IJBPAS, November, 2015, 4(11), Special Issue: 672-679

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

EFFECTS OF METACOGNITIVE STRATEGY TRAINING ON ACADEMIC PERFORMANCE AND TEST ANXIETY IN THIRD-YEAR HIGH SCHOOL STUDENTS IN TEHRAN PROVINCE

MARYAM BAHRAMI HIDAJI [1]*

1: Assist. Prof, Department of Psychology, College of Psychology, Islamic Azad University, Karaj Branch, Karaj, Alborz, Iran

***Corresponding Author: E Mail: bahrami_h3@yahoo.com**

ABSTRACT

This study is mainly aimed at investigating metacognition effect and its approaches toward improving academic performance and reducing test anxiety in high school students in Tehran province. The research methodology is quasi-experimental. Accordingly, 150 male third-year high school students are selected from the research population using multistage cluster sampling method. The sample is subsequently divided into control and experimental groups. The experimental group's intervention program includes a 75-minute-per-week metacognitive strategy training session.

Prior to executing the intervention program, a pre-test is administered to all students. Spielberger test anxiety inventory is used as the data collection tool. The data analysis results show that there is a significant difference between control group and experimental group. Therefore, metacognitive strategies and approaches training has a positive impact on improving academic progress and reducing test anxiety.

Keywords: Academic Progress, Metacognition, Test Anxiety, Training

INTRODUCTION

Metacognition is a term first used by Flavel (Flavel, 1987) regarding the memory. Flavel defined metacognition as knowledge about cognition or in more general terms, control of cognition (Salf, 1997). According to Brown et al., "metacognition is cognitions about cognitions or the executive decision-making process in which the individual must carry out cognitive operations and oversee her/his progress" (Brown, 1982). Metacognition is our knowledge about our own cognitive processes and how to

optimally use them to achieve learning objectives (Biehler and Snowman, 1993). Metacognitive strategies help individuals improve their ability to understand and retain of course content and thus, effectively enhance their learning efficiency. Learners can chart their path on the learning way by developing their metacognitive learning capacities and educators can pave the way by placing learning about learning on the agenda of their educational programs [10].

A better understanding of the learning process can help most students improve their academic performance.

Thus, knowledge of learning and study skills is considered as one of the major factors influencing students'' academic success (Mora, 2009, quoted by Salehi). Many learners experience academic frustration and failure due to lack of metacognitive learning and study skills and strategies (Darek, 2006). In a study

Ormrod (2000) showed that the more students know about effective learning strategies and the limitations of their own learning and memory capacities, they will equally have a better chance in enhancing their academic progress (Eskita, 2004; [8].Jennifer (2004), Tzuriel, Kanner, Kaniel, Haywood (1999) and Wiliams et al. (2002) in separate studies demonstrated the impact of metacognitive beliefs on students' academic success and learning outcomes. Venman and Spaans (2005) also found that metacognitive strategy training has a positive impact on students' academic success and learning outcomes[10].

Test anxiety is a general term used to refer to a type of anxiety or a specific social phobia that makes individuals doubtful of their abilities. One of the consequences of test anxiety is the reduced ability to deal with situations such as testing situation. These situations are situations in which individuals are evaluated and typically involve problem solving. In fact, test anxiety is a kind of evaluation anxiety. In other words, given the stage in which test anxiety occurs, it can be labeled as a process through which individuals create threatening situations out of testing situations. Test anxiety occurs in abnormal cognitive conditions (e.g. disturbing perceptions and unrelated thought about tests and exams) rather than academic stressors. Under highly stressful conditions, such abnormal responses result in a decline in memory performance (Parks-Stamm et al., 2010). In a research, two types of test anxiety were identified. The first type of test anxiety is associated with the lack of cognitive skills and those who lack such skills often feel that they are failures and consequently suffer from text

anxiety. The second type of test anxiety involves individuals who experience thoughts that are not related to their tasks. These unrelated thoughts produce cognitive interferences and prevent the use of cognitive skills. Those individuals who experience the second type of test anxiety possess the required cognitive skills, however, they suffer from some shortcomings in employing such skills (Abolghasemi et al., 2009).

Zivcic-Becirevic et al., 2009) have examined the role of cognitive beliefs in dealing with specific situations such as test anxiety. The results of regression analysis show that negative cognitive variables such as individual's beliefs regarding lack of control, existence of risks and lack of motivation and interest, as well as their automatic thoughts are the best describers of test anxiety. Wells

(2000), Pressley and Gatalla (1990) state that during a test, students use a metacognition principle called metacognitive monitoring as the executive process of metacognitive actions. Consequently, accurate and exact monitoring by students results in a change in their performance and learning adjustments and thus balances

their test anxiety (Bol et al., 2005; Nietfeld and Schraw, 2002; Nietfeld et al., 2005).

Vuk (2008) has explored the relationship between metacognitive ability and test anxiety in 99 students of educational psychology. The results show that students with higher cognitive abilities experience lower levels of test anxiety. This finding is consistent with the findings of a research conducted by Nathan (2000). According to Nathan's findings, there is a significant negative relationship between test anxiety and metacognitive skills. On the other hand, Jain (2006) has investigated the relationship between metacognitive strategies and test anxiety. The results indicated that development of cognitive and metacognitive strategies is the best predictor of students' grades.

The relationship between test anxiety and academic success has also been examined. Yerkes and Dodson believe that medium levels of anxiety can lead to

improved performance in specific tasks. Too high or too low levels of anxiety can deteriorate performance. This theory predicts a curved relationship between test anxiety and academic success [2].In total, some studies show that there is a negative relationship between test anxiety and academic success (Culler and Holahan, 1980; Hembree, 1988; Kivimaki, 1995; Williams, 1996; Kangli, 2003; Cassady and Johnson, 2002; Campbell et al., 2005).

MATERIALS AND METHODS

Research Population, Sample and Sampling Method Research population of the present study consists of all male third-year high school students in the city of Tehran in the academic year 2011-2012. The research sample includes 150 students. Multistage cluster sampling is used as the sampling method. The sample is randomly divided into control and experimental groups. Each group has 75 members. Metacognitive strategies are taught to the experimental group during 12 training sessions (one 75-minute weekly session) and according to a predetermined schedule.

1) Planning strategies (determining the purpose of the study, estimating the time required for study and learning, determining the speed of learning, analyzing how to deal with the learning subject, selecting cognitive strategies) 2) Control and monitoring strategies (evaluating progress, monitoring one's attention, developing

questions during study and learning, controlling time and speed of study, prediction test questions)

3) Regulation strategies (adjusting the speed of study and learning, modifying or altering cognitive strategy)

Tools

Spielberger test anxiety inventory is used din the present study. This questionnaire was developed by Spielberger (1980). The 20-item questionnaire describes an individual's reaction before, during and after a test. The test anxiety questionnaire is a self-reporting tool. Each member of the sample responds to the questions

according to a 4-item scale ("Never", "Rarely" "Sometimes" and "often"). These four items have a score value of 1, 2, 3, and 4, respectively. Higher scores indicate higher levels of test anxiety. Moreover, the minimum and maximum test scores are 20 and 80, respectively.

Cronbach's alpha coefficient of the questionnaire for both male and female samples is 0.92. Retest reliability coefficient was reported 80%. The retest was conducted after one month and three weeks (Register et al., 1991).

Al-Zahra (1991), Anthony et al. (1991) and Bandalos et al. (1995) have reported that the Cronbach'a alpha coefficient of the questionnaire for students was estimated between 0.92 and 0.97. In the present study, Cronbach's alpha and split-half methods were uses to determine reliability coefficient of the test anxiety questionnaire. Cronbach's alpha and split-half coefficient of the questionnaire as a whole were both estimated 0.96.

Table 1: Mean and Standard Deviation Values of Test Anxiety for Experimental and Control Groups during Pre-Test and Post-Test Stages

Variable	Stage	Statistical Group Indicator	Mean	Standard Deviation	Frequency
Test Anxiety	Pre-Test	Experimental Control	65.32 68.17	3.09 2.27	75 75
	Post-Test	Experimental Control	30.14 70.28	7.17 3.36	75 75

Table 2: Mean and Standard Deviation Values of Academic Performance for Experimental and Control Groups during Pre-Test and Post-Test Stages

Variable	Stage	Statistical Group Indicator	Mean	Standard Deviation	Frequency
Academic Performance	Pre-Test	Experimental Control	17.19 17.39	2.49 1.96	75 75
	Post-Test	Experimental Control	18.66 17.27	3.19 1.72	75 75

Table 3: The Results of Multivariate Analysis of Variance (MANOVA) on the Difference of Scores (Pre-Test _ Post-Test) of Test Anxiety and Academic Performance in Experimental and Control Groups

Variable	Value	Df	f	P-Value
Pillai Trace Test	806	2	29.56	0.0001
Willks Lambda Test	0.53	2	156.36	0.0001
Hotelling Trace Test	7.71	2	156.36	0.0001
Roys Largest Root Test	8.91	2	156.36	0.0001

Table 4: The Results of the Trace Test between Subjects Regarding Difference Scores Difference of Scores (Pre-Test _ Post-Test) of Test Anxiety and Academic Performance in Experimental and Control Groups

Variable	Sum of Squares	Df	Mean Squares	f	P-Value
Test Anxiety	44.17	1	1951.27	461.34	0.0001
Academic Performance	8.14	1	8.14	43.35	0.0001

RESULTS

Descriptive findings of the present research include statistical indicators such as mean and standard variation values of all research variables. These are presented inTables (1) and (2). As seen in Table (1), the mean values of test anxiety for experimental group and control group in the pre-test stage were estimated 65.32 and 68.17, respectively. However, the mean values of test anxiety for experimental group and control group in the post-test stage were estimated 30.14 and 70.28, respectively.The contents of table (2) show that during the pre-test stage, the mean and standard deviation values of academic performance for experimental group are 17.19 and 2.49, respectively. During the pre-test stage, the same values for control group are estimated 17.39 and 1.97, respectively. The mean and standard deviation values of academic performance for experimental group during the post-test stage are 18.66 and 2.19, respectively. During the post-test stage, the same values for control group are estimated 17.27 and 1.72, respectively.

As shown in table (3) the significance level of all tests indicate that there is a significant difference between the students in the experimental and control groups

regarding at least one of the dependent variables (test anxiety and academic performance).

In order to better understand and comprehend such difference, the results of the trace test between subjects are presented in table (4). As illustrated in table (4), there is a significant difference between students of experimental and control groups regarding their test anxiety ($f = 461.34$, $p = 0.0001$). Subsequently, the first hypothesis is confirmed.

In other words, the method involving metacognitive strategy training has reduced test anxiety among students of the experimental group. According to table (1), there is a significant difference between students of experimental and control groups regarding their academic performance ($f = 4.25$, $p = 0.0001$).

Consequently, the second hypothesis is also confirmed.

In other words, based on the information displayed in table (3), systematic desensitization method has improved the academic performance among students of experimental group.

CONCLUSION

Research hypotheses suggest that metacognitive training leads to improved academic performance and reduced test anxiety among students. As observed in the present study, experimental group's academic performance in the post-test stage was significantly better than control groups. The results show that receiving the required training as to how to employ metacognitive knowledge makes students aware of their strengths and weaknesses. Knowing the difficulty level of course subjects and their own areas of interest improved students' academic performance because acquiring such knowledge and awareness makes students able to control the internal and external resources required for achieving their learning objectives. The third component of metacognition is awareness of different tasks a student should fulfill. If students are not aware of the desired outcome of the task they are performing, it will be hard to organize academic and educational objectives.

Organizing, saving and intertwining the modern knowledge along with proper use of learning and skill strategies facilitates the process of study. The results of the hypothesis are consistent with the results of research studies conducted by Brown and Yalinkar (1982), Paris and Winograd (1990), Anderson (1990), Wolfgang(1995), Kaar and Jasb (1997), Hecker (1998), Ricky and Stacey (2000), Scott (2000), Ababaf (1996), Ebrahimi Ghavam Abad (1997), Avancian [4],Seif [9],and Barkhordarpour and Sarmad [5],The results suggest that receiving learning

strategy training improves the quality of academic performance among students. The findings based on the hypotheses' results suggest that metacognitive strategy training probably makes students more self-confident and sure about their ability to fulfill tasks, motivates them and gives them a high sense of responsibility. Hence, individuals who posses metacognitive skills are hard-working, diligent and persistent and have a high sense of responsibility. Thus, any progress in their academic performance seems logical.

The results of hypothesis analysis show that there is a significant difference between the mean scores of test anxiety for students employing metacognitive skills and members of the control group. The results are consistent with the findings of Sap (1994), Dadsetan [6], Culler and Holahan (1980), Cassady and Johnson (2002), Kang Li and Walcerz (2003), and Campbell (2005) who believe

that cognitive strategy training can reduce test anxiety. In an attempt to explain the results of the hypothesis test we can suggest that when an individual receives learning strategy training, he will try to behave in accordance with his tasks. When the respose related to that specific task is provided, the individual will experience enhanced success and improved achievements. Hence, any anxiety related to performance will be reduced [11].

Test anxiety diminishes an individual's self-esteem, self-confidence and thus, erodes his sense of competence and self-efficacy. It makes it impossible for the individual to use his psychological capacities and capabilities in order to achieve academic success. Such individuals have more impaired metacognitive beliefs.

They estimate that they worry more about their worries rather than their achievements. Moreover, metacognitive beliefs result in reduced academic success among students who experience test anxiety.

In general, an individual who experiences test anxiety can acquire the potential to achieve academic success through receiving metacognitive strategy training and producing task-related thoughts. This endeavor and task centeredness makes an individual devoted to his own academic objectives and helps him identify the appropriate path to reach them. Such mechanisms increase the likelihood of academic success.

REFERENCES

1.Ababaf Z (1996). Comparing Learning Strategies of Strong and Weak High School Students in Districts 2,,4, and 11 of Tehran in Academic Year 1995-1996.

Master's Thesis, Faculty of Psychology and Educational Sciences, Allameh Tabatabaei University (Unpublished).

2.Abolghasemi A, Mahnaz M, Bahman N, Hossein S (2002). Comparing Learning Strategies of Strong and Weak High School Students in Districts 8,

3.Abolghasemi, Abbas, Reza, Golpour, D. Narimani, D. Mohammad, Mohammad G (2009). Investigating the Relationship between Impaired Metacognitive Beliefs and Academic Success of Students Experiencing Test Anxiety. J. Edu. Psychol. Stu. 3 (10), 5-20.

4.Avancian E (1998). The Influence of Metacognitive Strategy Training on Comprehension and learning Speed among Female Middle School Students in Tehran. Master's Thesis, Faculty of Psychology and Educational Sciences, Allameh Tabatabaei University (Unpublished).

5.Barkhordarpour Z, Zohreh S (2000). The Evolutionary Relationship between Triarchic Mental Competencies and Academic Progress among Gifted and Ordinary Second Grade Students. J. Psychol. 13 (4), 64-82.

6.Dadsetan P (1995). Assessment and Treatment of Test Anxiety. Journal of Psychology 1 (1), ???.

7.Epidemiology Study of Test Anxiety and Investigating the Relationship between Test Anxiety and Self-Efficacy and Locus of Control with Respect to the Intelligence Variable. J. Edu. Sci.Psycho. (Chamran University of Ahvaz) 1 and 2 (3): 55-72.

8.Karshki H (2002). The Effect of Metacognitive Strategy Training on Students' Comprehension. J. Psychol. 1 (6).

9.Seif A (2000). Learning and Study Methods. 3rd ed., Ravan Publications.

10.Zare H, Naser Mohammad Ahmad Abad (2011). The Effect of Metacognitive Training on Math Problem solving among Students.Journal of a New Approach Toward Educational Management 3 (2), 161-176.

11.Zarei E, Mana SK, Manijeh SY (2011). The Effect of Cognitive and Metacognitive Strategy Training on reducing Test Anxiety and Improving Academic Performance of Female Third Grade Middle School Students in the Science Class. J. Edu. Sci. (Chamran University of Ahvaz) 1 (6), 62-82.