

## The Link between Creativity and Mental Health among the Students of the Universities in Tehran

Mahshad Mohammad Noori<sup>1</sup>, Hassan Ahadi<sup>2</sup>, Parviz Askari<sup>3</sup>, Kianoosh Hashemian<sup>4</sup>, Mohammad Mehdi Mazaheri<sup>5</sup>

<sup>1</sup> Department of Psychology, Science and Research Branch, Islamic Azad University, Khuzestan, Iran

<sup>2</sup> Professor, Department of Psychology, Science and Research Branch, Islamic Azad University, Tehran, Iran

<sup>3</sup> Assistant Professor, Department of Psychology, Ahwaz Branch, Islamic Azad University, Ahwaz, Iran

<sup>4</sup> Associate Professor, Department of Psychology, Roudhen Branch, Islamic Azad University, Tehran, Iran

<sup>5</sup> Professor, Department of Psychology, Science and Research Branch, Islamic Azad University, Tehran, Iran

Corresponding Author: [mahshad.mn@gmail.com](mailto:mahshad.mn@gmail.com)

**Abstract:** According to Freud's theory, the origin of creativity refers to the conflicts of unconscious mind. Psychologists, who came after Freud, reduced the effects of primary processes; moreover, explained that the origin of creativity refers to subconscious mind. Several principal studies performed in the era preceding the systematic ordering of the recent classification (DSM IV-TR and ICD 10) show among creative and famous individuals, a prevalence of severe mental disorders, significantly higher than among the general population. Even, recently, psychiatrist Szabolcs Kéri focused on a gene (neuregulin 1) that normally plays a role in a variety of brain processes and has a clear link with creativity. However, a variant of this gene (or genotype) is associated with a greater risk of developing mental disorders, such as schizophrenia and bipolar disorder. The goal of this research was to study the link between creativity and mental disorders among the undergraduate students of universities in Tehran. In this research, the subjects were 180 students of the universities in Tehran. Selection was in cluster manner, random sampling. The following instruments were used: Minnesota Multiphasic Personality Inventory (MMPI) and Abedi's creativity test. Two groups of variables were tested. Eight clinical criteria of mental disorders of MMPI and four criteria of creativity. Research design were quasi – experimental, field correlation type study. Statistical tests were correlation test and regression analysis. The results showed that there were negative and significant relations between depression and creativity, and between psychasthenia (Pt) and creativity ( $p < 0.01$ ). The best predictors of creativity were Pt and schizophrenia (Sc) criteria which Pt had negative coefficient and Sc had positive. It seemed that when these personality factors such as: self – confidence, relaxation, sense of security and normal approach to life come along with the tendency toward schizophrenia, person's creativity is increased.

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### 1. Introduction

When Guilford's studies introduced creativity based on the factor analysis method; creativity has been the subject of intensive research since 1960s. Experts on creativity generally agree with the phases a person goes through in the creative process:

1. *Preparation: acquiring skills, background information, resources, sensing and defining a problem*

2. *Concentration: focusing intensely on the problem to the exclusion of other demands - a try and error phase that includes false starts and frustration.*

3. *Incubation: withdrawing from the problem; sorting, integrating, clarifying at an unconscious level; often includes reverie, relaxation and solitude*

4. *Illumination: The Aha! Stage, often sudden, involving the emergence of an image, idea, or perspective that suggests a solution or direction for further work*

5. *Verification, Elaboration: testing out the idea, evaluating, developing, implementing, and convincing others of the worth of the idea. (Benjamin, 1984)*

These stages are not necessarily distinct and usually involve a complex recycling of the process.

Then, Torrance (1969) defined creativity broadly as the process of sensing a problem, searching for possible solutions, drawing hypotheses, testing and evaluating, and communicating the results to others. He added that the process included original ideas, a different point of view, breaking out of the mold, recombining ideas or seeing new relationships among ideas. Moving the focus to the behavioral perspective, Torrance described four components by which individual creativity could be assessed:

- *Fluency(FI): the ability to produce a large number of ideas*
- *Flexibility(Fx): the ability to produce a large variety of ideas*

- *Elaboration or Expansion (Ex): the ability to develop, embellish, or fill out an idea*
- *Originality (Or): the ability to produce ideas which are unusual, statistically infrequent, not banal or obvious. (Benjamin, 1984) & (Keating, 1980)*

In this research, creativity is sum of scores of a participant in the four components of creativity (as mentioned above: Fluency, Flexibility, Elaboration and Originality).

### 1.1. Literature review

The relationship between being genius and madness was considered by theorists from ancient times: This raises the suspicion that these studies claiming a higher prevalence of psychopathologies, higher rates of divorce and suicide ,also less marriage and less number of children among creative or eminent people. (Preti, 1996)

The oldest theory in this field ,in the fragment known as "Problemata XXX", Aristotle, or one of his disciple, raised the question as why the vast majority of the eminent people are afflicted by "melancholy", i. e. suffer from a mental disorder. The text, now accepted as part of the Aristotelian canon, is surprising in its modernity and accurately describes those characteristics peculiar to one of the most diffuse mental disorders, manic-depressive psychosis. The author of the Problemata XXX indicates many behavioral characteristics attributed the more eminent people of his time, attributes such as mood instability, and proneness to depressive withdrawal, impulsiveness, tendency to alcohol and drug abuse, high risk of suicide, all of which are peculiar to patients suffering from manic-depressive illnesses. In the Problemata XXX there are also illustrative stories taken from myth and literature, with a gallery of examples mixing excellence and bizarreness, often with a tragic outcome. (Preti, 1996)

In twentieth century, Freud's theory was suggested about the neurosis origins of creativity in primary process thinking. (Weisberg, 1993)

According to Freud's theory, the origin of creativity is the conflicts of unconscious mind. A paper that is the most frequently cited as the general statement of the Freudian view of art and creativity is 'Creative Writers and Day-Dreaming' (1908). Here Freud gives an account of creativity which casts the artist as a neurotic day-dreamer who allows us to enjoy our own dreams without shame. He is portrayed as an egotist, whose creations are only valuable to the extent that they provide a kind of narcotic effect, offering both the artist and audience a substitute for, and an escape from reality. (Glover, 1998)

Freud also explains that the creative person (or as referred above the day-dreamer) ignores reality in his dream and gives full rein to the pleasure

principle in evolving wishful fantasies. Similarly, the artist creates a world of fantasy in which he can fulfill his unconscious wishes. But he differs from the dreamer in one significant aspect - he is able to find a way back to reality in his creation, so in drawing a contrast between the authentic artist and 'those who are not artists', Freud suggests that the 'true artist' is exceptional in a way he can find his way back to reality again, know how to elaborate his day-dreams. (Glover, 1998)

After Freud, neopsychoanalysts, reduced the effect of primary processes in creative activities regarding the control of consciousness on the creative process. In fact, they suggested that creativity is the yield of preconscious mind. (Glover, 1998)

Moreover, neopsychoanalysts understand the creative activity emphasized the relationship between primary and secondary processes (as Kris, Klein, Rycroft, Milner and Winnicott). For instance, Kris's approach emphasizes the ego's control of the instinctual drives, e.g. the rhythmic shaking of the body in laughter, an activity where an 'archaic pleasure in movement is reactivated and is socially permissible'. He argues that the adult's enjoyment of wit can be 'justified before the superego' and this arises from the child's delight in word-playing. (Glover, 1998)

However, researches demonstrated that there is an unusual relationship between the creative gift and the risk of psychic disorder ; In fact ,in society , the rate of prevalence of mental disorders among creative people is significantly more than normal people ;Thus , it can be purposed that genius is the result of creative gift and this talent is positively related to madness. Also, Emil Kraepelin, having the different and effective attitude in his classic book: "Manic -Depressive insanity", purposes that Mania possibly results some changes in thinking processes; so that changes increase creativity. (Weisberg, 1993)

In this field , some studies performed in 19<sup>th</sup> century and those illustrated that mental disorders are more prevalent in famous creative people(Preti,1996); But ,in contrast ,may be that is a precipitate result because Lombroso's hypothesis rest on biographical evidence. This raises the suspicion when these studies claiming a higher prevalence of psychopathologies among creative or eminent people were biased by overexposure. For individuals, such as artists in the public eyes more information is available about their private lives: this could determine apparently a higher prevalence of disorders that tend, as a result of negative stigma, to be hidden whenever possible. In addition, some temperamental traits widespread among creative people, like eccentricity, uneasiness, propensity to excess and experimentation, could be a reflection not only of an underlying mental

disorder, but also, and above all, of the tolerance by society of the behavior of individuals who obtain achievement. In some ways, this behavior will be a secondary product of the achievement, has been rewarded since it permitted the expression of dissenting demands by which the majority of people are not able to express and which are not directly linked to the creative utterance. (Preti, 1996)

Despite these reservations, even the later studies in 20<sup>th</sup> century, performed using methods applying more recent classifications (DSM III, and now DSM IV-TR, and ICD 9, and now ICD10), some studies showed among both artists and scientists a prevalence of severe mental disorders significantly higher than among the general population, with a strong familial association among creativity, psychopathology, and higher suicide rates. (Preti, 1996)

In the field, a study performed in Germany from 1927 to 1943 on 5000 individuals, Adele Juda, at that time researcher at the Institute for Psychiatry of Munich, evaluated frequency and distribution of psychiatric disorders in a well-selected sample of eminent artists, scientists and their relatives. The study showed a significantly higher prevalence of mental illnesses among eminent people and their families compared to the general population. Among artists, disorders of the schizophrenic spectrum and psychopathologies were most common. Among scientists, instead, disorders of the cyclothymic type, in particular manic-depressive psychoses, were more frequent. In both groups, there was a high suicide rate and a strong familial heredity in the transmission of the psychopathological trait and of creative talent. After some decades, J.K. Carlson in a study of Iceland, reported a clear familial association between the diagnosis of psychosis, taken from hospital registers, and eminence in artistic or scientific fields, based citations in Who's Who. A clearly recognizable creative talent was present in the relatives of schizophrenic patients twice as often as in the general population; and in the relatives of manic-depressive patients six times as often as in the general population. Carlson, in his conclusion, suggested a familial link between creativity and psychoses, sustained by a common genetic basis. (Preti, 1996)

In the 1960s, an eminent researcher in the field of psychoses, Silvano Arieti in his book "Creativity, the magic synthesis" suggested his hypothesis about the relationship between schizophrenia and creative gift. He elaborated his hypothesis in the book that though processes typical of schizophrenic patients can favor the development of unusual mental associations which can, in turn, be inspiring to the creatively gifted individual, above all in the artistic field. Arieti supported his hypothesis in

many ways, indicating the extraordinary talent of schizophrenic patients in coining new words, and giving many examples of the artistic production of patients confined in Asylums in the first half of this century. The works of those artists are often very odd and disquieting, but although unusual they do not possess the requisite of being "socially enjoyable", which is essential if a product is to be judged as creative. (Preti, 1996)

Moreover, some studies on autistic people (especially creative talented of them) showed that their inner world may be intense, deep and rich, although carefully guarded because they have some characteristics which make them inaccessible to the majority of people: indeed, autistic children build barriers to defend their inner world. (Preti, 1996)

Kay Redfield Jamieson (1993) also found that poets are 30 times more likely to undergo a depressive illness than the rest of the population, and 20 times more likely to be committed to an asylum. (Bolton et. al, 2004)

In 1994, F. Post, a British psychiatrist, performed another research in the field. This investigation sought to determine the prevalence of various psychopathologies in outstandingly creative individuals, and to test a hypothesis that the high prevalence of mental abnormalities reported in prominent living creative persons would not be found in those who had achieved and retained world status. His method was the study of the family background, physical health, personality, psychosexuality and mental health of 291 famous men in science, thought, politics, and art. The membership of the six series of scientists and inventors, thinkers and scholars, statesmen and national leaders, painters and sculptors, composers, and of novelists and playwrights were determined by the availability of sufficiently adequate biographies. Extracted data were transformed into diagnoses in accordance with DSM- III-R criteria, when appropriate. So, the results showed that all excelled not only by virtue of their abilities and originality, but also of their drive, perseverance, industry, and meticulousness. With a few exceptions, these men were emotionally warm, with a gift for friendship and sociability. Most had unusual personality characteristics and, in addition, minor 'neurotic' abnormalities were probably more common than in the general population. Severe personality deviations were unduly frequent only in the case of visual artists and writers. Functional psychoses were probably less frequent than psychiatric epidemiology would suggest, and they were entirely restricted to the affective varieties. Among other functional disorders, only depressive conditions, alcoholism, and, less reliably, psychosexual problems were more prevalent than expected in some professional categories, but

strikingly so in writers. The research's conclusions demonstrated similar findings have been reported for living artists and writers, and this suggests that certain pathological personality characteristics, as well as tendencies towards depression and alcoholism, are causally linked to some kinds of valuable creativity. (Post, 1994)

Other researches, also, demonstrated that eminently creative individuals have a much higher rate of alcohol and drug misuse, Alzheimer & dementia, anorexia & bulimia, anxiety and personality disorders than the general population (Morgan, 2000), and bipolar disorder is associated with the positive psychological traits of spirituality, empathy, creativity, realism, and resilience. Clinical and research attention to preserving and enhancing these traits may improve outcomes in bipolar disorder. (Galvez et al., 2011)

Even, recently, psychiatrist Szabolcs Kéri of Semmelweis University in Hungary focused his research on neuregulin 1, a gene that normally plays a role in a variety of brain processes, including development and strengthening communication among neurons. In his researches, the results showed a clear link between neuregulin 1 and creativity. However, a variant of this gene (or genotype) is associated with a greater risk of developing mental disorders, such as schizophrenia and bipolar disorder. (Kéri, 2009)

Although many researches acknowledged the positive correlation between creativity and mental disorders, they rejected a causal relationship. Probably, a creative person is a troubled one, but his creative work is not necessarily resulted from his illness. Creative people make their works because of their strengths –not their weaknesses- such as personal resilience, high self-esteem and optimism (Morgan, 2000); some researchers even believed that poetry [or some other art works] has been used by poets [or some other creative persons] to deal with depression and anxiety. (Bolton et al, 2004)

Even in some cases a psychic trauma motivates creative people to produce the work. In other words, some researchers explained some aspects which can favor creative achievements among bipolar people:

One factor is their emotional reactivity: bipolar patients tend to be more sensitive to environmental and interior stimuli. Another factor is their greater disinhibition which makes them both opener to experimentation and more resourceful. Another typical characteristic of bipolar patients is their greater ability to concentrate, especially in the hypo manic phase of the disorder. Furthermore, the greater fluidity of mental associations of these individuals favors a more fertile imagination. (Holden, 2002)

Some new studies about the link between creativity and mental disorders has been proposed that creativity (including a large array of abilities which framed on richly interlaced set of brain networks) is probably related to manifold genes, and the genes that are supposed to support severe mental disorders might combine with in very many different ways. Factors explaining the possible contribution of the schizophrenic style of thought to creativity have been investigated: the broadening of attention, the preference for complex and asymmetrical designs, and the access to unusual dimensions of the mind, typical elements of schizophrenia, were reported to be relevant. (Preti, 2006)

All these studies indicate that mental disorders which imply an imbalance in the neural circuits which control mood, beyond the suffering that they cause in some circumstances favor the expression of adaptive potential. Mental illnesses are the result of underlying neurobiological variances that, as researchers like Tim J. Crow and Daniel R. Wilson remind us; continue to be the bases for the action of mechanisms of selection which help men to adapt to rapidly changing conditions of life, particularly in the relational sphere. (Preti, 1996)

This research also studied about any significant relationship between creativity and mental disorders among students of universities in Tehran. The hypothesis in the research is as follows: There is a significant relationship between creativity and tendency toward mental disorders among undergraduate university students in pure science and humanistic science of universities in Tehran. In addition to the above hypothesis; two subordinate issues are purposed:

- 1) Is there any significant differentiation in creativity in genders?
- 2) Is there any significant differentiation in creativity among students majoring in pure science and humanistic science?

Based on research questions, other hypotheses are as follows:

- 1) There is a significant difference between male and female in their creativity among university students.
- 2) There is a significant difference among students' creativity majoring in pure science and humanistic science.

### 3. Method

**3.1. Subjects:** Subjects in this study were undergraduate university students in pure science (Five majors: mathematics, physics, chemistry, biology and geology) and in humanistic science (Five majors: Economy, Persian literature, English language, psychology and counseling). The subjects

were studying in the universities in Tehran. Among 26108 students, 253 students were randomly selected in cluster manner through governmental universities and Non-profitable universities.

Control variables were:

- 1) Age: All the subjects were selected between 20-25 -year old students.
- 2) Married status: All of them were selected as singles.
- 3) Job: All the students were selected as unemployed persons.
- 4) Gender: The subjects included 125 males and 128 females.

### 3.2. Measurement Tools

The instruments were two paper-pencil questionnaires (Abedi's Creativity test, 60 questions [1], And the short form of MMPI, 71 questions).

Some examples of the questions of Abedi's Creativity test are as follows:

- Usually, when encountering with a very difficult problem, what do you do?
  - a) I cry, because I think I'm cannot solve the problem.
  - b) I do not cry, but I become sad.
  - c) I try to find out a suitable way to solve the problem.
- If some people, unexpectedly, would like you to talk about a topic more than 5 minutes, how much do you afford the task?
  - a) I do not afford because I am not ready.
  - b) I do all my best to afford it.
  - c) I afford it very well.

Abedi's creativity questionnaire includes 60 questions. These questions are under four dimensions (i.e. Fluency, Originality, Flexibility and Expansion) (Abedi, 2002).

The second instrument was the short form of MMPI; some examples of the questions like:

- I have strange and special experiences.
- Sometimes, I intensely would like to leave my family.

This test was standardized according to Iranian culture with 71 questions. (Okhovat, 1978)

### 3.3. Procedure

The two questionnaires (Abedi's creativity test and MMPI test) were given to subjects, simultaneously 180 answer sheets were collected and scored .Among the samples, there were 50 percent males and 50 percent females.

### 3.4. Data analysis

Methods which are use to analyze the data were statistical parametric methods;

The statistical methods were: Regression analysis as a method to analyze the data in the alternative hypothesis (The relationship between creativity and mental disorders) because regression analysis can predict the relationship. However, performing correlation technique is necessary to determine the correlation between creativity and the eight diseases that MMPI assessed them. Then, all data was analyzed by SPSS .16 software packages. So, the results are demonstrated in table (1).

Table (1) demonstrates that depression and creativity have minus significant relationship i.e. less depression of a university student, more creativity in  $p < 0.01$ . Also, the relationship between psychasthenia and creativity is significant in  $p < 0.01$ ; so, the less Pt, the more creativity in  $p < 0.01$ . And in the research, there is no correlation between the other mental disorder scores (in MMPI) and creativity.

In addition to the data, regression analysis studies the relationship among interactive effects of mental disorders with creativity. The results are demonstrated in table (2). According to table (2), regression equation is:

$$Cr = 145.63 + (-2.63) Pt + 1.29 Sc \quad \text{Equation (1)}$$

The other mental disorders are out of the *equation (1)*.

Also, we studied the relationship between interactive effects with one of the four dimensions of creativity and mental disorders by regression analysis. [Four dimensions of creativity were fluency (Fl), originality (Or), flexibility (Fx) and expansion (Ex).]

Separately, the results of four regression analysis are demonstrated in tables (3) to (6).

Based on table (3), regression equation of fluency dimension (Fl) is:

$$Fl = 39.80 + (-0.75) Pt + 0.38 Sc \quad \text{Equation (2)}$$

Fluency regression equation demonstrates that two disorders (Sc and Pt) are the best predictors of fluency, so Pt has negative coefficient and Sc has positive coefficient in the regression. And the other disorders are eliminated of the equation.

According to table (4), regression equation of originality is:

$$Or = 52.46 + (-1.29) Pt + 0.72 Sc \quad \text{Equation (3)}$$

Equation (3) demonstrates that Pt and Sc are the best predictors of originality, and Pt has negative coefficient, and Sc has positive coefficient in the regression equation .The other mental disorders were eliminated of the regression equation.

According to table (5), flexibility regression equation is:

$$Fx = 26.55 + (-0.35) Pt \quad \text{Equation (4)}$$

Above equation demonstrates that the best variable that can predict fluency is *Pt* entering in the equation with negative coefficient. The other mental disorders were eliminated of the regression equation.

According to table 6, regression equation of expansion is:

$$Ex = 27.87 + (-0.19) Pd \quad \text{Equation (5)}$$

Equation (5) demonstrates that *Pd* (psychopathic deviation) is the best predictor of expansion. *Pd* score enters in the regression equation with negative sign. The other variables were eliminated of the equation.

Using T-test for large groups (If members of a group are more than 30 (here  $N=90$ ), we have a large group and this formula must be used:

$$t = \frac{|M_1 - M_2|}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}$$

demonstrated that there are not any significant differences between males' and females' creativity; But the comparisons among creativity dimensions (in male and female university students) showed that the score of expansion dimension in female students, significantly, is greater than male students (the results are significant in  $\alpha = 0.05$ ); but there are no significant differences among the other dimensions.

### 3. Results and Discussion

The regression equations of the study were:

$$Cr = 145.63 + (-2.63) Pt + 1.29 Sc \quad \text{Equation (1)}$$

$$Fl = 39.80 + (-0.75) Pt + 0.38 Sc \quad \text{Equation (2)}$$

$$Or = 52.46 + (-1.29) Pt + 0.72 Sc \quad \text{Equation (3)}$$

$$Fx = 26.55 + (-0.35) Pt \quad \text{Equation (4)}$$

$$Ex = 27.87 + (-0.19) Pd \quad \text{Equation (5)}$$

The study of equations (1), (2) and (3) demonstrated that when some personality factors (such as: self-confidence, tranquility, sense of security and normal approach to life) come along with the tendency to schizophrenia; person's creativity, fluency and originality (innovation) are increased.

The study of expansion dimension demonstrated that the only important variable that predicts expansion is fewer tendencies to psychopathic deviation (*Pd* score in MMPI), i.e. the fewer tendencies to psychopathic deviation in people result in such personality factors: being over of limit controlled, until limit inactive and too hard self-

assertion, humiliate, self-criticism, balanced and happy, fidelity and right, deep relations with others, being able to forecast in result behavior, being able to form scheme of future. Thus, these personality factors are the best factors that can predict mind expansion ability (it means such people can complete a scheme and they can increase related components to it).

The best predicting variable of flexibility is reduction of psychasthenia disorder (*Pt*), and the reduction illustrates such personality factors: tranquility, sense of security and normal approach to life. In addition, regarding signs in equation (1) –the negative sign of *Pt* score and the positive sign of *Sc* score –demonstrates that if the decrease of *Pt* score (psychasthenia) comes along with the increase of schizophrenia score (*Sc*) results in increasing a person's creativity score.

However, when both of *Pt* and *Sc* are high scores in the equation, a person is diagnosed as a severe schizophrenic person, therefore; such people are not creative people. A person who has low *Pt* score, has some personality factors such as: self-confidence, sense of security and normal approach to life. When the factors come along with the tendency toward schizophrenia, a person's creativity is increased.

Observing the literature review, most researchers found out significantly a positive relationship between creativity and mental disorders (see pages 3-7). This research also generally confirms the last findings (i.e. we also found out, significantly a positive relationship between creativity and mental disorders). The last discoveries showed a positive relationship between creativity and schizophrenia. In this research not only schizophrenia is related to creativity, but also its interaction with decreasing psychasthenia has positive relation with creativity.

As a result, it can be inferred to some of the aspects that could favor the creative achievements among the university students who have little tendency toward schizophrenia:

1) Sense of solitude in such people results in positive introversion and abstract thinking.

2) Their sense of solitude and separation make much focusing for them.

3) According to Adler's theory, such people have sense of inferiority that causes they try hard and have more perseverance than the others.

4) When above factors come along with sense of security, self-confidence, and normal approach to life (i.e. the factors of fewer *Pt* score), they result in high creativity.

In addition, high *Sc* score demonstrates some facts such as:

1) Existing illness in a person and the illness can reduce his function and his focusing on a task.

2) Schizophrenia makes disability in decisions, so these factors are big obstacles for the advent of creativity.

Therefore, neither are university student's depressives, schizophrenic nor psychastheni, but the interaction between tendencies toward schizophrenia with decreasing psychasthenia affects increasing creativity.

On the other hand, large constancy in the creativity regression equation [145.63 in equation (1)] displays that many factors affect person's creativity. Some of these factors are known such as intelligence and genetic characteristics, but some of them are unknown. Also, all of these factors, either understandable or non-understandable were not assessed in this research.

In fact, according to the literature review, creative works sprang from peculiar combination of personal resilience, high self-esteem, and optimism, not because of, adversity. (Morgan, 2000) So, the theory can generalize of creative university students. On the other hand, assessment method of schizophrenia can be doubtful, because creative people have some special experiences (aha-experiences) that illumination involves them (traditional model of creativity includes the initial stage [preparation], incubation, discovery [illumination], expansion [elaboration] followed by verification) (Preti,1996)& (Benjamin,1984).Also, there is no instrument to evaluate illumination experiences in people ; and , such experiences are related to schizophrenic tendencies by MMPI .

Positive answers of MMPI questions cause to increase schizophrenic score in MMPI .For instance, these questions are:

- I guess that no one understands me.
- I have some special and strange experiences.
- Sometimes, I am so restless to remain in a place.

If there is a questionnaire to assess illumination experiences, absolute judge about schizophrenic tendencies in creative people will be possible.

In this research, there is some reliability restriction such as:

1) Almost all of people tend toward positive answers in personality questionnaires. Also, there is social deniability tendency in subjects; because most of people tend to have good expression in social positions and they like to deny unfavorable characteristics.

In addition, some motivations and conditions affect the results of ability tests like creativity questionnaire. (Cooper, 1998).

2) When the practitioners answered the two questionnaires (MMPI=71) questions and Abedi's creativity test =60 questions); maybe fatigue affected them and might increase the variance error; however, the fatigue affected total sample, and the results became valid.

3) Another limitation in this research is methodological weakness. Assessments of the field variables, generally, come along with little precision because of much complexity that exists in the background .For instance; the constant number in equation (1) was a big number and equal to 145.63:

(Creativity regression equation was:

$$Cr = 145.63 + (-2.63) Pt + 1.29 Sc$$

The number showed that practitioner's creativity is related to many other variables that they did not evaluate in this study.

The present findings, also, raise some questions for further researches:

1) Another research can be performed on university students that it uses other kinds of instruments (unless the questionnaire).

2) A new questionnaire is made by the known disorders (Bipolar disorders, schizophrenia, personality disorders, bulimia and anorexia nervosa); then after, that questionnaires normalized in Iran society and similar study will be performed by this new questionnaire.

3) Similar researches can conduct about either university courses ( such as Art ) or graduate courses (such as M.Sc. and Ph.D. courses)

Table1.Pearsonian correlation coefficients of each of the mental disorders with creativity

(Ma: Hypomania, Sc: Schizophrenia, Pt: Psychasthenia, Pa: Paranoia, pd: Psychopathic deviation, Hy: Hysteria, D: Depression, Hs: Hypochondriasis)

	<i>Hs</i>	<i>D</i>	<i>Hy</i>	<i>Pd</i>	<i>Pa</i>	<i>Pt</i>	<i>Sc</i>	<i>Ma</i>
Pierson correlation	-0.109	** -0.243	-0.009	-0.074	-0.073	** -0.292	-0.067	0.004
<b>Cr</b>								
Significance (Bilateral)	0.146	0.001	0.907	0.326	0.330	0.000	0.371	0.960
Number of sample	180	180	180	180	180	180	180	180

\*\* \_ Correlation is significant at the 0.01 level

Table2.Data regression analysis coefficients (Creativity predictors: Constant, Pt and Sc)

Entering variables	Unstandardized coefficients		Standardized coefficients	t	Significance	Correlations		
	B	Standard error	$\beta$			Zero-order	Partial	Part
Constant	148.723	3.408	-0.292	43.645	0.000	-0.292	-0.292	-0.292
<b>Pt</b>	-1.568	0.385		-4.077	0.000			
	145.627						-0.347	-0.346
Constant	-2.627	3.521		41.363	0.000		0.206	0.197
<b>Pt</b>	1.289	0.534	-0.490	-4.923	0.000	-0.292		
<b>Sc</b>		0.459	0.279	2.807	0.006	-0.067		

Table3.Data regression analysis coefficients (Fluency predictors: Constant, Pt and Sc)

Entering variables	Unstandardized coefficients		Standardized coefficients	t	Significance	Correlations		
	B	Standard error	$\beta$			Zero-order	Partial	Part
Constant	40.721	1.088	-0.256	37.444	0.000	-0.256	-0.256	-0.256
<b>Pt</b>	-0.433	0.123		-3.527	0.001			
Constant	39.803	1.127	-0.441	35.316	0.000	-0.256	-0.312	-0.312
<b>Pt</b>	-0.747	0.171	0.262	-4.371	0.000	-0.050	0.192	0.185
<b>Sc</b>	0.382	0.147		2.598	0.010			

Table 4.The coefficients of data regression analysis (Originality predictors: Constant, Pt and Sc)

Entering variables	Unstandardized coefficients		Standardized coefficients	t	Significance	Correlations		
	B	Standard error	$\beta$			Zero-order	Partial	Part
Constant	54.186	1.471	-0.300	36.848	0.000	-0.300	-0.300	-0.300
<b>Pt</b>	-0.696	0.166		-4.194	0.000			
Constant	52.456	1.496		35.058	0.000	-0.300	-0.393	-0.392
<b>Pt</b>	-1.288	0.227		-5.679	0.000	-0.032	0.267	0.255
<b>Sc</b>	0.720	0.195		3.692	0.000			

Table 5. The coefficients of regression analysis of data (Flexibility predictors: Constant, Pt)

Entering variables	Unstandardized coefficients		Standardized coefficients	t	Significance	Correlations		
	B	Standard error	$\beta$			Zero-order	Partial	Part
Constant	26.550	1.027	-0.221	25.859	0.000	-0.221	-0.221	-0.221
<b>Pt</b>	-0.349	0.116		-3.016	0.003			

Table6.The coefficients of regression analysis of data (Expansion predictors: Constant, Pd)

Entering variables	Unstandardized coefficients		Standardized coefficients	t	Significance	Correlations		
	B	Standard error	$\beta$			Zero-order	Partial	Part
Constant	27.869	0.721	-0.151	38.631	0.000	-0.151	-0.151	-0.151
<b>Pd</b>	-0.190	0.094		-2.031	0.044			



Table 7. Statistical indexes of creativity and its four dimensions based on students' gender

	Group	Average	Standard deviation	variance	Number of sample
<i>Creativity</i> <b>Cr</b>	<b>Girl</b>	136.61	15.39	236.94	90
	<b>Boy</b>	134.53	15.58	242.75	90
<i>Fluency</i> <b>Fl</b>	<b>Girl</b>	36.60	4.64	21.53	90
	<b>Boy</b>	37.59	5.13	26.32	90
<i>Originality</i> <b>Or</b>	<b>Girl</b>	49.07	6.30	39.69	90
	<b>Boy</b>	47.64	7.07	49.98	90
<i>Flexibility</i> <b>Fx</b>	<b>Girl</b>	23.94	4.66	21.72	90
	<b>Boy</b>	23.32	4.52	20.43	90
<i>Expansion</i> <b>Ex</b>	<b>Girl</b>	27.02	3.32	11.02	90
	<b>Boy</b>	25.98	3.59	12.89	90

Table 8. Creativity statistical indexes and its dimensions based on courses

	Group	Average	Standard deviation	variance	Number of sample
<i>Creativity</i> <b>Cr</b>	<i>Humanistic sciences (1)</i>	135.12	15.29	233.80	90
	<i>Sciences(2)</i>	136.03	15.42	237.74	90
<i>Fluency</i> <b>Fl</b>	<b>(1)</b>	36.38	4.64	21.53	90
	<b>(2)</b>	37.81	5.07	25.07	90
<i>Originality</i> <b>Or</b>	<b>(1)</b>	48.53	6.66	44.36	90
	<b>(2)</b>	48.18	6.81	46.38	90
<i>Flexibility</i> <b>Fx</b>	<b>(1)</b>	23.87	4.74	22.47	90
	<b>(2)</b>	23.38	4.44	19.71	90
<i>Expansion</i> <b>Ex</b>	<b>(1)</b>	26.34	3.65	13.32	90
	<b>(2)</b>	26.65	3.34	11.16	90

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