Comparing the Effectiveness of Metacognitive and Cognitive Strategies in Reducing Exam Anxiety and Meta Anxiety: Student Emails

Saleh ardestani samira[1], **Ghandi** parastoo[2], **Janeh** mozhdeh[3], **Ghasemi majdi** naeimeh[4]

(Received Feb. 2015 & Published online April. 2015 issue)

Abstract

The purpose of this study is to compare the effectiveness of meta-cognitive and cognitive strategies in alleviating exam anxiety and meta-anxiety among university students. The quasi-experimental research method along with pre-test/post-test and control groups was implemented. The statistical population comprised all the female students of Allameh Tabatabai University. The sample population consisted of 30 students randomly selected and assigned in three groups using available sampling methods. Exam anxiety and anxious thoughts questionnaires were subsequently distributed among the three groups. The covariance method was used to analysis the collected data. The results obtained from the covariance analysis showed that there were significant differences between the three exam anxiety groups. Also, it was shown that meta-cognitive and cognitive strategies had similar effects in reducing exam anxiety, and that the effect of meta-cognitive strategies was mostly in reducing meta anxiety among students. Due to the effectiveness of these two strategies in reducing exam anxiety, the results obtained from this study can be useful to experts in the field.

Keywords: Exam anxiety, meta-cognitive strategy, cognitive strategy, meta anxiety.

[1] .Ph.D student in Educational Psychology, Department of Psychology, Shiraz University, Shiraz, Iran
[2] M.s Graduated in Educational Psychology, Department of Psychology, Tehran University, Tehran, Iran)
[3] M.s Graduated in Educational Psychology, Department of Psychology, Allameh Tabataba'i University, Tehran, Iran
[4] M.s Graduated in School Counseling ,Department of Psychology, Allameh Tabataba'i University,Tehran, Iran
(DOI: dx.doi.org/14.9831/1444-8939.2015/3-4/MAGNT.10)

Introduction

Anxiety undeniably plays a role in the life of human beings by affecting their performance and efficiency in various situations. We all know that a certain degree of anxiety is essential for keeping the mind active towards achieving the set goals (McCaleb-Kaha, Wenner, 2009). However, high levels of anxiety are a threat to both physical and mental health and leave negative effects on one's personal, social, family, professional, and educational performance.

Emotional responses can occur anytime during an evaluation. At each stage of the evaluation, if we feel unprepared, if we doubt our ability to function properly, or even if we feel that we cannot exhibit our best performance, we feel sad, stressful, and rejected. However, if we are sure about our performance, then we demonstrate it through self confidence and pride in ourselves, and we are generally happy. Exam anxiety is a most important problem in schools and universities and has high levels among students. This problem might be due the predicted role for exams in the existing educational system in general since about 10 million primary and high school students and 15-20 percent of university students in the United States experience exam anxiety (Chapel et al., 2005). Based on certain studies conducted in Iran, about 17.2 percent of Iranian students exhibit exam anxiety (Abolqasemi, 2003). Exam anxiety which occurs during the exam period is associated with certain symptoms including stomach upset, sleep disorders, restlessness, changes in appetite, weakness, vertigo, blood pressure, pulse, and adrenalin/noradrenalin changes. Other signs of anxiety have also been reported: heart palpitations, paleness, stuttering, involuntary movements of limbs, body temperature changes, dryness of the mouth, and profuse sweating. Some students might exhibit the above symptoms in combination with cognitive symptoms, whereas others might show different symptoms (Sarason, 1980). Exam anxiety comprises two components: cognitive and physical. The cognitive component includes feelings of inefficiency, helplessness, expecting punishment, lack of status, diffidence, and implicit attempts to escape the exam situation. The physical components are defined collectively as emotional arousal and physiological reactions. It is believed that these components are the lasting effects of past anxieties which prevent the student from functioning properly and effectively during the exam session. Unsatisfactory performance during exams has also been attributed to the physical and cognitive aspects of anxiety.

Some scholars believe that high levels of anxiety produce destructive thoughts unrelated to exams which prevent the student from concentrating on exam questions. These thoughts can lead to educational failure. Other scholars argue that exam anxiety is the result of the student's feeling incompetent, and that there is no relationship between exam anxiety and student performance (Cheraghian et al., 2008). Ellice's rational-emotional method has so far been the most effective method in improving students' beliefs and introducing positive changes in their attitudes. Research results indicate that Ellice's method combined with Meichenbaum's cognitive behavior modification method can be effective in reducing exam anxiety. In their study, Lotfi, Izadifar, Ayazian, and Aqelinezhad (2011) examined the effects of Meichenbaum's cognitive behavior modification in reducing exam anxiety among high school students. Their results showed that exam anxiety symptoms in the test group were significantly reduced as compared with the control group. Another study investigated the effects of cognitive and metagognitive strategies in reducing exam anxiety. The results indicated that metacognitive strategies played a more effective role in reducing anxiety among

(DOI: dx.doi.org/14.9831/1444-8939.2015/3-4/MAGNT.10)

students (Qahvechi, Fatiashtiani, and Azadfallah, 2014). Ergene (2003) showed that the most effective strategy for reducing exam anxiety was a combination of skill-oriented strategies and other educational approaches. In this study, metacognitive strategies were implemented. Before explaining this strategy, we must mention that the cognitive approach attempts to introduce modifications in the student's evaluation rather than changing the metacognitive processes which lead to continued maladaptive thinking. A major development in recent cognitive strategies was the introduction of willingness/inclination and directing it towards metacognitive thinking or "thinking about thinking". Of course, certain aspects of cognitive strategies also include metacognitive dimensions. In metacognitive strategies, a person's evaluations are investigated and the correct methods of evaluation are taught to the person. Moreover, metacognitive strategies attempt to regulate the process of thinking through implementing the appropriate supervisions.

Other strategies have also been implemented for reducing anxiety. For example, the process of logical discussion in Ellice's method requires the ability to investigate and evaluate various belief systems. The method of solution involves asking the person to return to his automatic problem solving strategies and conceptualize the problem solving methods he uses in his life. Therefore, the educational methods used in the matecognitive approach are more comprehensive than those used in the cognitive approach. These metacognitive elements generally attempt to improve cognitive performance through supervision and evaluation of thinking, which would ultimately lead to adaptive thinking methods (Wells et al., 2009). Metacognitive strategies are based on the axiom that human being's metacognitions would lead to specific response patterns to internal experiences such as anxiety, negative emotions, and strengthening of negative thoughts. In other words, the self regulatory executive function model (SREFM) plays an important role in this process. Many psychological problems can be expressed in terms of S-REFM and the cognitive attentional syndrome (CAS). The first research evidence showed that metacognitive strategies could reduce symptoms in the generalized anxiety disorder (Wells and King, 2006; Fischer, 2006), the obsessive-compulsive disorder (Fischer and Wells, 2008; Simon, Schneider, and Herptz-Dalman, 2006), and the posttraumatic stress disorder (Rolls and Sambi, 2004; Wells, Welford, Frazer et al., 2008). Also, reliable evidence indicated that CAS played a role in exam anxiety and other anxiety disorders (Barahman, 2009; Well and Carter, 2001; Mathews et al., 1999). Another study addressed the effectiveness of metacognitive strategies in the cognitive/attention syndrome as well as the cognitive emotion regulation of the persons affected by anxiety. The results showed that these strategies could effectively reduce many symptoms including obsessive and catastrophic rumination symptoms (Salmasi, Hassani, Karami, Mohammadkhani, 2013). In a meta-analysis for investigating the effectiveness of applied strategies for reducing exam anxiety, it was exhibited that such strategies were indeed effective in reducing anxiety (Arouzi, Abedi, Foroushani, 2013). On the other hand, the study conducted by Sepehrani (2013) indicated that regular cognitive and desensitization strategies were more effective than teaching study skills. In their study, Momeni, Rezai, and Ganji (2014) showed that metacognitive strategies were effective in reducing exam anxiety among students.

The metacognitive approach defines anxiety as the catastrophizing of and consequent inability to control a problem. A person might employ being worried as a coping strategy, but the problem becomes more acute when the person

(DOI: dx.doi.org/14.9831/1444-8939.2015/3-4/MAGNT.10)

uses being worried as a solution to cope with his anxiety (Wells, 1995).

Since being worried is a critical component in defining exam anxiety, it seems to be a coping strategy activated for dealing with destructive negative thoughts (i.e., failure in the exam). If a person thinks his fear might be useful in avoiding potential risks, this person becomes "worried happy" (Wells et al., 2009). Using fear as a coping strategy is linked to matecognitive beliefs which are generally personal. These beliefs in turn activate negative metacognitive beliefs which play a significant role in exam anxiety.

Exam anxiety actually surfaces when the negative beliefs regarding worries and exam anxiety are activated or when the person feels his performance is being evaluated (Wachelka, 1999). Therefore, a strategy for reducing CAS and metacognitive beliefs related to being worried can also reduce exam anxiety and metaworries (i.e., being worried about one's worries).

Since students are valuable resources in the development of a country, and since anxiety plays a significant role in students' life and their educational performance, the authors deemed as appropriate to compare the effectiveness of metacognitive and cognitive strategies in reducing exam anxiety and metaworries in students.

Methodology

The statistical population comprised all the female students of Allameh Tabatabai University. Thirty students were selected as samples from this population and randomly classified in three groups. Metacognitive and cognitive strategies were taught in the first and second groups respectively, whereas the third (control) group did not receive any instructions. Each group consisted of 10 students. Pre-test and post-test methods were implemented before and after instruction.

Research Tools

1. The Test Anxiety (TAI) Questionnaire

This questionnaire included 20 items. The participants were asked to respond to each item in accordance with the intensity of their experienced feelings (Spielberger, 1980). The following four scales were provided; 1) Never, 2) Sometimes, 3) Often, and 4) Always. Subsequently, the mean TAI score was calculated. Eight items were related to worries (W) and 12 items to emotions (E). This questionnaire was translated into Persian by Abolghasemi (1998) and subsequently accredited by the relevant authorities. The reliability of this questionnaire was established through the test-retest method conducted on a sample comprising 52 male Iranian students (Mousavi et al., 2008). The Cronbach alpha coefficients for female and male samples were reported to be above 0.92, and the reliability coefficients for the test-retest methods after three weeks and one month were reported as 0.80. The validity of the questionnaire was obtained as 0.82 and 0.83 in boys and girls respectively based on the Sarason exam anxiety scale (1980). Also, the reliability coefficient of this questionnaire was obtained as 0.85 based on the Cronbach alpha method. The validity of the questionnaire in the present study was obtained as 0.82 through the internal correlation method.

2. The Anxious Thoughts Inventory (ANTI)

This is a questionnaire for measuring worries (Wells, 1995) and comprises three subscales, namely, social worries, health-related worries, and metaworries. The first two subscales are content-based scales, whereas the metaworries subscale determines the metacognitive evaluations (worrying about the worries) and the processing dimensions of worries. The responses to every item were given scores

(DOI: dx.doi.org/14.9831/1444-8939.2015/3-4/MAGNT.10)

from 1 (never) to 4 (always). Each subscale demonstrated suitable psychometric characteristics (Cronbach alpha between 0.75 and 0.84). The Iranian version of the questionnaire has a Cronbach alpha between 0.57 and 0.92 (Barahmand, 2009). Wells (1994) reported the Cronbach alpha values of 0.84, 0.81, and 0.75 for social worries, health-related worries, and metaworries respectively.

The present study determined the validity of this questionnaire as 0.87 (based on the internal correlation method) and its reliability as 0.89 (through Cronbach's alpha method).

Methodologies

The present study used the quasi-experimental method along with pre-test, post-test, and control groups. Based on the scores obtained from responses provided by female students to Spielberger's exam anxiety questionnaire, 15 students with high levels of exam anxiety were selected and randomly classified in one control group and two test groups. The following entry criteria were considered: 1) an exam anxiety score with at least one standard deviation above the mean value, and 2) age between 22 and 30. The exclusion criteria included: 1) no psychotic or physical disease which can lead to aggravated anxiety factors, 2) no sign of exam anxiety for at least six months, and 3) no drug abuse. Each metacognitive training session lasted 60 minutes and the students participated in 9 such sessions. Cognitive strategies class lasted 45 minutes and the students took part in 8 such sessions. The training courses were offered on a weekly basis. No other training was provided simultaneously for the students attending the cognitive and metaconitive courses. All the participants were asked to complete the distributed questionnaires at the start and end of each session so that the effect of educational strategies before, during, and after the training course could be identified. Upon receiving treatment, a three-month follow up period was allowed during which the students would not receive any other training. The ANCOVA (covariance) and the repeated measurements methods were used to analyze the data through the SPSS-14 software.

Cognitive Strategies Training Schedule

This educational package was adapted from Well's package (translated into Persian by Mohammadkhani, 2009). The following schedule was followed for teaching the metacognitive strategies against exam anxiety:

Session 1: Case conceptualizations and completing questionnaires

Session 2: Preparing the students for participation in the training course

Session 3: Metacognitive method

Session 4: Challenging the metacognitive beliefs regarding uncontrollability (recollecting mindfulness, conducting a special test to postpone worries)

Session 5: Challenging the metacognitive beliefs related to the risk of being worried (intensified maladaption, examination of evidence, behavioral tests, rave test, inflicting self-harm as a result of worries, evaluating the negative effects of worries on the body)

Session 6: Challenging worries via positive metacognitive beliefs (verbal redocumentation, unproportional worries strategy, modification of worries test)

Session 7: Challenging positive metacognitive beliefs regarding worries (modification of worries test)

Session 8: Relapse prevention

Session 9: Final evaluation, completion of exam anxiety and anxious thoughts questionnaires

Cognitive Strategies Training Schedule

(DOI: dx.doi.org/14.9831/1444-8939.2015/3-4/MAGNT.10)

The material for cognitive training was adopted from the Lihee educational package (translated by Fathi et al., 2008). Eight sessions of instruction were scheduled as follows:

Session 1: Conceptualizing the subject and compiling treatment programs; explaining how thoughts could generate feelings

Session 2: Identification of negative automatic thoughts

Session 3: Identification and classification of various cases of distortion in thinking

Session 4: Challenging thoughts

Session 5: Challenging thoughts and evaluating rules and assumptions

Session 6: Challenging thoughts and evaluating rules and assumptions (continued)

Session 7: Conclusion – This last instruction session was devoted to reviewing the topics and instructed material presented earlier during the training course.

Session 8: The required evaluations were conducted and the students were prepared for the follow up procedure

Results

The information regarding the age of participants is presented in Table 1.

Table 1: Descriptive indexes related to sample individuals' age in terms of educational group

	No. of Samples	Mean	Standard Deviation
Metacognitive Therapy	10	24.2	0.73
Cognitive Therapy	10	23.2	0.85
Control	10	26.2	0.87

The mean and standard deviation values for pre- and post-test scores in the three groups obtained from applying the exam anxiety method, metaworries subscale, and anxious thoughts questionnaire are demonstrated in Table 2. As can be seen in Table 1, the mean scores for the pre-test groups are similar, whereas the mean values obtained for the post-test and follow-up (after completion of training sessions) are different.

Table 2: Pre- and post-test mean values obtained from exam anxiety and metaanxiety methods

Meta Worries		Exam Anxiety		
Post-Test	Pre-Test	Post-Test	Pre-Test	Groups
7.9 (2.3)	11.9 (3.1)	52.1 (2.3)	59.6 (4.1)	Metacognitive Strategies
10.2 (2.1)	14.3(3.7)	54.9 (3.1)	60.2 (4.7)	Cognitive Strategies
16.2 (4.9)	15.8 (4.4)	64.0 (4.9)	58.2 (4.1)	Control Groups

The post-test scores were obtained via a one-way ANCOVA for controlling the level of each variable. Also, the results obtained from the covariance method (Table 2) indicated a significant difference among the three groups in terms of exam anxiety.

(DOI: dx.doi.org/14.9831/1444-8939.2015/3-4/MAGNT.10)

Table 3: Exam anxiety and metaanxiety covariance results

	Sum of Square	Degrees of Freedom	Mean Squares	F	Significance Level
Pre-Test	31.17	1	31.17	0.419	0.499
Groups	753.5	2	376.6	4.95	0.018
Error	702.42	11	63.85		
Total	379.18	15			

The least significant difference (LSD) was used to analyze the general variations from pre-test to post-test stages as well as the inter-group differences. According to Table 3, the metacognitive and cognitive strategies had similar effects on reducing exam anxiety. Also, the group undergoing metacognitive instruction exhibited a significant reduction in terms of metaworries scores (mean difference p= 0.009 , -9.1) as compared with the control group. The LSD results showed that application of metacognitive strategies in the test groups reduced both exam anxiety (mean difference p=0.01, -9.1) and metaworries (mean difference p=0.023, -4.3). The results also showed that the group receiving cognitive strategies instruction reported fewer cases of exam anxiety at the completion of the instruction sessions as compared with the control group (mean difference p=0.015, -6.4). However, no significant difference was observed between the results obtained from the cognitive strategies group and the control group in terms of reducing metaworries (p=1.56).

Table 4: LSD test pair-wise comparison of two educational strategies (metacognitive and cognitive)

SE	P Value	Mean Difference	Variable	Groups	
4.87	0.81	-2.4	Exam Anxiety	Cognitive	Metacognitive
5.34	0.03	-9.1	Exam Anxiety	Control	Metacognitive
6.27	0.015	-6.4	Exam Anxiety	Control	Cognitive
1.47	0.007	-5.1	Meta Worries	Cognitive	Metacognitive
1.33	0.043	-4.318	Meta Worries	Control	Metacognitive
0.0001	1.56	-1.6	Meta Worries	Control	Cognitive

Discussion and Conclusion

The present study was aimed at investigating the effectiveness of metacognitive instruction (as compared with cognitive instruction) in reducing exam anxiety and metaworries among female university students. The results showed that the two instructed strategies (cognitive and metacognitive) had similar effects in reducing exam anxiety. Recollecting mindfulness is the fundamental structure in the S-REFM as applied to emotional disorders (Wells and Mathews, 1994). This method virtually facilitates the existing variations in the main pathological processes, and is particularly emphasized in metacognitive strategies (Wells et al., 2009).

(DOI: dx.doi.org/14.9831/1444-8939.2015/3-4/MAGNT.10)

Regarding the nature of exam/test anxiety, studies show that it can be attributed to two important components, namely, metacognitive worries ad coping skills. For reducing exam anxiety, the main cognitive component must be targeted and the relationship between exam anxiety and cognition must be explained via the relevant model (Mathews et al., 1999). As pointed out in these concepts, there is no particular difference between cognitive and noncognitive methods in reducing exam anxiety. Also, in several studies on cognitive strategies, a relationship was observed between worries and certain aspects of exam anxiety. These results showed that cognitive methods could significantly reduce the exam-anxiety-related worries (Harris and Johnson, 1983).

As shown in Table 3, metacognitive strategies reduced exam anxiety, whereas no such reduction was observed in the control group. This is indicative of the effectiveness of metacognitive strategies in this regard. Metacognitions give direction to our attention, thinking, and coping styles. This implies that for reducing exam anxiety, these metacognitions and not the consequences of our thinking must be modified (Wells, 1995).

S-REF is the fundamental component of metacognitive strategies. In dealing with emotional disorders, these strategies focus on the effect of high vulnerability and illogical activities on attention. The CAS emphasizes on improving exam anxiety via reducing repeated thinking patterns (Wells and Cartwright-Hutton, 2004). The results showed that cognitive strategies were effective on reducing anxiety. The fundamental concept of cognitive strategies implies that emotional and behavioral reactions are not consequences of events themselves, but are exhibited as a result of the way events are interpreted. Cognitive strategies can help individuals to concentrate on their assignments rather than their own personal responses. This method identifies the very thoughts that create anxiety and remind students of all levels of these thoughts. Then, it teaches them to identify the maladaptive emotions through interpreting and labeling the emotions activated during exams (Michenbahm and Carter, 1980). The results obtained in the present study were in good agreement with those obtained by Nourbala (2009). In fact, these results indicated that, as compared with cognitive approaches, metacognitive strategies were more effective in reducing anxiety frequency although they exhibited a similar effect in terms of reducing exam anxiety.

In explaining the effectiveness of cognitive strategies in reducing metaworries as compared with cognitive strategies, we point out that anxiety disorders are behavioral consequences and believed to result from the person's negative evaluation of the situation. Both cognitive and metacoognitive strategies try to control these consequences (Wells, 1995). Also, metaworries (being worried about worries) are considered to be the key concept in the metacognitive approach in dealing with anxiety disorders (Wells et al., 2009). Cognitive strategies concentrate on the content of thoughts, and do not consider worries as the main core of anxiety disorders. For this reason, metacognitive strategies can reduce the increasing worries during exam sessions. There were certain limitations in the present study. Firstly, this research is based solely on the symptoms reported by students themselves. Secondly, only 30 cases were studied, and this limits the generalization of the obtained results. Also, the direct and indirect effects exerted by the instructor might place limitations on the validity of the obtained results. Therefore, it is suggested that a larger sample size be used in future works. Also, we propose that the present study be compared with other similar studies in terms of effectiveness of the mentioned strategies.

(DOI: dx.doi.org/14.9831/1444-8939.2015/3-4/MAGNT.10)

References

1. Abolghasemi A., "Anxiety: Origin, Evaluation, Interference", Psychological Studies Journal, **(1998)**, **5(4): 82-97**
2. Salmani B., Hassani J., Karami Gh., Mohammdkhani Sh., "Metacognitive Therapy Effectiveness on the Cognitive/Attention Syndrome and Emotion Regulation Strategies in Persons suffering from Anxiety", Behavioral Sciences Journal, **7(2), (2013)**
3. Qahvehchi F., Fathiashtiani A., Azadfallah P., "Comparing the Effect of Metacognitive Therapy with Cognitive Thherapy Methods in Fundamental Reduction of Exam Anxiety", Behavioral Sciences Journal, **7(1), (2013).**
4. Fathi L. et al., "Cognitive Therapy Techniques", Danzhe publication, **(1999)**.
5. Mousavi M., Haqshenas H., Alishahi B., "Exam Anxiety and ite related Personall and Social Aspects in High School Students in Shiraz", Behavioral Studies Journal**, 6(1), (2008).**
6. Wells A., "A Practical Guide on Metacognitive Therapy of Anxiety and Depression",translated by Mohammadkhani Sh., Varadanesh Publication, **(2009)**.

List of Tables

(DOI: dx.doi.org/14.9831/1444-8939.2015/3-4/MAGNT.10)