Available online at www.scholarsresearchlibrary.com

Scholars Research Library

Scholars Research Library

Annals of Biological Research, 2012, 3 (12):5697-5700
(http://scholarsresearchlibrary.com/archive.html)

Annals of Biological Research
Scholars Research Library
ISSN 0976-1233
CODEN (USA): ABRNBW

Investigate of the effect of instruction of metacognitive knowledge on academic stress

Maryam Goran[1], Ali Mostafaei[2] and Akbar Rezaei[2]

[1]Department of Psychology, Tabriz Branch, Islamic Azad University, Tabriz, Iran
[2]Department of Psychology, Payame Noor University, Tehran, I.R. RAN

ABSTRACT

The purpose of this research was to investigate the effectiveness of instruction of metacognitive knowledge on academic stress in high school female students. This research method is quasi experimental with pretest and post test. Given this, 37female first grade students (19 subjects in experimental group and 18 subjects in control group) were randomly selected using multi-stage cluster sampling. Measurement device used was academic stress questionnaire and metacognitive knowledge strategies were instructed to subjects during 8 sessions. The data were analyzed by descriptive statistics and multi-covariance and covariance. The results showed that instruction of metacognitive knowledge have significant effect on reduce of academic stress.

Keywords: *instruction, metacognitive knowledge, academic stress, students*

INTRODUCTION

Metacognition is defined as cognition about cognition", or "knowing about knowing. It can take many forms; it includes knowledge about when and how to use particular strategies for learning or for problem solving [1]. Metacognition is classified into three components:

1. Metacognitive knowledge (also called metacognitive awareness) is what individuals know about themselves and others as cognitive processors.
2. Metacognitive regulation is the regulation of cognition and learning experiences through a set of activities that help people control their learning.
3. Metacognitive experiences are those experiences that have something to do with the current, on-going cognitive endeavor [2].

Metacognition includes at least three different types of metacognitive awareness when considering metacognitive knowledge:

1. **Declarative Knowledge**: refers to knowledge about oneself as a learner and about what factors can influence one's performance [3] Declarative knowledge can also be referred to as "world knowledge.

2. **Procedural Knowledge**: refers to knowledge about doing things. This type of knowledge is displayed as heuristics and strategies [3] A high degree of procedural knowledge can allow individuals to perform tasks more automatically. This is achieved through a large variety of strategies that can access more efficiently.

3. **Conditional knowledge**: refers to knowing when and why to use declarative and procedural knowledge [4]. It allows students to allocate their resources when using strategies. This in turn allows the strategies to become more effective.

Individuals with a high level of metacognitive knowledge and skill identify blocks to learning as early as possible and change "tools" or strategies to ensure goal attainment. Students who demonstrate a wide range of metacognitive skills perform better on exams and complete work more efficiently. Metacognitive strategies training can consist of coaching the students in thinking skills that will allow them to monitor their own learning [5].

Another research variable is academic stress. Selye [6] defined stress, as a nonspecific response of the body to any demand made upon it. A modern definition of stress is: a psychological and physical response of the body that occurs whenever we must adapt to changing conditions, whether those conditions be real or perceived. Stress has powerful effects on mental functioning, mental and physical performance, interpersonal encounters, and physical well-being [7 and8].

According to the ideas by Pintrich and Degroot [9] the learners who have high academic stress would apply effective learning strategies more frequently in relation to the learners with lower stress. Various studies reveal that the learners who use deeper strategic approaches would reach better learning results and experience less academic stress in comparison to the learners who use superficial strategic approaches.

The studies led in the field of cognitive psychology indicate that the learning and study strategies and goal setting could improve the students' academic performance through reducing the level of academic stress. Identifying these strategies could be a significant step for appropriate academic interventions and could improve students' achievements through determining the strengths and weaknesses in their study and providing them with adequate interventions [5].

,Smith [10] considers academic stress as an affective state which includes test anxiety, lack of academic achievement, and experience of discordant emotions, inattention and lack of goal setting. Academic stress indicates to the increasing need for knowledge and at the same time individual's perception about lack of enough time for gaining that knowledge

MATERIALS AND METHODS

Participants

Considering the subject of the research, the statistical population included the total female secondary school students (3507 students) in Mahabad. The sample consisted of 37 female students were selected through cluster sampling. The subjects were randomly assigned to experimental (19 subjects) and control group (18 subjects).

Materials

Metacognitive knowledge: Metacognitive knowledge was instructed to subjects during 8 sessions. Session 1) planning strategies (Determination of the rate, the anticipated time needed for learning and reading speed), session 2) planning strategies (Analysis dealing with the issue, the selection of appropriate strategies), session 3) monitoring strategies (evaluation of progress, monitoring on attention, questioning), 4) regulatory strategies (adjustment speed of study), 5) identify negative thought from negative emotions, 6) review of homework, 7) displacement of positive thinking, 8) set realistic goals.

Students Life Stress Inventory (SLSI): Student-life Stress Inventory [11] was used to collect the data. The inventory consists of 51 items listed in 9 sections indicating different types of stressors (frustrations, conflicts, pressures, changes, and self-imposed stressors) and reactions to the stressors (physiological, emotional, behavioral, and cognitive appraisal) as perceived by students.

Previous studies [12, 13] showed the SLSI to be a fairly reliable and valid inventory measuring students' stressors and reactions to stressors. For instance, Cronbach's alphas for 95 participants on the nine SSI categories ranged from .52 to .85 [11]. For 290 participants on total SLSI, the alpha was .76, for men .78, and for women .76 [12]. Test-retest reliability on SLSI for 87 participants was .78, for men .92, and for women .72 [14]. On the nine categories, test-retest reliabilities for 95 participants ranged from .57 to .76 [11]. Significant differences were found among the three stress level groups (mild, moderate, and severe) on total SLSI for 290 participants ($F = 71.00$, $p < .0009$[12] and for 381 participants ($F = 71.72$, $p < .0001$) in 2001 [13].

RESULTS AND DISCUSSION

Table 1: mean and std. deviation of academic stress in experimental and control group

group	Mean	Std. Deviation	N
1	118.5263	15.20734	19
2	130.3889	23.36951	18
Total	124.2973	20.24004	37

As can be seen in table 1, men of stress in experimental group (post test) is 118.53 and std. deviation is 15.21; in control group, mean of stress (post test) is 130.39 and std. deviation is 23.37. Mean of stress in experimental group is less than the control group.

Table 2: summary of multivariate analysis of covariance on academic stress

Multivariate Tests[c]						
Effect		Value	F	Hypothesis df	Error df	Sig.
Academic stress	Pillai's Trace	.976	14.474[a]	14.000	5.000	.004
	Wilks' Lambda	.024	14.474[a]	14.000	5.000	.004
	Hotelling's Trace	40.528	14.474[a]	14.000	5.000	.004
	Roy's Largest Root	40.528	14.474[a]	14.000	5.000	.004
a. Exact statistic						

In table 2 Summary of multivariate analysis of covariance effects of instruction on academic stress is presented. As can be seen, instruction of strategies has significant effect on academic stress.

Table 3: Tests of between- subjects effect in academic stress

Dependent Variable: academic stress					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	10789.504[a]	2	5394.752	46.339	.000
Intercept	262.455	1	262.455	2.254	.142
Pre .aca.stress	9488.789	1	9488.789	81.506	.000
group	704.946	1	704.946	6.055	.019
Error	3958.225	34	116.418		
Total	586391.000	37			
Corrected Total	14747.730	36			
a. R Squared = .732 (Adjusted R Squared = .716)					

As can be seen in table 3, R Square is .732 and Adjusted R Square is .716 and the difference is significant at level .0001; this means that 71.6% of academic stress is explained by metacognitive knowledge.

Table 4: Pairwise Comparisons between experimental and control group in academic stress variable

Dependent Variable:academic stress						
(I) group	(J) group	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-8.774*	3.565	.019	-16.019	-1.528
2	1	8.774*	3.565	.019	1.528	16.019
Based on estimated marginal means						
**. The mean difference is significant at the .05 level.* *a. Adjustment for multiple comparisons: Bonferroni.*						

As can be seen in table 4, mean difference in experimental and control group is 8.77 and this difference is favor of experimental group. This means that academic stress in experimental group is lower than control group and instruction of metacognitive knowledge was effective in reducing of academic stress.

Table 5: summary of univariate analysis of covariance on academic stress

Dependent Variable: academic stress					
	Sum of Squares	df	Mean Square	F	Sig.
Contrast	704.946	1	704.946	6.055	.019
Error	3958.225	34	116.418		
The F tests the effect of group. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.					

To control type 1 error, every ANCOVA by using Benfroni method were examined at level of .05. As can be seen at table 5, results of Funivariate analysis, showed a significant difference in academic stress between experimental and control group ($F_{(1,34)}$= 6.055, P< .05). in other words, subjects academic stress have decreased with regard to instruction of metacognitive knowledges.

DISCUSSION

The aim of study was to investigate the effect of instruction of metacognitive knowledge on academic stress in female high school students. Therefore, 37 subjects were selected through cluster sampling and metacognitive knowledge, instructed to them during 8 session and academic stress completed by them before and after instruction. The results of the research showed that instruction of metacognitive knowledge can reduce academic stress.

These results with published findings about stress and mental health are consistent [3, 4 and 5]. These researchers found that metacognitive knowledge and strategies are effective in reducing stress. Reducing stress is associated with increased academic performance.

Other researchers [5, 15 and 16] have shown that instruction of metacognitive knowledge has a great impact on improving the quality of reading and understanding of students, increasing the ability to acquire and apply of knowledge, solve math problems, depression, comprehension and problem solving, increase the understanding and maintenance of texts.

In general, it can be concluded that metacognitive knowledge and strategies training is effective in reducing the academic stress.

REFERENCES

[1] J Metacalfe, AP Shimamura. Metacognition: knowing about knowing. Cambridge, MA: MIT Press, **1994**.
[2] JH Flavell *American Psychologist*, **1979**, 34, 906-911
[3] G Schraw *Instructional Science*, 1998, 26, 113-125.
[4] R Garner.*Review of Educational Research*, **1990**, 60, 517-529.
[5] P Kadivar, J Kavousian, M Arabzadeh, F Nikdel. *Procedia-social and behavioral sciences*, **2011,** 453-456.
[6] A Mostafaei. *Annals of biological Research,* **2012**, 3, 7, 3468-3473.
[7] J Shigemi , Y Mino , T Tsuda , A Babazono , H Aoyama. *Journal of Personality and Social Psychology*, **1975,** 32(2), 329-337.
[8] JS Lee, GF Koeske, E Sales. (2004). *International Journal of Intercultural Relations*, **2004** ,*28(5*), *399-414.*
[9] PR Pintrich, EV De Groot. *Journal of educational psychology,* **1990**, 82, 1, 33-40.
[10] R Misra, M McKean, S West, R Tony. *College Student Journal,* **2000**, 34, 2, 236-246.
[11] B Gadzella. *College Student Journal,* **2008**, 42,2, 254-264.
[12] BM Gadzella. *Psychological Reports,* **1994**, 74,2, 395-402.
[13] BM Gadzella, M Baloglu. *Journal of Instructional Psychology*, **2001**, 28, 2.
[14] BM Gadzella, D Guthrie. *Proceedings of the Texas Academy of Science,* **1993**, 000.00.
[15] K Parviz. MSc thesis, Shahid Beheshti University, (Tehran, Iran, **2004**).
[16] S Fahimzadeh. MSc thesis, Alzahra University, (Tehran, Iran, **2002**).