she is encouraged to maintain and develop his/her relaxation. Gradually, he/she comes to believe that he/she can reduce his/her sensitivity toward negative emotions and behaves logically. Thanks to the SD, the individual becomes able to reduce his/her anxiety level and behave in a normal way. In sum, the present study showed that the SD helps students to control their emotions and manage their behaviour, which ultimately reduces their test anxiety. Although the present research did not test the effects of the combined psychotherapy technique on reducing test anxiety, as previous studies [22] demonstrated, it is more possible that the effects of a combined model would be stronger than applying just one. However, we failed to find any significant differences between the two psychotherapy techniques on reducing test anxiety.

Conclusions

We suggest that the cognitive and behavioural techniques are not only able to reduce test anxiety, but the effects of these psychotherapy techniques can also be used in different aspects of life. These results may be contradictory to Brush's findings [23] which marked the importance of the negative emotion targets more than cognitive skill targets in psychotherapy models. That is, the lack of significant differences between the CT and SD in our findings may support the thesis that both negative emotions and cognitive skills may have an equal impact on test performance. Thus, helping test-anxious students with either managing their emotions or cognitive skills can enhance test performance and provide similar results. It is notable to say that through these techniques, students can recognise their dysfunctional thoughts and change their perception and attitudes in which they will be sufficiently able to manage their negative emotions and reduce their anxiety in school activities and life. In essence, these students could enhance their school achievement, as well as their social skills.

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