

Relationship between thinking styles, critical thinking and creativity among the students of Semnan university of medical sciences

Roghayeh Sajedi

Lecturer, Semnan University of Medical Sciences, Semnan, Iran.

Correspondence: Roghayeh Sajedi, Lecturer, Semnan University of Medical Sciences, Semnan, Iran. E-mail: sajadi4249@yahoo.com

ABSTRACT

This study was conducted to investigate the relationship between thinking styles, critical thinking, and creativity among students in Semnan University of Medical Sciences in the academic year of 2015-2016. For this purpose, 214 samples (92 males and 122 females) were selected among students by using random sampling method. This study is descriptive and correlational. To collect data, California Critical Thinking Questionnaire and Abedi's Creativity Questionnaire were used. The data were analyzed using SPSS software. To analyze data, Pearson correlation coefficient and regression analysis were used. The mean difference between male and female subjects was examined according to each variable of thinking style, variables of critical thinking and creativity using t-test for independent groups. The results showed that thinking styles (legislative, judicial, liberal, general, internal) and critical thinking (deduction, interpretation and induction) have significant positive correlation with creativity and thinking styles (uni-polar, partial, conservative) have significant negative correlation with creativity. In addition, executive thinking style and critical thinking (evaluation of logical reasoning) have non-significant positive relationship with creativity and legislative, executive, judicial, general, anarchic, and liberal thinking styles have significant and positive correlation with critical thinking (identification of hypotheses). Additionally, results showed that the mean scores of girl and boy subjects are different significantly in thinking styles and critical thinking at 0.05 level and mean scores of girl and boy subjects are not different significantly in variables of creativity, thinking styles (executive, judicial, liberal, uni-polar, oligarchy and hierarchical) and critical thinking (inference, evaluation, logical reasoning). Based on the results of this study, paying attention to style of thinking, critical thinking, and creativity is sensible and important. Creating and fostering them can pave the way for educational system development and consequently the development of society.

Keywords: thinking styles, critical thinking, creativity, Semnan University of Medical Sciences.

Introduction

In recent decades, researchers have been more interested in the study of types, styles and ways of thinking^[1-3]. Some of these researchers have tended to examine thinking styles. Sternberg (1988) states that thinking styles are preferred methods of people to use cognitive abilities. These styles show how people

like to use their abilities in everyday life^[4]. According to Sternberg theory, different ways of process information by people is called thinking styles. In fact, thinking styles are preferred methods and the way of using their abilities rather than abilities themselves. They refer to a way of thinking preferred. Although there are controversial views on terminology of thinking style among theorists, all agree that people use fixed and distinct way to encode, store, and process information in mind, that it is independent of intelligence^[5]. According to Sternberg, thinking styles are distinct in five dimensions of functions, forms, levels, areas, and trends that function includes legislative, executive, and judicial. Levels refer to general and detailed categories and trend refers to liberal and conservative styles. Forms mean uni-polar, hierarchic, oligarchic, and anarchic styles. Areas also refer to internal and external style of thinking^[6]. Thirteen thinking style

Access this article online

Website: www.japer.in

E-ISSN: 2249-3379

How to cite this article: Roghayeh Sajedi. Relationship between thinking styles, critical thinking and creativity among the students of Semnan university of medical sciences. *J Adv Pharm Edu Res* 2018;8(S2):7-11.

Source of Support: Nil, Conflict of Interest: None declared.

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of Sternberg can be divided in two general groups. The first type of thinking styles that is creativity- generating which includes legislative, judicial, general, hierarchical, and liberal style requiring complex data processing, and executive, partial, uni-polar and conservative thinking styles requiring simple data processing. The remaining four styles (anarchical, oligarchy, internal and external), depending on the specific task style, can be either simple or complex thinking styles ^[7].

Another variable associated with different thinking styles of students that researchers have studied and analyzed it from different aspects in recent decades is critical thinking and fostering it as one of the main goals of schools and universities. Critical thinking is a general term used mainly to refer to two very different concepts of ability and willingness. Ability refers to capability of a person to think critically, while the willingness refers to the desire of the person to think critically ^[1]. One of the most appropriate definitions of critical thinking was presented by Robert Ennis (1987). He considers critical thinking as reasonable reflective thinking focused on decision-making for believing, and he states that a myriad of skills, including trends shape such logical or reasonable reflective thinking ^[8]. Watson and Glaser stated: critical thinking is blend of knowledge, attitude, and performance in each person. They consider critical thinking ability in the five following skills: 1) deduction: deduction is a result that one gains it from occurred continuous phenomena. It is ability to distinguish right data from wrong data among information given 2) identification of Hypotheses: Hypothesis is a pre-specified phrase taken for granted or proposed to be accepted. Identifying hypotheses is in fact the ability of identifying proposed hypotheses of expressed phrases. 3) Inference: in inference, result or results are obtained from logical introduction. In inference, mental bias should not affect judgment and conclusion, since it leads to wrong conclusion. In inference, minds moves from part to whole in a way that general result is obtained from partial introduction. In addition, in inference, the ability to make distinction between primary information and data and general result is very important. Interpretation: it is one's ability to process information and to determine its validity. In this process, it should be judged on whether results are derived reasonably or logically from data and introductions. Therefore, in interpretation, inference does not take place, but the results are available to us and the important thing is that data and introductions are analyzed and evaluated that if results derived from them are true or false. 5) Evaluation of logical arguments: in important cases of making decision on choosing strong and weak arguments, it is more desirable to be able to distinguish between strong and weak arguments. A logical argument is strong when it is important and has direct relationship with the question, while it is weak when it not directly related to the question (even if it is very important), or it is less important and related to with scientific and less important aspects of question ^[9].

The definition of Watson and Glaser of critical thinking is the basis to test critical thinking that are widely used in assessment

of critical thinking and it is accepted by most researchers in various scientific fields. As mentioned earlier, some thinking styles are creative ^[7]. To provide a full definition of creativity is a little difficult. Mac Gulderk and Oliver believe that creativity includes personal creation, risk taking, designing new ideas, and it is one of the basic human characteristics ^[10].

Creativity is ability or power to create new products through using imagination power. Most psychologists agree that creativity refers to new and valuable achievements. Eysenck believes that creativity is a mental process leading to problem-solving, ideation, conceptualization, making art forms, theorizing, and products that are innovative and unique ^[11]. Creativity is related with cognitive, emotional, environmental, and motivational variables ^[12]. Macdade (2000) found significant correlations between thinking styles and critical thinking, and this proves this that thinking styles play important role in critical thinking ^[13]. Zhang (2003) also showed a significant positive correlation between critical thinking and legislative, executive, and judicial thinking styles. In addition, he found a negative correlation between the conservative thinking style and critical thinking. Studying the relationship between thinking styles and critical thinking, Ching and Chang (2004) conclude that critical thinking is negatively correlated with partial and conservative thinking styles, and positive correlation with legislative, judicial uni-polar, oligarchic, external, and internal thinking styles. While there was no correlation between hierarchical, liberal, and anarchical thinking styles ^[14]. Some experts believe that using proper thinking styles or making them coordinated with abilities, we can overcome problems and make maximum use of our capabilities ^[15]. Several studies have shown that thinking styles are correlated with the processes of creativity, problem solving, decision making, academic achievement, and factors such as culture, gender, age, education, work history, etc., affect people thinking styles ^[15]. Hedayati et al (2011) found a difference in legal, partial, conservative, external, and internal thinking style among female and male people ^[16]. Mobini Dehkordi et al (2011) also refer to relationship between thinking styles and creativity. They argue legislative, judicial, liberal thinking styles have positive and significant correlation with creativity, while there is negative and significant relationship between executive, partial, uni-polar, and conservative thinking styles ^[17]. Keshtkaran et al (2009) concluded that there is a significant relationship between creativity and styles of thinking ^[18]. Zhou and Zhang (2011) also found a relationship between thinking styles and creativity concepts ^[19]. Attlee et al (2011) also suggest that there is a significant relationship between thinking styles and creativity ^[20]. Glassner and Schwarzer (2007) found a relationship between creative thinking and critical thinking in their studies in which by strengthening critical thinking, creative thinking also improved ^[21]. Ian Piaui (2011) also found a positive and significant relationship between creative thinking and critical thinking among teachers in his study and he stated that teachers who have high level of creative thinking and critical thinking, they can make better decisions in complex and confusing

situations ^[22]. In a study conducted by Kohanyia (2011), it was found that creativity is higher among women than compared to men ^[23]. Based on the above-mentioned points, the relationship between thinking style, critical thinking, and creativity is examined by following hypotheses:

1. There is a relationship among styles of thinking and critical thinking, and creativity.
2. There is a relationship among styles of thinking and critical thinking, and creativity of males and females.

Methodology

Population, sample, and method of study

The study population included all Medical University students (n= 2650) that a sample of 214 subjects (92 males, 122 females) were selected using random sampling. This research is a descriptive correlational study. By implementation of questionnaires and collection of data, their analysis was performed using SPSS software. In order to understand the relationship between thinking styles and critical thinking and creativity, Pearson coefficient of correlation and regression analysis were used. The mean difference between male and female subjects was examined according to each variables of thinking styles, critical thinking, and creativity using t test for independent groups. The following tools were used to collect data:

Thinking Styles Questionnaire: The questionnaire contains 65 questions developed by Sternberg, Wagner, and Zhang in 2007, and it was validated on Iranian students by Enayati Novinfar et al ^[16]. In this questionnaire, response of every question is scored on a seven-point Likert scale and each of the five questions assesses one of 13 styles of thinking. In this study, Cronbach's alpha for legislative, executive, judicial, general, partial, liberal, conservative, hierarchical, uni-polar, oligarchy, anarchical, internal, and external thinking styles was obtained respectively, 0.87, 0.75, 0.80, 0.76, 0.86, 0.88, 0.89, 0.0.88, 0.89, 0/95, 0.96, 0.67, 0.93, 0.77, 0.76.

California Critical Thinking Questionnaire: This test was developed by Watson and Glaser (1980) ^[24]. The questionnaire contains 80 questions that have been translated into Persian language, and due to cultural conditions, some examples were changed. This test was validated in several studies conducted in Iranian society, and its reliability was reported 0.70 using coefficient alpha test ^[25]. In this study, Cronbach's alpha was 0/67. Watson Glaser test consists of five subtests (deduction, identification of hypotheses, inferences, interpretation, and

evaluation of logical reasoning), each was asked by 16 questions.

Abedi's Creativity Questionnaire: This test was developed based on the theory and definition of creativity by Abedi in Tehran. This test includes four sub-scales of fluidness, expansion, innovation, and flexibility. Abedi obtained validity of this questionnaire using factor analysis and correlation with similar tests (Torrance) and reported its reliability 0.75, 0 / 81, 0 / 74 and 0/88 using test-retest ^[26]. In this study, reliability was obtained 0.72 using Cronbach's alpha.

Results

The first hypothesis: there is a relationship between the style of thinking, critical thinking, and creativity.

Table 1 shows that thinking styles (legislative, judicial, liberal, general, internal) and critical thinking (deduction, Interpretation and induction) has significant positive correlation with creativity and thinking styles (uni-polar, partial, and conservative) have significant negative correlation with creativity. In addition, executive thinking style and critical thinking (evaluation of logical reasoning) have non-significant positive relationship with creativity, and thinking styles (oligarchy, anarchical, internal) and critical thinking (identification of hypotheses) have non-significant negative relationship with creativity. In addition, oligarchy and hierarchical thinking styles have non-significant positive correlation with critical thinking (evaluation). In addition, internal thinking style has non-significant negative correlation with critical thinking (evaluation). Partial, conservative, uni-polar, and external thinking styles have significant negative correlation with critical thinking. Additionally, legislative, executive, judicial, general, liberal, and anarchist thinking styles have significant positive relationship with critical thinking, identifying assumptions.

The second hypothesis: There is a difference between thinking styles, critical thinking, and creativity of female and male.

Comparison of mean of the female and male in studied variables showed that there is a significant difference at the 0.05 level between two genders in variables of thinking styles (legislative, general, partial, conservative, anarchical, internal, external) and critical thinking (deduction, identification of hypotheses, interpretation). Additionally, results show that the mean scores of female and male has no difference in variables of creativity, thinking styles (executive, judicial, liberal, uni-polar, oligarchic, and hierarchical) and critical thinking (deduction, evaluation of logical reasoning).

Table 1: Correlation matrix between five levels of thinking styles, critical thinking, and creativity

Thinking styles	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Functions																			
1.Creativity																			
2.Legal	0/360																		
3.Executive	0/104	0/048																	
4.Judicial	0/275	0/634	0/108																
Levels																			
5.General	0/349	0/451	0/377	0/357															

12. Bashardoost Tajalli, Fariba; Zandi, Zahra, (2010). Creativity comparison between students who studied life skills courses and those who didn't. *Social and Behavioral Sciences* (5): 1390–1395.
13. Mcdade.D.C.(2000). Relationships between learning styles and critical thinking ability among health professional students. *Dissertation Abstracts International: Humanities and social Sciences*, 61(6A).2212.
14. ChingShu., Yang, &Chaun. Lin Wen, (2004). The Relationship among Creative, CriticalThinking and Thinking Styles in Taiwan High School Students, *Journal of Instructional Psychology*, 31.
15. Emamipoor, S, Saif, a (2003), investigating the changes in styles of thinking in students and their relation to creativity and academic achievement, *Journal of Educational Innovations*, No. 3, second year, spring 82, pp. 35-56.
16. Hedayati, A, Heideri, A, Enayati Novin, a (2011), investigating the relationship between job burnout and styles of thinking among teachers, the first scientific conference on education in Iran, p. 96-93.
17. Mobini Dehkordi, A, Dehghan, M, Amer, K, Hedayati, a (2011), Investigating the relationship between thinking styles and creativity among experts of Zamyad Company, Fifteenth International Conference on Oil and Gas 1982, pp 71-56.
18. Keshtkaran, A, Mohabati, F, Hedayati, SP; Roshanfard, A., (2009), Investigating the relationship between thinking style and organizational innovation of senior and middle managers of public hospitals in Shiraz, *Journal of Public Health, School of Health Research*, Volume 7, Number 4, pp 40-33.
19. Zhu, C.; Zhang, L.-F. (2011)." Thinking styles and conceptions of creativityamong university students", *Educational Psychology*, Volume 31, Issue 3, Pages376.
20. Ettlje, J.E., Groves, K.S., Vance, C.M. (2011)." The role of thinking style and innovative intentions for optimal creativity and innovation in organizations", *Proceedings of the Annual Hawaii International Conference on System Sciences*, art. no. 57.
21. Glassner, Amnon; Schwarz, Baruch.B. (2007). What stands and develops between creative and critical thinking? *Thinking Skills and Creativity* 2: 10–18.
22. Yan Piaw, Chua. (2011). Hindrances to Internal Creative Thinking and Thinking Styles of Malaysian Teacher Trainees in the Specialist Teachers' Training Institute, *Procedia Social and Behavioral Sciences* 15: 4013–4018.
23. Kohanyia, A. (2011). Families and Creativity.*Encyclopedia of Creativity* (Second Edition). pp: 503-508.
24. Watson, G., & Glaser, E.M. (1980). *Watson- Glaser Critical Thinking Appraisal Manual*.San Antonio: The Psychological Corporation: Harcourt Brace Jovanovich, Inc.
25. Mosalanejad, L and Sobhanian, S. (2003), Investigating the critical thinking in virtual and traditional education in computer science, *Steps of Development in Medical Education*, Fifth period, the second number, pp 137-124.
26. Abedi, J. (1983), Creativity and new ways of measuring it, *Psychological research*, Volume 2, number one and two.