

High school students test anxiety: The role of thinking and learning styles

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Abstract

Purpose: The purpose of this research was to investigate the relationship between thinking styles functions and learning styles with the rate of test anxiety of students. **Material & Method:** Method of research was correlation. Statistical population was the high school students (male & female) in Arak city. According to the multistage cluster random sampling, first, the dual areas of education Arak city was selected by one area of education, then 400 students (200 female & 200 male) completed the Kolb Learning Styles Inventory (1991) and Sternberg-Wagner thinking Styles Inventory (1992). Data were analyzed using descriptive findings including mean, standard deviation and frequency distribution and also were analyzed using Pearson correlation coefficient and one-way Anova. **Findings:** findings indicated significant relationship between the executive and judicial thinking styles and also legal thinking style with students' test anxiety. The results showed that assimilate learning style than most other styles have been less test anxiety. **Discussion:** students who follow thinking and learning styles which best fits to their personality characteristic experience less test anxiety.

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1. Introduction

Among all the factors that influence an individual, his styles of learning and thinking, play a major role (Chen & Tsai, 2012) Parents and teachers are able to perceive children and their natural tendencies of how they think, act and learn in different ways and in different situations (Bonaccio & Reeve, 2010). Styles depend upon cerebral dominance of an individual in retaining and processing different modes of information in his/her own style of learning and thinking. Style indicates the hemisphericity functions of the brain and students' learning strategy (Sternberg & Zhang, 2005).

In this relation test anxiety is a combination of physiological over-arousal, tension and somatic symptoms, along with worry, dread, fear of failure, and catastrophizing, that occur before or during test situations. It is a physiological condition in which people experience extreme stress, anxiety, and discomfort during and/or before taking a test. This anxiety creates significant barriers to learning and performance. Research suggests that high levels of emotional distress have a direct correlation to reduced academic performance and higher overall student drop-out rates. Test anxiety can have broader consequences, negatively affecting a student's social, emotional and behavioral development, as well as their feelings about themselves and school. (Lowe & Ang, 2012).

2. Research Background

Anxiety as part of every human life, in all societies, is considered as a suitable and compatible response and has a long history of human existence (Zhang, 2009). Lack of anxiety or illness anxiety may encounter person a lot of difficulties and dangers and anxiety in extent moderation and constructive compels that person for doing his affairs, timely and appropriate effort, thus makes his life more durable and more productive (Dehqanysofy, 1391). Anxiety and its related fields in recent decades has been one of the most extensive territories of research. Recent studies have shown that anxiety disorders have the highest frequency in the general level of population that one of forms of this disorder is test anxiety. Test anxiety includes an unpleasant emotional experiences and feelings and worry or anxiety in situations that person, feels that his performance is evaluated (Dehqanysofy, 1391). In fact, test anxiety refers to unpleasant experience of anxiety and emotionality in situations that a person feels to be under evaluation (Dosh, 1980).

Test anxiety is a type of anxiety disorder which caused as a result of extensive tests during the different stages of life can cause anxiety. It is probable for each person to face with academic numerous tests. In this regard test anxiety is proposed seriously when score and test is the only means of improvement assessing students which has high importance (talmasebi, 1390; quoted in Khazaei, 1391). In the field of pathology of test anxiety, many factors are seen such as lack of adequate preparation, previous negative experiences, negative thoughts, school and personality, family factors (Gomepoor, 1387). The results of some studies show the relationship between thinking styles and cognitive aspect of test anxiety (Zhang, 2009; Kagan, 1965, Moyassar, and Linden 1976, 1973; quoted in Azadydhbydy, Khormaye, 1394). Background of styles theory on learning returns to the early decade 90, in 1991, theory of cognitive styles was proposed and after a while Sternberg's theory of thinking styles in the field of education (Horak, 2002). According to Sternberg's theory of mental self-government, human has preferences in dealing with peripheral issues and thinking about them that it is said to be thinking style. Although, thinking styles are neither good nor bad in itself, but it is said to way of thinking that man is more comfortable with it (Grygornko and Sternberg, 1997).

Sternberg's thinking Styles model includes three functions, four faces or figures, two-levels, two extents or scopes and the two tendencies (Ko &etal, 2007). Three important functions of thinking Styles are: legislative (creative), executive (implemented), judicial (evaluative). Four forms of thinking Styles are: kingdom (single dominance), hierarchical (Paver democracy), oligarchic (the oligarchs), and

lawlessness (Seif, 1378). Also, learning styles refers to individual capability and preferences that it affects How to understand, collect and process of teach (Chen, 2012). The research results show that determining the type of learning style helps teachers for more effective learning. Different learning styles for information processing, affect academic achievement of students (Bassey, Umoren & Udida, 2007).

Students with legislative style prefer assignments, projects and tasks that they create based on their planning (Sternberg & Zhang, 2005). Individuals with legislative style like to do things to your liking. They also are interested in the creation and development and designing affairs. In other words, they impose their own laws (Seif, 1387); But people with executive thinking style in doing things do not show any creativity. They like to obey the rules and use their existing ways in doing things. They prefer organized issues already and like to fill gaps between existing structures, rather than create new structures themselves. Executive individuals like to guide about what they do, on the other hand, individuals with judicial style like to evaluate the role and judge about things. Attention concentrates these individuals on the evaluation of other activities products and tends to evaluate the rules, structures and existing ways. They prefer tasks that are related to the analysis and evaluation of things and ideas (Grygorneko and Sternberg, 1997).

Kolb (1984), developed learning style model based on the research of people like Rogers, Piaget and Jung. Kolb's theory of learning styles includes four different learning styles, based on four-stage learning cycle, learning cycle stages include: Objective-emotional experience, reflection-visual observation, abstract- intellectual conceptualization, active- scientific experimentation. Kolb specified four types of learning thinking styles by combining four learning stages: normative or convergent thinking style, deviation or divergent styles, harmonization or absorptive style and accommodative or other homogeneous style. Students with convergent learning styles learn practically through thinking on the subjects and do those activities.

Learners with divergent learning style learn through feeling and seeing, they prefer to see than and use imagination to solve problem. Learners with Accommodate learning style learn through experiencing and doing and learners with absorptive learning style learn through think and look deeply. These people use abstract concepts to understand the position (Sadler and Smith, 2010). Test anxiety is a general term and refers to a type of anxiety or social phobia that doubt about his abilities and its subsequent is reduction of opposition potency with exam situations, situations where a person is subjected to evaluation and involves in solving the problem or issue. Thus it can be stated that a suffering person from test anxiety knows training Questions response, but intensity of test anxiety prevents him from using his knowledge. As a result, it is expected that there was significant inverse relationship between anxiety scores and test scores (Narimani, Aslamdost and Ghaffari, 1385).

Most of the researches have taken place in relation to thinking style and educational issues of students. The results Grygornko and Sternberg (1997), were examined the relationship between thinking style and performance of 199 students (146 girls and 53 boys) aged 13-16. The results of study showed that the spatial style had a significant positive relationship with all measures of academic performance. legislative style showed a significant relationship with analytical and creative and final project scales, executive style had significant negative relationship with the final project scales, also, the study results of Horak (2002), that he did on technical-engineering students, showed that this issue that executive styles in the students has the most relationship with the academic achievement that it is confirming comment of Sternberg about the impact of the lessons type on the relationship between thinking styles and academic achievement.

Abdollahzadeh (1388) in his research about the thinking styles and its relationship with learning the fundamentals of information technology has been shown that administrative thinking style has the greatest power of explaining learning through ICT and in another study, Husseini (1388) suggests that legislative

thinking style has the greatest predictive power of the fundamentals of communications and information technology. The results of some researchers suggest relationship of learning styles with anxiety. The study results of Momeni, Yazdanbakhsh and Faramarzy (1394), showed that there is significant correlation between learning styles and independent cognitive styles to background with math anxiety and as well as learning styles and unrelated cognitive styles to the field have predictive power of math anxiety. The study results of Ahmadi, Mohammadi (1390), Ahmad and khezri (1385), Srmys (2010), Hadfield and McNeill (1994), McCoy (1992), Oslo, Don and Giessen (2002) show that there is a relationship between learning styles and anxiety (according to Momeni, and Faramarzi, Yazdanbakhsh, 1394).

Considering the mentioned matters, it can be acknowledged that Students have a lot of individual differences that this led to diverse ways of learning and thinking styles in them. Thus, according to the above cases and the high prevalence of test anxiety, also, according to the negative effects of it such as stress, anxiety, worry, confusion, arousal (Kareshki, Amynyzdy and Ekhteraytasy, 1390), doubt about yourself, lack of concentration, adverse physical reactions, dropping performance, negative impact on academic achievement (Bonucci, Rio, 2010), and reducing the overall well-being (Kareshki, Amynyzdy and Ekhteraytasy, 1390) on learners, The primary aim of this study was to investigate the relationship between the functions of learning style and thinking style with amount of exam anxiety in the students.

3. Method

The statistical population of this study included high school students of Arak educational system. Multi-stage cluster was employed as a Sampling method. So 400 (200 males and 200 females) peoples were selected using kerjerci & Morgan table. For data collection at the first step 2 District Education of Arak was selected at the second step, 4 high school (2 males high school and 2 females high school) from each district then two class from every high school totally 16 class were selected. 460 students who were volunteered for the study completed the questionnaire and finally 60 uncompleted questionnaires were deleted and 400 students were remained for the study.

3.1. Measurement tools

The instrument in this study was thinking style inventory of Sternberg and Wagner (1992) which was short form and has 24 questions and measures executive, judicial and legislative thinking Styles sub variables. Sternberg and colleagues conducted extensive studies in order to investigate reliability of thinking styles inventory, reliability factor of sub-tests was obtained 0.56 for executive style, 0.88 for the judicial style, and 0.78 for the legislative style. Ground et al., reported Cranbach's alpha of three executive, judicial and legislative styles respectively, 0.60, 0.70 and 0.58. In addition, Kolb (1991) questionnaire was applied for measuring learning styles.

Kolb's learning style questionnaire has 12 item and each includes four sub variables: objective experience, reflective observation, abstract conceptualization and active experimentation. Four scores were obtained from the sum of the four-part in twelve questions of inventory that these four scores represent the four ways of learning. Two scores were obtained from two by two subtract of these ways, means, the subtraction of abstract conceptualization from objective experience active experimentation from reflective observation.

A study by Jackson and Jones (1996) was performed, reliability coefficient of Kolb's learning styles inventory by cranach's alpha was obtained 0.64 for objective experience component, 0.58 for reflective observation, 0.72 for abstract conceptualization and 0.68 for active experimentation. Reliability of this inventory in Iran was reported as following: objective experience (0.66), reflective observation (0.31), abstract conceptualization (0.65) and active experimentation (0.31).

Test Anxiety scale developed by Mehregan, Najjarian 0.74 and active experimentation 0.75. Measurement scale of test Anxiety was used for and Ahmadi (1380) and has 22 items. In order to scoring this scale for each of the four option "never," "rarely," "sometimes" and "often" respectively is considered 0,1,2,3. In study of Mehregan et al, inventory reliability was obtained 0.94 using Cronbach's alpha method. Factor analysis was used by the principal components method with varimax rotation in order to determine the structural validity of test anxiety scale. Investigation of factor analysis showed that 22 items of the scale are on one factor. The collected data from the sample was entered into SPSS software and descriptive and inferential statistics were used for answering the research questions.

Findings

Table 1 shows the descriptive findings of exam anxiety and cognitive styles variables. Accordingly, the variables mean of test anxiety, executive function, legal and judicial thinking style are obtained respectively 31.81, 19.89, 19.39 and 15.92. Also, the standard deviation of these variables was obtained 8.53, 6.11, 6.09 and 6.66. The data of table 1 show the mean of learning styles (objective experience, reflective observation, abstract conceptualization and active experimentation) which respectively was equal to 29.860, 31.340, 3.120, and 28.78. Also, standard deviation was obtained 8.27, 9.16, 7.84 and 9.36. Accordingly, students were classified in four convergent, divergent, and adaptive and absorber learning styles. In addition, the results showed that 3.34 % students were in the absorbers style and 15.8% were in the divergent style and 35.5% were in the converge style and 14.5% were in the adaptive style.

Table 1. Descriptive findings of anxiety and thinking styles

| Variable | Mean | standard deviation |
|-------------------------------|--------|--------------------|
| Test Anxiety | 31.815 | 11.538 |
| Administrative thinking style | 19.890 | 6.080 |
| Judicial thinking style | 19.392 | 6.097 |
| Legal thinking style | 15.922 | 6.664 |
| Objective experience | 29.860 | 8.278 |
| Reflective observation | 31.340 | 9.167 |
| Abstract conceptualization | 30.120 | 7.847 |
| Active experimentation | 28.780 | 9.363 |

Other results showed that the relationship between thinking styles sub variables and test anxiety was negatively significant. Accordingly, the correlation was -0.24 for executive thinking style, -0.41 for Legal thinking style and -0.23 for judicial thinking style.

Table 2. Results of one-way analysis of variance in thinking styles and test anxiety of male and female students

| | Sum of Squares | Degrees of Freedom | mean square | F | significance |
|----------------|----------------|--------------------|-------------|--------|--------------|
| Between groups | 5927.069 | 3 | 1975.690 | 16.577 | 0.001 |
| Within groups | 47197.241 | 397 | 119.185 | | |
| Total | 53124.310 | 399 | | | |

Results of table 2 shows that according to f score (16.577) and significance level (0.001) it can be concluded that the difference between two groups of male and female students in thinking style and test anxiety was significant.

Table 3. The results of Turkey's post hoc test

| first variable | second variable | Mean residuum | standard error | degrees of freedom | Low limit | High limit |
|----------------|-----------------|---------------|----------------|--------------------|-----------|------------|
| Divergent | Comparative | 3.84324 | 1.661186 | 0.097 | -0.6443 | 8.1308 |
| | Absorber | 8.88013 | 1.30740 | 0.001 | 5.5071 | 12.2532 |
| Comparative | convergent | 1.53700 | 1.710 | 0.806 | -2.8753 | 5.9493 |
| | Absorber | 5.03689 | 1.65262 | 0.013 | 0.7732 | 9.3006 |
| Absorber | convergent | -2.30624 | 1.98664 | 0.652 | -7.4317 | 2.8192 |
| | convergent | -7.34313 | 1.70125 | 0.001 | -11.7323 | -2.9540 |

Table 3 shows the results of Turkey's post hoc test. Accordingly, it is concluded that there is significant difference between absorber and divergent learning styles in test anxiety with confidence factor 99% and students who use divergent learning styles; they had more anxiety than students who use absorber learning style. While the difference of test anxiety between the absorbing and adapter styles is observed in error level 0.05, so, the students with absorbing learning style experience less anxious about test. Similarly, in comparison of absorptive and convergent learning style, the students who use absorber learning style, had less test anxiety. But, significant difference associated with test anxiety wasn't observed between other styles.

4. Discussion

According to the finding of the study difference between two groups of male and female students in thinking style and test anxiety was significant. These results were consistent with studies results of Zhang (2009), Kagan (1965), Moyasar (1976), Khazaei (1391). Accordingly, the students who have legislative thinking style tend to do things as they wish. They are interested in creating and editing and designing affairs and because they impose rules themselves, are Creative and lawful people, and so when things are going well for them and can easily answer a lot of questions using their own creativity, admit a little anxious to themselves. But people with executive thinking style in doing things do not show any creativity. They obey the existing laws and because they like to complete the gaps between existing structures, and face with problems in doing affairs and or affairs weren't done matching their desire and therefore they are due to low confidence in themselves are anxious in exam.

On the other hand, people with judicial thinking style tend to judge things. These students tend to assess the rules, structures and existing practices and may fail in the evaluation of different things and because cannot evaluate many of the issues, they experienced test anxiety. From opinion of the Grygornko and Sternberg (1997) people with judicial thinking style, prefer tasks that are related to the analysis and evaluation of things and ideas. But unfortunately, because assignments and many lessons content is not analysis and evaluation, admit more anxious. Also, the results showed that there is significant difference between the divergent and absorber learning style in the test anxiety and the students use divergent learning style have more anxiety than students use absorber learning style for learning.

While the difference of test anxiety between comparative and absorber styles can also be seen in the error level 0.05, so that students with absorber learning styles experience less anxious about the exam. Similarly, in comparing convergent and absorber learning style, students that used absorber learning style, had less test anxiety. But a significant difference wasn't observed between other styles associated with test anxiety. The results are consistent with study results of Momeni, Yazdanbakhsh and Famarzi (1394), Ahmadi and Mohammadi (1390), Ahmadi and khezri (1385), Srmys (2010), Hadfield and McNeill (1994), McCoy (1992), Oslo, Don and Giessen (2002). Students that use divergent styles, actually learn through feeling and seeing and less use than practical activities to learn. They use their own imagination and given that the content of textbooks in the education of our society is less near to imagination force, they cannot

use properly and timely their learning style and experience more anxiety. Students with absorber learning style, learn through thinking and looking deeply.

These students have the necessary thinking to do some issues and answer questions and well learn concepts and experience less anxiety. In this regard, officers of the curriculum and compilation office are recommended that concepts help students have more creativity; they use them in setting and change the content of textbooks. It is suggested teachers that try to improve and strengthen this thinking style in the students, have the necessary efforts. In addition, teachers are recommended to use innovative and new methods and new in teaching to students learn through thinking on issues and doing practically activities, it is also recommended that they think deeply in designing the exam questions and book activities and student assignments and understood and analyzed concepts well.

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