Original Article

Relationship between Metacognitive Learning Strategies, Goal Orientation, and Test Anxiety among Students at Birjand University of Medical Sciences

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Abstract

Background: Academic achievement of students in the fields of medical sciences is influenced by several factors, including cognitive learning strategies, goal orientation, and test anxiety. We aimed to assess the relationship between metacognitive learning strategies, goal orientation, and test anxiety.
Methods: The statistical population of this descriptive and analytical study was 2621 students studying at Birjand University of Medical Sciences. The sample size was calculated to be 335 according to Krejcie and Morgan's table and determined via stratified-randomized sampling method. The *Motivated Strategies for Learning Questionnaire* (*MSLQ*) was used to collect data which consisted of 47 items on cognitive learning strategies, goal orientation, and test anxiety. Data were analyzed using independent t, Pearson's correlation, and ANOVA tests.
Results: The results showed a significant, negative correlation between the dimensions of metacognitive learning strategies and test anxiety as well as a significant, positive association between the dimensions of metacognitive learning strategies and goal orientation ($P<0.05$). There was a significant difference between test anxiety mean scores of male and female students, while there was no significant difference between the mean values of goal orientation and test anxiety in terms of faculty and student age ($P>0.05$).
Conclusion: According to the results, metacognitive learning strategies and goal orientation are two contributory factors to reduction of test anxiety in students.
Keywords: METACOGNITIVE STRATEGIES, TEST ANXIETY, GOAL ORIENTATION

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Introduction

As defined by Kaplan and Sadock, anxiety is a very unfavorable and ambiguous generalized feeling that is accompanied by physical presentations such as palpitations, sweating, headache, restlessness, etc. It is associated with changes in physiological responses such as breathing rate, heart rate, and blood pressure whereby an individual's performance is greatly declined (1,2). One of the most threatening events that induce anxiety in students is the testing situation. When students undergo intense fear of poor performance on a test, they experience test anxiety. Spielberger categorizes anxiety into state and trait anxiety. In state anxiety, the individual exhibits a temporary response because of the situation in which she/he is involved in. Spielberger considers trait anxiety as a permanent attribute in which the individual displays the potential for anxiety (3). Test anxiety is the main cause of several

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negative outcomes including mental illness, failure to complete academic programs, and a sense of insecurity (4). Pintrich proposes test anxiety as one of the main components of motivational beliefs in self-regulated learning strategies (5). Spielberger regards test anxiety as a temporary anxiety where a person views his/her position as threatening, adding that test anxiety may affect the ability to concentrate and recall the learned materials. Components of test anxiety consist of worry and emotionality. Spielberger considers worry as concern about performance, consequences of failure, and comparison of oneself with others, and describes emotionality as a kind of autonomic nervous reaction (6). Guida and Ludlow characterize test anxiety as an unpleasant emotional reaction to the evaluation in classroom or school. This emotional state is accompanied by stress, encouragement, concern, confusion and arousal of the nervous system. From this perspective, test anxiety is proposed to have the two components of anxiety (cognitive and emotional). In the context of this theory, anxiety is assumed to deviate an individual from the tasks undertaken because of cognitive manifestations such as negative expectations about one's position and efficacy (7). Test anxiety appears in students when they know that their performance will be measured or evaluated, and anxiety acts as a reaction to the induced stress (7).

One of the variables that affect test anxiety is goal orientation. The type of goal we choose defines our motives to achieve it. Aims characterize goal orientation as a reflection of consistent patterns of personal beliefs that make people act and respond differently and have different orientations to different situations (8). From the perspective of Pintrich, goal orientation is a major component of motivation in self-regulation strategies of learning (4). Goal orientation in learning situations explains an individual's motivation from learning; that is why it affects his/her tendencies, actions, and responses in learning situations. Goal orientation is different from specific objectives specified for activities in learning situations. These objectives are simply stimuli for a person to learn a specific task under specific conditions (8). Pintrich categorizes goal orientation into two general types: first, goals that drive an individual to approach a task or issue, and second, goals that are applied in a certain situation, pointing out that Dweck also introduced two goals in his model including learning goals and performance goals (9). In addition, Harackiewicz and Elliot divide goal orientation into two branches: mastery orientation and performance orientation. In the mastery orientation, focus is on the development of knowledge, skills and competence over prior performance, while in performance orientations, attempt is to demonstrate competence through better performance in academic and scientific tasks (9).

In general, goal orientation is associated with behavioral, emotional, and cognitive consequences (10). Pintrich proposes progress goals in a two-dimensional matrix whereby there are four orientations to goals including competence-oriented goals, competence-avoiding, performance-oriented and performance-avoiding (11). A learner with performance-oriented goal concentrates on learning, task competence, acquirement of new skills, and increases efficacy. On the other hand, one with a competence-avoiding goal tends to focus on avoiding misunderstanding, incompetence over tasks, and application of criteria of not making mistakes. As opposed to those who have competence-oriented goals, the learners with the performance-oriented goal focus on the external manifestation of competence, application of social comparison, and search of fame. In contrast, the learners with performance-avoiding goals try to avoid being defeated or looking silly. They attempt in some way not to fall behind others (12). Previous research on goal orientation and test anxiety indicate a significantly negative relationship between them (13,14). There is an overall significant association between goal orientation and academic performance (15). Goal

orientation can affect academic performance (16). Education of self-regulation strategies can reduce test anxiety in learners (17) and contribute to academic achievement (15,18,19). Among other factors affecting students' test anxiety are metacognitive strategies. They constitute a further concept introduced in the context of Pintrich's self-regulation strategies for learning (14,15). Metacognition is divided into two general categories: metacognitive knowledge and metacognitive control and regulation (16). Metacognitive knowledge involves informational knowledge, attitude to knowledge, cognitive strategies and variables that affect cognition. Metacognitive control and regulation consist of the whole range of activities including judgment about the extent to which a certain material is easy or difficult to learn, learning and monitoring of learning, sense of learning, and evaluation of the learner's self-confidence (16). Cognitive strategies are known as ways of learning. Metacognitive strategies are measures that control and guide cognitive strategies (20). Skilled learners employ cognitive strategies to reach cognitive development and apply metacognitive learning strategies to monitor and control the progress (20). Studies suggest a significant relationship between metacognitive skills and goal orientation (13,21,22).

Previous research shows an inverse and significant relationship between metacognitive skills and test anxiety (17,23,24). A predictive variable for test anxiety has been shown to be application of metacognitive strategies, and some studies suggest that teaching metacognitive strategies can lead to reduced levels of test anxiety in learners (24-27). Also, there is a positive significant relationship between metacognitive learning strategies and academic achievement (29). In the present study, we tried to investigate the relationship between metacognitive learning strategies (planning, monitoring and control, regulation and regulatory activities), goal orientation and test anxiety among university students. Finding associations between these variables can help plan more efficiently to reduce anxiety and increase academic achievement among university students.

Materials and Methods

The statistical population of this descriptive and analytical study was 2621 students studying at Birjand University of Medical Sciences. The sample size was calculated to be 335 according to Krejcie and Morgan's table and determined via stratified-randomized sampling method. Each faculty was considered as a stratum. Thereafter, students were selected randomly from each faculty in proportion to the total participation in the study was voluntary and the students consent obtained verbally. All identifier data were kept confidential. The Motivated Strategies for Learning Questionnaire (MSLQ) was used to collect data which consisted of 47 items on cognitive learning strategies, goal orientation, and test anxiety. Metacognitive strategies and self-efficacy had 9 items each, while goal orientation and test anxiety consisted of 5 and 7 items respectively, all scored on 5-point Likert scale. The face validity of the questionnaire was confirmed by experts, and to determine its reliability, Cronbach's alpha was used, which showed reliability coefficients of 0.79, 0.87, and 0.82 for metacognitive strategies, goal orientation and test anxiety, respectively. The data were analyzed in SPSS software, version 14. Kolmogorov-Smirnov test showed normality of data distribution. Therefore, Pearson's correlation test was used to determine the relationship between variables, independent t test was used to compare means of the variables in terms of sex, and ANOVA was used to compare means of variables in terms of faculty. The significant level was set at $P<0.05$.

Results

The demographic characteristics indicate that of the 335 participants, 150 were men (45.1%; mean age: 21.4±5.2 years) and 185 were women (54.9%; mean age 19.7±4.2 years) (Table 1).

The results showed a significant, positive association between metacognitive learning

Table 1. Frequency distribution of participants in terms of sex

Variable	Sex	Frequency	Percentage
Sex	Men	150	45.1
	Women	185	54.9
	Total	335	100
Faculty	Health	52	15
	Nursing and Midwifery	80	24
	Medicine	117	35
	Allied Medicine	49	14.6
	Dentistry	37	11.4
	Total	335	100
Age	<20 years	105	31.5
	21-25 years	141	42
	>26 years	89	26.5
	Total	335	100

strategies and goal orientation and a significant, negative correlation between the dimensions of metacognitive learning strategies and test anxiety (P<0.05, Table 2).

The results showed no significant difference between goal orientation mean scores in terms of sex (P>0.05). However, the difference between male and female students' anxiety mean scores was significant (Table 3).

The results showed no significant difference

Table 2. Correlation matrix of metacognitive learning strategies, goal orientation, and test anxiety of the students

Dimensions of metacognitive strategies and goal orientation	Statistic	Goal orientation	Test anxiety
Planning	Correlation	0.711	-0.640
	Significance	0.0001	0.0001
Monitoring and control	Correlation	0.706	-0.345
	Significance	0.0001	0.002
Regulation	Correlation	0.636	-0.612
	Significance	0.0001	0.0001
Regulatory activity	Correlation	0.711	-0.640
	P value	0.0001	0.0001
Goal orientation	Correlation	--	-.0325
	Significance	--	0.004

Table 3. Comparison of goal orientation and test anxiety mean scores of students in terms of sex

Variable	Dimension	Goal orientation	P value	Test anxiety	P value
Sex	Male	16.01±2.21	0.09	15.08±2.12	0.03
	Female	18.48±3.14		19.48±3.26	

Table 4. Comparison of goal orientation and test anxiety mean scores of students in terms of faculty

Variable	Dimension	Goal orientation	P value	Test anxiety	P value
Faculty	Health	16.01±2.24	0.19	17.25±3.55	0.15
	Nursing and Midwifery	18.48±3.14		16.42±4.12	
	Medicine	19.01±2.69		15.61±2.45	
	Allied Medicine	17.48±3.12		16.95±2.42	
	Dentistry	18.01±2.24		15.32±2.13	

between goal orientation mean scores in terms of faculty (P>0.05, Table 4).

Discussion

This study aimed to investigate the relationship between metacognitive learning strategies, goal orientation and test anxiety of students at Birjand University of Medical Sciences. The results showed that there was a significant relationship between the dimensions of metacognitive strategies and goal orientation. In this regard, the planning strategy proves useful which includes goal setting for learning and studying, prediction of the time required to study, determination of the appropriate speed of studying, analysis of how to deal with the learning subject, and selection of useful learning strategies. By monitoring and controlling metacognitive strategies. This means that the learner exerts conscious supervision on his/her learning progress including monitoring of attention when reading and asking questions when studying. These strategies can help a person to quickly notice the problem every time she/he faces one. In the regulation strategy, the individual enjoys greater flexibility which helps him/her to change the learning strategy and style in case needed. Through the regulating activities strategy, the learner comes to recognize and resolve ineffective cognitive strategies. This strategy is in coordination with the monitoring and control strategy. As a result, an education of the metacognitive strategies can help a person to act more efficiently in goal orientation. Goal orientation, which is defined as a uniform pattern of beliefs, actions, and emotions, aims to specify behavioral intentions of individuals and to force the person to have peculiar orientations in different situations whereby the person acts differently in each particular situation. This finding is consistent with the findings of previous studies (21,28).
A further finding of this study was the significant relationship between metacognitive strategy and test anxiety where the correlation coefficients between all aspects of metacognitive strategy and test anxiety were negative. Test anxiety is a situational anxiety that involves students and learners in general. Sarason considers test anxiety as a form of self-preoccupation characterized by low self-perception and doubtful belief in one's abilities. It is usually accompanied by negative cognitive evaluation, lack of concentration, undesirable physical reactions, and poor academic performance (17). Similar studies tend to confirm this finding suggesting that cognitive skills have a significant inverse relationship with test anxiety. The results of the current study are consistent with Mohammadi and colleagues' (29) study. As a result, attainment of metacognitive strategies is a contributory factor to enhance academic performance of learners.
A significant negative correlation was also found between goal orientation and test anxiety. In other words, goal orientation will reversely influence test anxiety. Accordingly, the students who are goal oriented during studies and have academic and learning planning would get anxious to a lesser degree. This is consistent with the findings of previous studies (13,18).
The limitations of this study include lack of cooperation of all students in completing the questionnaires as well as mental conditions and problems of some students. This may have affected their responses, and was beyond the control of the researchers.

Conclusion

Overall, the current study and its comparison with the results from similar studies indicate the association and effectiveness of metacognitive strategies and goal orientation on reduction of test anxiety in students. Therefore, an education of metacognitive strategies and introduction of goal orientation to the learners in academic and testing situations can improve learners' academic performance and reduce their irrational anxiety.

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Conflict of Interest

The author declares no conflict of interest.

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