Effects of cognitive restructuring and study skills training on anxiety and academic achievement

Efectos de la reestructuración cognitiva y el entrenamiento en habilidades de estudio sobre la ansiedad y el rendimiento académico

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ABSTRACT

The aim of this study was to evaluate the influence of cognitive restructuring and study skill training on test anxiety and academic achievement. In this study, 94 high school students were randomly selected to receive either a Cognitive Restructuring Training (CRT) or Study Skill Training (SST) psychoeducational group therapy. Analyses indicated that cognitive restructuring and study skills training negatively effects on state and trait anxiety symptoms, and positively effects on students' academic achievement. However, the present study found evidence of the effects of state anxiety follow-up as a mediator on academic achievement. Despite these and other limitations, we conclude that cognitive restructuring and study skills training are effective treatments for test anxiety and academic achievement.

Keywords: test anxiety, state anxiety, trait anxiety, cognitive restructuring, study skills training.

RESUMEN

El objetivo de este estudio fue evaluar la influencia de la reestructuración cognitiva y la capacitación en habilidades de estudio sobre la ansiedad ante los exámenes y el rendimiento académico. En este estudio, 94 estudiantes de secundaria fueron seleccionados al azar para recibir una terapia psicoeducativa de entrenamiento de reestructuración cognitiva (CRT) o entrenamiento en habilidades de estudio (SST). Los análisis indicaron que la reestructuración cognitiva y el entrenamiento en habilidades de estudio afectan negativamente los síntomas de ansiedad de estado y rasgo, y los efectos positivos en el rendimiento académico de los estudiantes. Sin embargo, el presente estudio encontró evidencia de los efectos del seguimiento de la ansiedad del estado como mediador en el logro académico. A pesar de estas y otras limitaciones, llegamos a la conclusión de que la reestructuración cognitiva y el entrenamiento en habilidades de estudio son tratamientos efectivos para la ansiedad ante los exámenes y el rendimiento académico.

Palabras clave: ansiedad ante los exámenes, ansiedad ante el estado, ansiedad por rasgo, reestructuración cognitiva, entrenamiento en habilidades de estudio

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Introduction

Anxiety can find its roots in physical, mental, behavioural, and cognitive causes (Seligman, Walker, & Rosenhan, 2001). It is regarded as a natural response to a stressful agent, assisting one in handling an unwieldy condition by means of encouraging the individual to get adapted to the problem. The criteria for the normality or abnormality of anxiety can be determined by the severity and the reasoning behind it (Barker & Buchanan-Barker, 2010). As a suitable and consistent reaction, anxiety seems to be an indispensable part of normal life in all human societies. Life without anxiety or with excessive anxiety is largely threatened. On the contrary, mild anxiety can moderate our life appropriately and make it more efficient and bearable (Abolghasemi, Mehrabizadeh-Honarmand, Najarian, & Shokrkon, 2004). According to Lazarus, the relationship between human and the environment is mainly related to emotions and stress (Lazarus, 1991, 1999). As a result, the weight of an emotion depends on the power of adaptability to the situation which may be judged as positive or negative by the individual.

Test anxiety is associated with serious fear, irregular and increased heartbeat, worry, and other physiological symptoms (Abolghasemi et al., 2004; Vitasari et al., 2010). There are two components of test anxiety such as worry and emotionality (Putwain, 2007). Worry component is related to cognitive anxiety and pessimism about one's competence, and performance, but emotionality talks about the physiological arousal in the exams (Putwain, 2007). To anxious students, an exam is a threat so in such situations; they behave anxiously as though they were in danger and threatened. Based on the findings on test anxiety, it was revealed that school children have demonstrated poor performance on school progress (Luigi et al., 2007; Reeve & Bonaccio, 2008). Research has indicated that as the level of anxiety builds up, the students' memory quality decreases, and so do his reasoning and concentration (Aronen, Vuontella, Steenari, Salmi, & Carlson, 2004).

In educational psychology, there are a considerable number of interventions to reduce anxiety level among students and at the same time increase their academic achievement. One of these interventions is cognitive restructuring (CR), which is a learning process to disprove cognitive distortions, or the fundamentals of 'faulty thinking' with the purpose of replacing one's irrational, counter-factual beliefs with more accurate and profitable ones. The two most popular cognitive therapeutic methods in test anxiety intervention are rational emotive therapy (Ellis, 1962, 1977) and systematic rational restructuring (Goldfried, Decenteceo, & Weinberg, 1974). Both forms of treatment are based on the premise that anxiety or emotional disturbance is as a result of irrational or illogical thinking. However, rational emotive therapy provides the rationale for cognitive restructuring and systematic rational restructuring classifies this rationale into a series of more systematic steps and procedures (Zeidner, 1998).

Another therapy based on skill-deficit model is study skills training. Some researchers argue that poor study habits and test-taking abilities may cause some students to experience a higher level of test anxiety than other students (Spielberger, 2005; Spielberger & Vagg, 1995a).

2. The Study

2.1. Study Design

The current study is located in true experimental design. For state and trait anxiety data collection in this study was used of true experimental research design with randomized subjects, pre-test, post-test, and follow-up within the control group. Pre-test (STAI) applied before interventions for identifying the homogeneity of students in experimental and control groups. Homogeneous group are called a set of subjects of units who are the same or similar on the relevant variable (Ary et al., 2009). Post-test (STAI) applied two weeks after interventions to reveal the effect of interventions on dependent variables. Finally, follow-up (STAI) applied after interventions at about six weeks (four weeks after post-test) to show the effects of applied interventions after a certain period of time. Post-test and follow-up applied, at selected time interval, to assess the effect of the independents variables on two dependent variables namely test anxiety and academic achievement.

Two different kinds of treatments on the basis of the cognitive approach and deficit skills model were applied for two experimental groups in this study. The treatment or experimental group 1 was given 8

sessions of the cognitive restructuring within 90 minutes for every session. The cognitive restructuring consists of eight critical activities in order to help anxious students to understand what cognitive restructuring is, and how it can help them to cope with the irrational believes, and ways to replace them with the rational believes. Experimental group 2 was also given 8 sessions of study skills training within 90 minutes for every session. Study skills training intervention was on the base of cognitive deficit approach due to assist students to improve their study and test-taking habits and skills. Moreover, study skills training is directed toward improving a variety of cognitive activities that affect the organization, processing, and retrieval of information (e.g., study habits and test-taking skills), and training in study skills does not directly address the specific cognitive components of test anxiety (Spielberger, Gonzalez, Taylor, Algaze, & Anton, 1978; Spielberger & Vagg, 1995b).

2.3. Instrumentation

The main instrument used for assessment in this study was State-Trait Anxiety Inventory (STAI) developed by Spielberger (1980). This instrument is known as a self-reported measure with two different parts. The first part has a 4-point Likert scale (from 1 = almost never, 2 = sometimes, 3 = always, and 4 = almost always) consist of 20 questions, i.e. 1 – 20, and the second part also has a 4-point Likert scale (1 = almost never, 2 = sometimes, 3 = most times, and 4 = almost no) consist of the remaining 20 questions, i.e. 21 – 40. Furthermore, the data on grade point average was collected in the end of the second semester after the 14th week duration. Thus, this data was collected from the Iranian higher institutions which is in line with the Iranian educational system of CGPA ranging from 0.00 – 20). Statistical analysis was conducted to analyses direct and indirect effects of two interventions on academic achievement.

2.4. Population and sampling

Qazvin province was randomly selected out of 31 provinces in Iran as the sample population. All the respondents in this study must be boy students from high school who are in the 11th year of study; therefore the aid of society in this study focused on Qazvin high school boy students. There were 12 boy high schools in the city of Qazvin which Sadra High School was randomly selected as a sample in which the actual experiment has taken place. Ecological validity (when the situational characteristics of the study are not representative of the population) could be a threat to the external validity. All the respondents were carefully selected from the year eleven of high school students, between the ages of 17-18 years old.

3. Result and Discussion

3.1. Effects of Cognitive Restructuring and Study Skills Training on State and Trait Anxiety Post-test and Academic Achievement

The main alternative hypothesis of this study stated that, there is an association between psycho-educational interventions (cognitive restructuring and study skills training), anxiety (state and trait anxiety post-test), and academic achievement among high school students. To test the main hypothesis of this research multi mediation analysis was done using Preacher and Hayes (2008) SPSS PROCESS macro for testing mediation analysis. Mediation analyses (Table 3) revealed significant effects of psycho educational group interventions to both mediators (state and trait anxiety).

Table 3. Multiple mediation direct effects on post-test

		Coeff (B)	Se	t	p
IV to Mediators	Path a_1	-4.4032	1.2390	-3.5539	.0006
	Path a_2	-3.2581	1.2689	-2.5676	.0119
Direct Effects of Mediators on DV	Path b_1	.0144	.0088	1.6357	.1054
	Path b_2	-.0058	.0086	-.6698	.5047
Total Effect of IV on DV	Path c	.3226	.1024	3.1517	.0022
Direct Effect of IV on DV	(c-prime path)	.3674	.1103	3.3302	.0013

Dependent, Independent, and Proposed Mediator Variables:

DV = Final Semester GPA

IV = Study Groups (Study Skills Training, Cognitive restructuring and Control groups)

MEDS = State and Trait Anxiety Post-test

Sample size = 94

Psycho educational group interventions effect on mediators (a path) showed a significant negative effect on state anxiety post-test (B patha1= -4.403, p <0.001), likewise it affected negatively on trait anxiety post-test (B patha2=-3.258, p < 0.01). Moreover, both mediators, state and trait anxiety, did not show a significant effect on academic achievement (b paths). State anxiety post-test affected positively on academic achievement (B pathb1= 0.014, p> 0.05) while trait anxiety post-test showed a negative effect on academic achievement (B pathb2= -0.005, p> 0.05). In addition, psycho educational group interventions also have a direct influence (c') on academic achievement. The direct effect of psycho educational group interventions on academic achievement was still significance after controlling for both mediators (B pathc'= 0.3674, p <0.05). The total significant effect of psycho educational group interventions on academic achievement (Bpathc= 0.322, p< 0.05) was reduced after mediation but it was still significant. The model summary (table 5) shows that the multiple correlation coefficient (R), using all the predictions simultaneously, is .35 (R2=.12) and the adjusted R2 is .09, meaning that 9% of the variance in anxiety (state and trait anxiety post-test) can be predicted by types of study groups (cognitive restructuring, study skills training, and control group). Thus, these results revealed that anxiety (state and trait anxiety post-test) cannot be considered as significant mediators and this mediation is not a partial mediation and according to these finding the null hypothesis was accepted. The relation among all research variables in post-test was illustrated in figure 1.

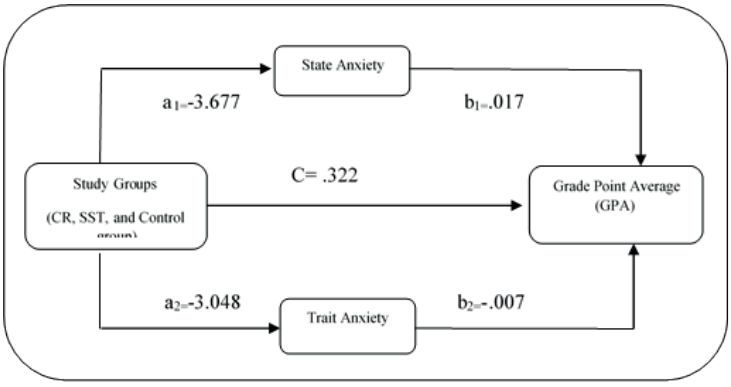

Figure 1. Path diagram of mediation analysis of research variables in follow-up

These findings also are in line with the results of previous researches on the effects of study skills training on students' test anxiety (Sapp, 1999; Spielberger, 2005; Spielberger & Vagg, 1995a). One of the possible causes of effectiveness of cognitive restructuring and study skills training interventions on students' state and trait anxiety could be related to the students' coping skills. Coping skills refers to the ways in which a person attempts to change circumstances or his interpretations of circumstances, to make them more favourable and less threatening (Folkman & Lazarus, 1991; Lazarus, 1999; Lazarus, 2000). Lazarus and Folkman (1984) classified two basic types of coping approach as problem focused and emotion-focused coping. Problem-focused coping is aimed at managing or changing a threatening or harmful stressor. This coping strategies tend to be most effective when person can exercise some control over the stressful condition or circumstances (Park, Armeli, & Tennen, 2004). Emotion-focused coping strategies will be applied when a person think that nothing can be done to alter a situation with regards to the efforts toward relieving or regulating the emotional impact of the stressful situation. However, when coping is effective, people can adapt to the situation due to stress and anxiety will reduce (Hockenbury & Hockenbury, 2007).

3.2. Effects of Cognitive restructuring and Study Skills Training on State and Trait Anxiety Follow-up and Academic Achievement

The main alternative hypothesis of this study stated that, there is an association between psycho-educational interventions (cognitive restructuring and study skills training), anxiety (state and trait anxiety follow-up), and academic achievement among high school students. To test the main hypothesis of this research multi mediation analysis was done using Preacher and Hayes (2008) SPSS PROCESS macro for testing mediation analysis. Mediation analyses (Table 4) revealed significant effects of psycho educational group interventions to both mediators (state and trait anxiety). Psycho educational group interventions effect on mediators (a path) showed a significant negative effect on state anxiety follow-up (B patha1= -3.6774, $p < 0.05$), likewise it affected negatively on trait anxiety post-test (B patha2=-3.048, $p < 0.05$). Moreover, state anxiety follow-up as mediator showed a significant effect on academic achievement (b paths).

Table 4. Multiple mediation direct effects on follow-up

		Coeff (B)	Se	t	p
IV to Mediators	Path a_1	-3.6774	1.2433	-2.9578	.0039
	Path a_2	-3.0484	1.2623	-2.4149	.0177
Direct Effects of Mediators on DV	Path b_1	.0177	.0089	1.9991	.0486
	Path b_2	-.0079	.0087	-.9045	.3682
Total Effect of IV on DV	Path c	.3226	.1024	3.1517	.0022
Direct Effect of IV on DV	(c-prime path)	.3636	.1037	3.3891	.0010

Dependent, Independent, and Proposed Mediator Variables: DV = GPA final; IV = Study Groups (Study Skills Training, Cognitive restructuring and Control groups)

MEDS = State and Trait Anxiety Follow-up

State anxiety follow-up affected positively on academic achievement (B_{pathb1}= 0.0177, p< 0.05). On the other hand, trait anxiety follow-up as mediator did not show a significant effect on academic achievement. Moreover, trait anxiety follow-up showed a negative effect on academic achievement (B_{pathb2}= -0.0079, p> 0.05). In addition, psycho educational group interventions also have a direct influence (c') on academic achievement. The direct effect of psycho educational group interventions on academic achievement was still significance after controlling for both mediators ($B_{pathc'}$= 0.3674, p <0.05). The total significant effect of psycho educational group interventions on academic achievement (B_{pathc}= 0.322, p< 0.05) was reduced after mediation but it was still significant.

Table 5. Model summary for DV model

	R	R-sq	Adj R-sq	F	df1	df2	p
Post-test	.35	.12	.09	4.26	3.00	90.00	.007
Follow-up	.37	.14	.11	4.76	3.00	90.00	.004

The model summary (table 5) shows that the multiple correlation coefficient (R), using all the predictions simultaneously, is .37 (R^2=.14) and the adjusted R^2 is .11, meaning that 11% of the variance in anxiety (state and trait anxiety follow-up) can be predicted by types of study groups (cognitive restructuring, study skills training, and control group). Thus, these results revealed that anxiety state anxiety follow-up can be considered as a significant mediator and this mediation is a partial mediation and according to these finding the research hypothesis was accepted. However, trait anxiety follow-up cannot be considered as a significant mediator and this mediation is not a partial mediation and according to these finding the null hypothesis was accepted. The relation among all research variables for follow-up was illustrated in figure 2.

On the base of cognitive restructuring intervention, students educated to challenged, recognized and changed the irrational beliefs systems by applying rational emotive therapy (RET) and then discovered the worrisome task-irrelevant thoughts and substituted positive self-statement that redirect the attention to the task-relevant thoughts by applying systematic rational restructuring (SRR), anxious students could combat sufficiently with trait anxiety component. On the other hand, study skills training intervention attempts to guide anxious students to adopt the used of scientific study habits such as learning style, memory functions, time management, goal setting, motivation, reading and summarising skills instead of using the traditional study habit. Similarly, the current study skills training focused on educating anxious students to apply some test taking skills before, during, and after the exam due to improve their academic achievement and challenge to decrease the level of students' trait anxiety. Based on the problem focusing coping strategy, study skills training focus on managing or changing a threatening or harmful stressors (e.g. Examination) by applying some activities in order to control the stressful condition or circumstances (Park et al., 2004). In addition, this study proved that the effectiveness of cognitive restructuring and study skills training interventions due to reduce the level of high school students' anxiety.

It is considerable that the stressful factors of an assessment situation are critical proximal parameters that evoke high levels of test anxiety. On the other hand, academic achievement is invariably affected by anxiety when attention is diverted from task to self-belittling thoughts or negative self-statements. When test interferes cognitively in recalling the previously learned material, the student performance is affected, and this leads to aggravated physiological reactivity. Kurosawa and Harackiewicz (2006) stated that, students with a high level of test anxiety are concerned and encounter more distractive cognitions under assessment conditions than other students. Moreover, anxious students also deteriorates their performance (Kurosawa & Harackiewicz, 2006). Thus, cognitive restructuring may assist anxious

students to remove disruptive thoughts and also help students with test anxiety to better control their thoughts and concentrate on the task (Zeidner, 1998). On the other hand, based on the skills-deficit model, the distinctive characteristic of the test anxiety experience is meta-cognitive awareness, which test-anxious students experience more test anxiety because they are not ready for the exam. Therefore, they will experience more emotional disturbances such as anxiety and stress and also feelings of low academic ability. Etiologically, the deficit model says that anxiety and poor performance result from weak efficiency on the part of the student to study well, and his lack of knowledge on test-taking skills, which itself can be traced back to the insufficient attention given by parents and the improper teaching strategies and styles offered by school on this regard. Considering the proximal factors which bring about evaluative stress, the skills-deficit model emphasizes on the impacts of the importance of the study material, which boosts the examinee's knowledge on the insufficient intake of the material owing to poor study skills. Test anxiety indicates that the students are not ready for the test. Hence, this model aims to provide study skill training and counselling to the students so that they can prepare to deal with the test situation (Zeidner, 1998). With regard to the findings which shown significant effects of psycho educational interventions (cognitive restructuring and study skills training), it could be concluded that these interventions could help anxious students to improve their academic achievement.

5. Conclusion

Totally, based on the findings of this study, the authors identified that there is an association between psycho-educational interventions (cognitive restructuring and study skills training) on test anxiety (state and trait anxiety) and academic achievement (grade point average) among high school students. The findings revealed that psycho educational group interventions have a significant negative effect on state anxiety and trait anxiety across post-test and follow-up. However, state and trait anxiety as mediators showed a weak effect on students' grade point average. Besides, study groups (cognitive restructuring, study skills training, and control group) as independent variable showed a positive significant effect on students' academic achievement (grade point average). Based on this study the authors recommended that cognitive restructuring and study skills training interventions could be a reliable intervention to assist anxious students to cope with test anxiety appropriately and improve academic achievement. However, this study is characterized by certain limitations such as making sessions attractive for students, presenting the contents in the simple forms, understandable and applying two different interventions cognitive restructuring which involves rational emotive therapy and systematic rational restructuring and study skills training which involves study habits and test taking skills. Finally, this article posed a challenge for further study to investigate the effects of combined interventions on anxious students in other dimensions such as depression and phobia. Besides that, the study could contribute more if future studies focus on different and various sectors.

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