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THE EFFECT OF EMOTIONAL INTELLIGENCE AND COGNITIVE PERFORMANCE ON CREATIVITY OF UNIVERSITY STUDENTS

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ABSTRACT

The goal of this research is to investigate the effect of emotional intelligence and cognitive performance (abstract reasoning ability, spatial reasoning ability and numerical reasoning ability) on creativity. Statistical society are undergraduate student of Farhangian university (330) and by using random sampling method, 50 students were selected. All student complete, Gough's Creative personality scale (1979), emotional intelligence questionnaire of Barron, and abstract reasoning ability, spatial reasoning ability and numerical reasoning ability tests. We used SPSS software for data analyzing. The Results of step wise multiple linear regression showed that emotional intelligence, abstract reasoning and spatial ability predict student creativity and numerical reasoning ability is not significant predictors of creativity.

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INTRODUCTION

In the new era one of the most important factors in one's development in the society is creativity. Research on the subject of creativity has attracted researchers' attentions around the world and in different fields of study. Therefore, this concept is considered a major subject in different fields (Runco, 1986). Of course, it should be noted that creativity has different definitions in different cultures and societies. Creativity is introduced as one of the most complex subjects in psychology (Sawyer, 2011).

Some of the researchers have stated that creativity is consisted of different factors such as personal features, cognitive abilities and motivation (Amabile, 1996; Eysenck, 1993). This shows that cognitive and emotional factors can play an important part in creativity. Sometimes, decision making is more impressed by emotions than thought. Although scholars emphasize on the logical and cognitive abilities, with the introduction of emotional intelligence other aspects that influence one's success were studied. In other words, emotional intelligence is a person's ability to face everyday personal and social conflicts and predicts his or her failure in life, because it shows his or her performance in emergency situations (Barron, 2000). Given the effect of emotional intelligence on people's performance on different situations, it is expected that this factor predicts the creativity of people, either.

The research done in reference with IQ and creativity demonstrate a direct relationship between these two factors. (Torrance, 1962; Preckel, Haling and Waiz, 2006). Therefore, it is expected that the brain's cognitive functions that includes problem solving in different fields predict the one's creativity. Brain's cognitive functions can

be investigated through solving spatial, abstract and numerical problems (Amani, Alamolhodaei & Radmehr, 2011). So this way, it can be inspected whether these variables are predictive of creativity or not.

Regarding the importance of creativity and people's need to this concept for achievements in their lives, the purpose of this study is to answer this question that whether emotional intelligence and brain's cognitive function (abstract, spatial and numerical reasoning) can predict one's creativity or not?

In this article, initially, creativity, emotional feeling and abstract, spatial and numerical reasoning are explained and then, the research hypothesis is examined by using appropriate statistical reasoning.

Theoretical Foundations

All through the history, creativity is considered as the driving force of most of the human's innovations (Neumann, 2007), and has played critical role in growth and development of science. On the other hand, creativity is one of the skills that one need for problem solving and therefore confronting life's issues (Castro, 2012). Consequently, its explanation and evaluation is crucial. Thus, one of the goals of educational systems should be educating creative people in order to make appropriate decisions in unpredictable situations, as well as developing scientific fields. Creativity is about the process of inspiring new ideas in people's mind (Tall, 1991), which is considered as one of the complex subjects in psychology. Different definitions for creativity have been proposed. According to Sternberg and Lubart (2000) creativity is the ability to do something which is unexpectedly compatible and useful. Sternberg (2001) defined creativity with the ability to create new and novel

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ideas which are apt and of high value. Although, Mann (2006) believes that there are over a hundred contemporary definitions to creativity, in order to be able to do research about it, the researcher needs a clear definition for this concept (Plucker, 2004). Considering the proposed definitions in this field, creativity in this study is the ability to produce something new and novel. Some of the researchers state that creativity is consisted of factors such as personal features, cognitive abilities, cognitive style and motivation (Amabil, 1996); therefore, it is expected that emotional and cognitive factors and predict it, which are explained in the following section.

Emotional intelligence and its appealing and broad aspects has attracted not only the psychologists but also the psychiatrists' attention (Barczak, 2010). Employing emotional intelligence happened in 1940s and the first people who did research on this subject were Salovey and Mayer, 1990. Daniel Goleman brought the greatest achievement in this field by publishing his book on emotional intelligence (Seif, 2005). Salovey and Mayer (1993) defined emotional intelligence as the ability to process information about your own and others emotions. Barron, also, has developed a multi-factorial model for emotional intelligence. He believes that emotional intelligence is a collection of abilities, capabilities and skills that arm a person for managing his/her environment and achieving success in his/her life. Emotion is a basic element in this kind of intelligence, which distinguishes that from cognitive intelligence. Besides, according to his view, emotional intelligence in emotional- social skills changes and develops over time, which can be improved with education and therapeutic techniques (Barron, 1998, 1999).

Mental abilities are among the predictive factors for a person's achievement in different fields (Rohde and Thompson, 2006; Spinath, 2006). Brain's cognitive functions can be measured using different factors. In this study abstract reasoning, spatial reasoning, and numerical reasoning are considered. In this study, abstract reasoning is the ability to analyze data, solving complicated problems and applying old information in new situations (Plucker, 2004). Spatial reasoning is the skill that refers to the ability to think about 3D objects and making conclusion using limited information (Eliot & Smith, 1983). Numerical reasoning is the ability to work with numbers, tables and charts (Emeke, Adegoke, 2001). The above mentioned factors are the independent variables of this study.

LITERATURE REVIEW

Creativity is a basic concept for innovation. Creating new ideas is the core scheme of every definition (Barczak, *et al.*, 2010). Vast number of research has been seeking to understand brain's processes relative to creativity (Gilhooly, ., Fioratou, Anthony, Wynn 2007) and achieving thorough insight about this concept (Jauket, *al.*, 2014). Research done in this field has studied different aspects of creativity (Sternberg, 1999). Guilford (1950) concluded that people with divergent thinking show more creative behaviour in different situations. Amabil (1983) found significant relation between creativity and motivation.

Mental abilities and IQ are among the factors that predicts ones success in different fields of education (Rohde, Thompson, 2006). Fiest (2011) concluded that a person's IQ is a predictive of their creativity. Batey (2010) and his colleges found that there is a significant relation between fluid intelligence and creativity. In recent years researchers observed that cognitive abilities should be noticed along with non-cognitive abilities that might affect creativity. This is sited in non-cognitive part of emotional intelligence (Batey, Furnham, 2006). Emotional intelligence contains awareness, regulation and the ability to express a range of emotions. For a long time, the most serious IQ theoreticians have tried to introduce emotion to the field of intelligence instead of considering emotion and intelligence in two opposite points (Homaii, 2010). Sánchez-Ruiz (2011) in his research about emotional intelligence factors and creativity found that there is significant relation between these two variables. Euviss *et al.* (2007) in their study on 107 college students found significant relation between students' creativity an emotional intelligence.

The purpose of the present study is to investigate the effect of emotional intelligence and cognitive abilities of college students.

MATERIALS AND METHODS

The population of this study was 330 BA students of Neyshabour's Teacher Education Center who were studying in the field of psychology . The size of the sample was estimated 50, using IBM SPSS, and they were selected by was done Simple random sampling.

In order to evaluate student's creativity Gough's creative personality scale was applied. This questionnaire was designed by Gough (1979). It contains 30 questions with 18 positive and 12 negative items. Each positive answer is scored one positive point and each negative answer is scored one negative point. Therefore, the scores are between the ranges of negative 12 to positive 18. Zampetakis *et al.* (2009) estimated its reliability coefficient, using Cronbach's alpha coefficient, 0.75. In studies done by ELdham and Kafing (1996) this questionnaire was recognized as a credible instrument (cited in Zampetakis, 2009). In Zampetakis's study its internal and one dimensional validity was confirmed using measurement model coefficients acquired from analysis of structural equations. . In the present study Cronbach's alpha coefficient of the questionnaire was 0.73.

Students' emotional intelligence was studied through Barron's questionnaire. This questionnaire is one the most valid questionnaires on emotional intelligence which is the result of long-lasting efforts of a researcher named Barron. So far, large number of research has been conducted on this questionnaire in different countries and cultures and its validity and reliability have been approved.

Barron (1997-1999) determined the reliability of the questionnaire's scales, using Cronbach's alpha, between 0.79 to 0.86 with the average of 0.79. So, according to the results the reliability and validity of the questionnaire was approved (Mokhberiannejad, 2007).

Cognitive function of the people was evaluated using abstract, special and numerical reasoning tests. The reliability and validity of these tests in the present studies was examined by Alamolhoda *et, al*(2011). In the following section each of these variables are shortly explained.

Abstract reasoning

The questions regarding numerical and special reasoning are somehow related to real world, while this relativity is much less in abstract reasoning. Generally speaking, abstract reasoning is the ability to analyze data, solving complicated problems and using prior knowledge in new situations. In order to solve these problems participants should find the proper pattern between figures, while there are intruding information around them. This test contains 25 questions, which participants are required to answer in 20 minutes.

Spatial reasoning

Spatial reasoning is one of the reasoning skills that points at the ability to think about objects and make conclusions using limited information. Generally spatial reasoning includes visual issues. The point here is to investigate and make predictions which needs finding the relation between shapes or objects in different subjects. This test contains 45 questions which should be answered in 20 minutes.

Numerical reasoning

Numerical reasoning is the ability to work with numbers, tables and charts. Questions in this section have special logic behind them. In order to answer these questions, one needs to interpret the information and after discovering the logic, provides the right answer. This test has 22 questions that students have to answer in 20 minutes.

Procedure

Each week one questionnaire was presented to the participants, which had to be answered according t the allotted time.

RESULTS AND DISCUSSION

After data gathering, in order to analyze the data IBM SPSS version 20 was used. The points scored by the participants in each test are presented in Table 1.

Table1 Descriptive statistics

Test	Number of question	Minimum score	Maximum score	Mean of score	Standard deviation	Variance
Numerical reasoning	50	4	19	10.30	3.797	14.42
Abstract reasoning	50	3	16	8.62	3.030	9.18
Spatial reasoning	50	5	35	17.66	6.965	48.52
creativity	50	2	11	6.96	2.166	4.69
Emotional intelligence	50	190	390	296.70	59.724	3566.91

Table2-Multipleregression coefficients

Depend variable	Independ variables	R	R ²	β	Beta	F	sig
creativity	Emotional intelligence	0.60	0.36	0.02	0.45	27.27	0.002
	Abstract reasoning	0.72	0.52	0.23	0.34	25.11	0.001
	Spatial reasoning	0.78	0.60	0.09	0.31	23.27	0.003

According to Table 1, participants had better performance in numerical reasoning than other cognitive abilities. In order to investigate the effect of Emotional intelligence and cognitive abilities on creativity multiple linear

regression was used. The results o f the multiple linear regression is reported in Table 2.

According to Table 2, the variables predicting participants' creativity in this study are emotional intelligence, abstract and spatial reasoning, unlike numerical reasoning which is not a good predictor of creativity. From these results, it can be stated that emotional intelligence, abstract and spatial reasoning predict changes in creativity by 36, 52 and 60 percent, respectively.

CONCLUSION

The results of this study reveal that participants got lower marks in abstract and spatial reasoning than numerical reasoning. This result is in accordance with Amani's (2011) results. The reason for this might be the excessive emphasis of educational books on numerical calculation aspects and ignoring other cognitive processes.

Emotional intelligence is consists of recognition and control of the emotions by a person, him/herself. In other words, a person who has high emotional intelligence combines three elements of emotions (cognitive, physiological, and behavioural) successfully (Broadberry, 2004). Emotional intelligence has been one of the researchers' favorite domains in the past few decades. Some of the researchers has investigated the relation between this variable and creativity .Hansenne and Legrand(2012) proved significant relation between these two variables. In this study, considering the regression equation, emotional intelligence is predictive of creativity. In this sense, Chan (2005) found significant relation between these two variables. Olatoye(2007), also, confirmed this relation.

The research conducted on cognitive abilities such as intelligence and creativity has discovered significant relation between these two variables. (Bandak, 2012; Farmhan *et, al*.2007;&Bati *et, al*. 2011). In this study, abstract reasoning is predictive of creativity. Although there has not been any research on this case, it can be stated that according to Torrance creativity is a kind of problem solving and abstract reasoning is about the ability to use information in unfamiliar situations. All in all, it can be said those who can use information according to specific situation are more proficient in this domain.

This is the characteristic of a creative person. In this study, spatial reasoning can also predict a person's creativity. This ability which is about the ability to think about 3D objects, is one of the factors that predicts

problem solving (Radmehr, 2010). This reveals that people with this ability can use information in different ways. Finally, it was observed that numerical reason does not predict creativity. This reasoning which is about the ability to work with numbers, only deals with learning procedural (Amani, 2011) and does not require high level and complicated thinking.

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