

The Role of Metacognitive and Self-Efficacy Beliefs in Students' Test Anxiety and Academic Achievement

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Abstract: Metacognitive and self-efficiency beliefs are two major categories of cognitive sciences which their role has been considered in the education by the researchers. The purpose of conducting this study is to investigate the correlation between the metacognitive and self-efficacy beliefs with the students' test anxiety and academic achievement. The statistical population of research included all high school students in Kermanshah and 127 of them were randomly selected. Research data were collected by using the metacognition beliefs questionnaire (MCQ-30), General Self-Efficacy Scale (GSE) and Spielberger test anxiety and the students' average points were considered as the academic achievement. In this study, which has the correlation type, the data were analyzed by the regression analysis. The results of research showed that there is a correlation between the metacognitive beliefs and test anxiety with the academic achievement and also there is a significant correlation between the self-efficacy beliefs and academic achievement, but there is no significant correlation between the self-efficacy beliefs and the test anxiety. Using the results of this research, it can be concluded that the metacognitive beliefs play the role in the students' test anxiety and academic achievement and also the self-efficacy beliefs affect the academic achievement.

Key words: Metacognitive beliefs, self-efficacy beliefs, test anxiety, academic achievement.

INTRODUCTION

Metacognition is defined as any knowledge or cognitive process in which there are the assessment, monitoring or cognitive control (Flavell, 1979; Moses & Baird, 2002). Based on a viewpoint, it can be considered as a general aspect of understanding which plays role in all cognitive activities. Some of the certain aspects of metacognition are associated with the psychological disorders (Wells & Matthews, 1994, Wells, 2001).

Metacognition is a multifaceted concept. This concept involves the knowledge (beliefs), processes and strategies which evaluate, supervises or control the identification (Moses & Baird, 2002). Nelson & Narens (1990) have pointed out that the cognitive processes operate together in two or more levels. These levels are called the Meta and object levels. Two known processes in their model similar to the information flow between two levels are presented in Figure 1. Information flow from the object to the Meta level is called monitoring or supervision which leads to the knowledge of Meta level about the object level state. Information flow from the Meta level to the object level is called the control. Control informs the object level from which is later done later. Meta level includes a dynamic model (for instance, a focused mental simulation on changes over time) of the object surface. This simulation includes the knowledge and objective about the methods and the object level can be used in order to achieve this objective.

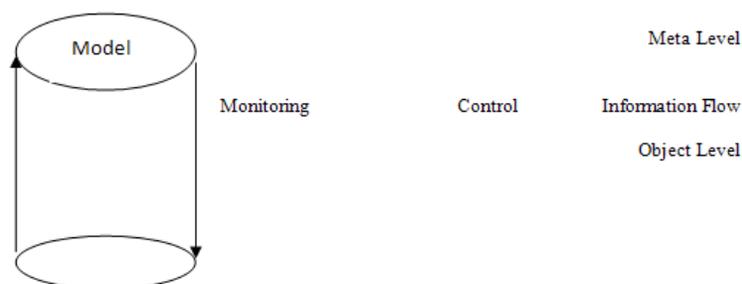


Fig. 1: Mechanism of Meta/object level by Nelson & Narens, 1990.

For understanding in the psychological disorder, the correlation between the Meta and object level can be used. As monitoring includes the input processes for system of self-managing and control of a person, any distortion in monitoring can play the role in the psychological bad action (Biabangard, 2002).

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It seems that the emotions have been obtained from the changes in the success or failure and have originated from a planned action. Displayed emotions may create the orientation in ongoing programs. For instance, the anxiety is created through the threat of human life and activates the plans associated with being alert to the environment or escaping. (Simon, 1967)

Williams, Watts, McLeod and Matthews (1988), in the cognition associated with depression, the trait (clinical) and state-dependent anxiety distinguishes different orientation and puts them in a model of attention and memory at different stages of processing. Here the effects of anxiety are seen before the attention and the state-dependent anxiety increases the amount of threat determined by a stimulus, while the trait anxiety and clinical anxiety create the orientation in dedicating the next source.

In interaction between the person and environment, the Self-Efficiency is one of the most important influential components. Self-Efficiency is defined as the "People's judgment of their capabilities for organizing and implementing a series of actions in order to achieve a set of determined actions" (Bandura, 1986, quoted by Pentrich and Schunk). According to Bandura's viewpoint (quoted by 1986, Liaw, 2009) the self-efficiency is two-dimensional, one which is the efficiency-expectation in doing a specific task and the other one is the expectation of task outcome. Efficiency-expectation indicates that the person is sure about his own ability in a specific situation. The expectation of teaching outcome means the expectation, which the individual has about his own teaching which creates the behavior change in the students. Outcome expectation is associated with the structure of success expectation in the theory of expectation value, but it not exactly similar. Self efficiency is one of the elements of self concept and contains the beliefs and expectations which are effectively associated with the individual needs and tasks (Baron & Byrne, 1997). Test anxiety is an unpleasant emotional reaction to the evaluation situation. This emotion is determined with the mental feeling of stress, anxiety and excitation of autonomic nervous system (Guida & Ludlow, 1989). In different studies, the prevalence of anxiety in students - has been reported 10 to 30 percent (McReynolds, Morris & Cratochwill, 1983). Wine (1980) has described the anxiety as a cognitive-attention structure for explaining the way of test anxiety impact on the performance. Based on the cognitive-attention, the people with test anxiety take attention to the activities unassociated with the task, mind engagement, self-criticism and physical worry and, therefore, they pay less attention to the task and this will reduce their performance (Abolghasemi *et al*, 2009).

Metacognition beliefs are associated with the test anxiety. Matthews, Hillyard & Campell (1999) have shown the correlation of Metacognition beliefs with the stress, anxiety, thinking unassociated with the test and physical symptoms with test anxiety. Moreover, three metacognitive components including the cognitive self-awareness, positive beliefs about the worry and negative beliefs about the thought uncontrollability were associated with the test anxiety. They also indicated that the metacognition and test anxiety have significant correlation with the academic achievement.

High levels of test anxiety can lead to the distraction from one task to another (Abolghasemi, 2003). This theory predicts the curve-shaped correlation between the test anxiety and academic achievement. In contrast, Roklin & Thompson (1985) have reported a linear correlation between the test anxiety and the academic achievement. Those supposed that the difficult tests increase the test anxiety compared to the easy tests; this issue specifically creates the anxiety particularly in the students who are not able to pass the test. Generally, there is a negative correlation between the anxiety and academic achievement in almost difficult tests. In contrast, this correlation is positive for easy tests (Abolghasemi, 2009). Totally, some of the studies indicate the negative correlation between the test anxiety and academic achievement (Culler & Holmhan, 1988; Hembree, 1988; Kivimaki, 1955; Williams, 1996; Dadsetan, 1995; Lucangeli & Scruggs, 2003; Cassady & Johnson, 2002; Champell *et al*, 2008). While some of the studies indicate the weak and non-significant correlation between two above variables (Paul & Eriksen, 1964; Suinn, 1969; Poulman & Kennelly, 1984).

So far, the correlation between the metacognitive beliefs and students' academic achievement has been studied in a very limited research, but it seems that the metacognitive beliefs have an important impact on the students' academic achievement (Abolghasemi, 2009). The research conducted by Bransford (1990), Sternberg (1985) and Zhmmerman (1990) indicate that there is a positive correlation between the cognitive self-awareness and learning; and the self-awareness is necessary for learning (Skhtika, 2002). The result of research conducted by Rahmani (2001) has indicated that the cognitive strategies can predict the students' academic achievement significantly and positively. Research conducted by Amini (2007) also has come to this conclusion that there is a correlation between some of the components of metacognitive beliefs and the students' academic achievement.

People with test anxiety usually have low levels of self-efficacy. The individual with test anxiety has a feeling of helplessness and powerlessness and also is not able to control or influence the test events (Schunk, 1991). Hunsley (1985), Hembree (1988), Zeidner (1992), Benson *et al* (1995) and Kivimaki (1995) found a significant negative correlation between the test anxiety and self- efficiency. Given the importance of test anxiety and academic achievement in students, this research was conducted with the aim to study the role of metacognition and self-efficacy beliefs in the test anxiety and the students' academic achievement.

Method:

Statistical population of this research includes all students at a high school of Kermanshah and 127 students were randomly selected from them. Research plan is descriptive and correlative. For data analysis, the inferential and descriptive statistical methods including the mean, standard deviation, correlation coefficient, regression, and analysis of variance were used. The following questionnaires were used for data collection:

1. Spielberger test anxiety questionnaire: This questionnaire was developed by Spielberger in 1980 and has 20 articles which examine the subjects' individual differences in test anxiety. The coefficients of internal consistency reliability and retest of this questionnaire have been reported 0.92 and 0.90, respectively. This questionnaire is translated into Persian and validated by Abolghasemi *et al* (2002). Bandlos *et al* (1995) reported Cronbach's alpha coefficient of this questionnaire from 0.92 to 0.97 for the students. (Abolghasemi, 2003).
2. Metacognitive Beliefs Questionnaire: This questionnaire, which has been developed by Wells and Caertwright-Hatton (2004), has 30 items, which has five components of positive beliefs about the worry, cognitive confidence, cognitive self-awareness, the negative beliefs about the uncontrollability of thoughts and the beliefs about the need to control thoughts. Cronbach's alpha coefficient and its reliability retest coefficient have been reported 0.93 and 0.78.
3. Self-Efficacy Beliefs Questionnaire: This questionnaire was developed by Scherer *et al* (1982) in order to measure the general self-efficacy beliefs. This questionnaire has 17 articles and can be implemented without any age restriction. Barati (1997) has reported the validity test equal to 0.76. Keramati (2001) has reported Cronbach's alpha of this questionnaire equal to 0.85. The students' average point of last semester was considered as the academic achievement.

Findings:

Data analysis has indicated that there is a significant correlation between the test anxiety and the components of cognitive beliefs. The correlation between the positive beliefs about the students' worry and the test anxiety was obtained equal to -0.35 and the correlation between the cognitive confidence and students' test anxiety was 0.33 and these correlations were significant at the level $P \leq 0.05$. But the correlation between the test anxiety and cognitive self-awareness was -0.20, with the negative beliefs about the uncontrollability of thoughts was 0.23, and with the component of beliefs about the need to control thoughts was equal to 0.22; and these correlations were significant at the level $P \leq 0.01$. In this study, no significant correlation was obtained between the self-efficacy and test anxiety, but the correlation 0.30 was obtained between the students' self-efficacy and the academic achievement and the correlation was significant at the level $P \leq 0.05$. The correlation coefficients between the students' mean (academic achievement) and components of cognitive confidence, cognitive self-awareness, and beliefs about the uncontrollability of thoughts were equal to -0.22, 0.38, and 0.28, respectively, and they were significant at the level $P \leq 0.05$. Correlation coefficients between the variables are presented in Table 1.

Table 1: Matrix of correlation coefficients between the research variables.

Variables		Test Anxiety	Significant level	Academic Achievement	Significant level
Metacognitive beliefs	Positive beliefs about the worry	-0/35	0/01	0/06	Not significant
	Cognitive Confidence	0/33	0/01	_0/22	0.01
	Cognitive self-awareness	_0/20	0/05	0/38	0.01
	Negative beliefs about the uncontrollability of thoughts	0/23	0/05	_0/14	Not significant
	Beliefs about the need to control thoughts	0/22	0/05	0/28	0.01
Self-Efficacy		0/02	Not significant	0/30	0.01

The results of above table suggest that there is no significant correlation between the self-efficacy and the students' test anxiety between, but there is a significant correlation equal to 0.30 between the self-efficacy and their academic achievement

Table 2: Regression analysis of components of metacognitive beliefs and self-efficacy with the test anxiety and academic achievement.

Criterion Variable	References	SS	df	MS	F	R ²	sig
Test Anxiety	Regression	3488/77	6	581/46	9/15	0/31	0/0
	Remained	7623/68	120	63/53			
	Total	11112/45	126				
Academic Achievement	Regression	109/74	6	18/29	9/02	0/31	o
	Remained	243/1	120	2/02			
	Total	352/8	126				

The above table shows that the model is significant statistically; in other words, the predictor variables can predict the criterion variables (test anxiety and academic achievement) with the coefficient of determination 0.31.

Table 3: Information about the studied variables in predicting the criterion variables.

Criterion Variables	Predictor Variable	Indicator	
		B	t
Test Anxiety	Self-Efficacy	-0/13	-0/09
	Positive beliefs about the worry	-1/17	0/24
	Cognitive Confidence	-0/91	-0/32
	Cognitive self-awareness	-4/17	0/00
	Negative beliefs about the uncontrollability of thoughts	0/66	0/28
	Beliefs about the need to control thoughts	3/57	0/00
		-0/32	-0/15
		3/57	0/05
		0/20	0/07
		/94	0/34
		0/68	0/23
	2/92	0/004	
Academic Achievement	Self-Efficacy	0/06	0/27
	Positive beliefs about the worry	3/45	0/001
	Cognitive Confidence	0/01	0/2
	Cognitive self-awareness	0/31	0/75
	Negative beliefs about the uncontrollability of thoughts	-0/07	0/18
	Beliefs about the need to control thoughts	-2/32	0/02
		0/1	-0/28
		3/6	0/00
		0/05	-/12
		-1/46	0/14
		0/1	0/20
	2/52	0/01	

The results of above table suggest that in predicting the test anxiety the components of positive beliefs about the worry, cognitive confidence, cognitive self-awareness, and beliefs about the need to control thoughts are effective with beta coefficients -0.32, 0.28, 0.15, and 0.23, respectively, but the self-efficacy beliefs are not effective in predicting the test anxiety. Moreover, in predicting the academic achievement, the self-efficacy beliefs are effective with beta coefficient 0.27, cognitive confidence with beta coefficient 0.18, cognitive self-awareness with beta coefficient 0.28, and beliefs about the need to control thoughts with beta coefficient 0.20; these coefficients are significant at the level $P \leq 0.05$.

Discussion and conclusion:

Test anxiety is a general term and refers to the anxiety which makes the person hesitant about his own abilities and its outcome is to reduce the ability to cope with the success of test and evaluation. The results of this study indicate that there is no significant correlation between the self-efficacy and the test anxiety. This result of present study is consistent with the results of research conducted by Schunk (1991), Bandura (1986), Dyckman (1992), Hunsley (1985), Hembree (1988), Zeidner (1992), Benson *et al* (1994), Bandlos and Yates (1995) and so on. Mentioned researchers considered the self- efficiency as a structure which affected the test anxiety. Perhaps the reason why these findings have been inconsistent with the previous findings is due to the low size of studied sample. With this sixe, the results cannot be easily generalized to other societies. Moreover, the results of research show that there is a correlation equal to -0.35 between the positive beliefs about the students' worry and their test anxiety and the correlation equal to 0.33 between the students' cognitive confidence and the test anxiety. Moreover, there is a correlation equal to -0.20 between the test anxiety and the component of cognitive self-awareness, equal to 0.23 with the component of negative beliefs about the uncontrollability of thoughts, and equal to 0.22 with the beliefs about the need to control thoughts. The results of research are consistent with the research conducted by Abolghasemi *et al* (2009). So far, a few studies have been conducted about the correlation between the metacognitive beliefs and the academic achievement, but Abolghasemi believes that the metacognitive beliefs have an important impact on the test anxiety. Benjamin (1981) and Tobias (1985) argue that the test anxiety is related to the metacognition and cognitive strategies.

Another finding of this research indicates that there is a significant correlation between the students' academic achievement and some of the metacognitive components. There are the significant coefficients between the students' academic achievement and the component cognitive confidence, self-awareness, and beliefs about the need to control the thoughts equal to 0.22, 0.38, and 0.28, respectively. The results of this research are consistent with the research conducted by Amini (2007), Skhtika (2002), Oromrood (2000), Shommer (1993) and Rahmani (2001).

The correlation 0.30 was obtained between the self-efficacy and the students' academic achievement, and this is a significant correlation. In other words, the more the self-efficacy is increased, the more the students' academic achievement is increased. This is consistent with the findings of research conducted by Peinrich (2003), Lin (2001), Hall *et al* (2003) and Naghsh *et al* (2010). The results of a meta-analysis also indicate the correlation between the self-efficacy belief and the academic achievement equal to 0.38, on average. (Moulton *et al*, 1991) .Naghsh *et al* (2010) also found the correlation equal to 0.45 between the self-efficacy and the academic achievement. Based on this research, the teachers are suggested to value their self-evaluation for abilities as well as the value for their performance. Generalizing the results to other communities should be done with caution because the sample size is not the representative of other communities. Future research should study the role of metacognitive beliefs in students' test anxiety and academic achievement in both genders.

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