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# Predict the Creativity of the Engineers of Kermanshah Engineering Organization Based on Their Personality Five Factors and Mental Health

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**Abstract:** Aim: The aim of this study was to predict the creativity of the engineers of Kermanshah Engineering Organization based on their personality and mental health factors. Method: This study was performed with Pearson correlation and multiple regressions, Cranach's Alpha coefficient, SPSS software version 20. A total of 375 engineers were selected based on Morgan table that completed 3 types of questionnaires: Torrance questionnaire (verbal section), (NEO-FFI) questionnaire and GHQ-28 questionnaire. The significant level in this study was considered as 0.05. This study was descriptive and correlation based. The sampling method was random. The study was a descriptive – correlative. Result: Correlation and regression analysis showed that there was a significant relationship between creativity (fluidity, flexibility, innovation, expansion) with five factors of personality (Neuroticism, Extraversion, Conscientiousness, Openness, Agreeableness) and mental health (physical symptoms, anxiety and insomnia, depression, social function). So regression analysis showed that personality factors (neuroticism, extraversion, flexibility) are better models to predict creativity.

**Keywords:** Creativity, Personality Five Factors, Mental Health, Engineers.

## Introduction

Creativity is a concept that is associated with many factors. Therefore discovery connection between creativity and personality factors and mental health is of utmost importance. According to Rogers (1977) man is born inherently creative, but creativity is in the early stages of life evolved and why there need attention and guidance. Rogers believes that in human is natural inclination to creativity and foremost created every human being is his own. Maslow (1941) believed that the creativity of the characteristics of people who are demanding self-created. He believes that the creative process is not only irrational but rational above. Because intellectual activity, volitional and emotional person and brought together permanent loan to mobility. He believes that creative thinking is the highest degree of emotional health and self-actualization and self-enrichment means in healthy individuals. He sees the current process to deal with one considers realistic and informed. (Rogerz, 1961; Maslow, 1968; Pirkhaefi, 2012; 3). Torrance depth conflict and ability to express emotional in the creative, critical and believes that creative thinking, showing the highest degree of emotional

health and self-expression healthy individuals in self-improvement and their development is underway (Bandak and et al, 2016, 4). Guilford outlined an educational nature are for four elements of creativity, fluency, flexibility, originality, elaboration, attention to creativity in organizations today especially has been much more. Creativity is the core capital and capacity to manage creativity key assets for future organizations (Sadeghie malamiri, 2015, 3). Several factors affect the amount of creativity individual, but on the basis of scientific reports as well as the impact of any is not direct effects creativity on character. The importance and decisive role characteristics in the creativity has caused increasing attention of researchers in this area (Foladvande masonry and et al, 2015, 3). The character is very complex concept in psychology that awareness of the foundation and theories of psychotherapy often constitute pathology. Character can be defined as a set of durable and unique features that may change in different situations (Schultz, 2009). The concept of mental health means feeling of well-being and ensure their effectiveness, self-reliance, capacity, competition, dependence on intellectual and emotional potential of inter-generational and self-actualization etc. mental health is more than the absence of mental disorders (salami and et al, 2011, 2). Creativity is effective variable in the mental health field. So it can stimulate and strengthen the mental health help, and mental health meant to promote positive aspects in men (Blanter of pirkhaefi, 2012, 2). In the field of creativity and personality and mental health impact of many researches has been done on creativity. Which express the relationship between creativity and personality and mental health? And also expresses the importance of this issue and its impact on communities and people's lives are. Among these may be noted the following research: Hossienifar and et al (2011) showed that the five personality factors, agreeableness, extroversion, responsibility and conscientiousness, are predicted positive and neuroticism negative predictor for creativity. Ghardashi (2011) research suggests that between all the components of the creative personality dimensions than fluid dimension there is a significant relationship. Fornham and bacchius (2011) the results showed that extraversions are associated with the four components of creativity and five personality factors are related to the four components of creativity and innovation can be traced through them. In research Tehrani, Shojaeezadeh, Hosseini and Alizadegan (2012) findings suggest that personality type was significantly associated with mental health. Carolin (2006) studies with people with mental disorders and healthy individuals showed that creativity not only mental health but in contrast to people with mental health is an important feature, scientific evidence related to non-clinical samples indicates the relationship between creativity and mental health, It can be noted that in this case the research Pirkhaefi (2012) a significant effect creativity and its associated elements on reducing anxiety and depression, increased compatibility, increased self-efficacy, increased personal growth, increasing flexibility and optimism, positive emotions development, streamlining coping skills and increase mental health component. Rezaei, Ebrahimighavam,

Delawar and Rezaei (2014) the results showed that of the 30 personality characteristics, beliefs seven characteristics include flexibility, determination, competence, imagination, aesthete, flexibility and restraint in the exercise of a significant positive relationship with creativity and two features aggression, humility and creativity have a significant negative relationship. Fornham and et al (2014) study showed that among personality traits, flexibility, agreeableness, are predicting for creativity. And research results minds Mansouri, Mohammadifar and Najafi (2015), suggests that the relationship between emotional intelligence and creativity is not significant but the five factors of personality and creativity in a component of accountability and flexibility positive and significant. And in the neurosis there is a significant negative relationship. Dehghani, Dehghani and MazaherieTehrani (2015) Tracer as a creative relationship with job satisfaction and mental health nursing women; research showed that there was a significant negative correlation between anxieties and develop creativity. khorakian, maharati, heshmati (2015) tracer as a Creativity and innovation. Jowkar and Alborzi (2016) research suggests that there is a positive significant relationship between cognitive and emotional creativity. As well as the five personality factors, factors openness to experience and extraversion positive and significant predictor of emotional creativity and cognitive creativity, of agreeableness, positive predictive factors and neuroticism were negative predictor cognitive creativity. Pirkhaefi (2016) research findings showed that in the mental health field, creativity effective variable and to stimulate it can help to promote mental health. Pirkhaefi (2016) conducted a study entitled, the relationship between met cognitive components of creativity with mental health in students, in all these cases had pointed to the significance of the relationship between creativity and personality traits and mental health. In this study, we tried to predict creativity based on five factors of personality and mental health have been engineers engineering organization of Kermanshah province. Finally, the researcher seeks to answer the whole question, what is the relationship between creativity and engineering exist five factors personality and mental health?

This research was conducted in the form of a multiple regression correlation study. The study population consisted of all engineers engineering organization of Kermanshah province in 2016, which included 10559 patients using random sampling based on Morgan table, 375 engineers as people were selected to participate in this research were.

## Methods

In this study, three types of questionnaires were used. To measure creativity, the Torrance creativity questionnaire (verbal section), and to measure personality factors of five factors personality NEO questionnaire, and GHQ-28 questionnaire was used to assess mental health. Torrance creative thinking questionnaire consisting of 60 questions Tuesday is an option, score this test was performed in

accordance with the prospectus Torrance test of creative thinking is, Torrance has reported 51% predictive validity of test of creativity, 12 years old ever is a long-term study from a population university of Minnesota high school (1971- 1959). Torrance creativity questionnaire measures four components which include: Fluency, Innovation, Flexibility, Expand ability. Big five personality questionnaire (NEO-FFI) there is 60 question and components of the questionnaire included Agreeableness, Conscientiousness, Extroversion, Openness, and Neurosis. The questionnaire based on a factor analysis of the scores of NEO-PI a good internal consistency, for example: Costa and Maccry (1992) have reported Cronbach's alpha coefficient between (98% to agree to 86% for neuroticism). Methods such as likert scoring five valuable. GHQ like other forms questionnaire GHQ is just four options. In the original version of the response spectrum is (much lower than usual, less than usual, as always, and more than ever). But the form used in this study, most of the questions was written (good, little, much, and much). This questionnaire is composed of 4 scale, each of which has seven questions, questions related to four scale is, respectively. These measures include the following: Somatic symptoms (S), Anxiety and insomnia (A), Social functioning(S), and Depression (D). GHQ mean sensitivity of the questionnaire is (84% between 7% to 89%) and the feature-fold (82% between 78% to 85%) (Williams and Goldberg, 1987), the questionnaire is divided in to two likert method and GHQ scoring. This method was used in grading GHQ.

## Research Findings

This study included 375 engineers engineering organization of Kermanshah province, which is available from the community, was.

**Table 1**  
Frequency of Qualitative Variables

| CFP   | FP    | F   |              |                |
|-------|-------|-----|--------------|----------------|
| 72.3  | 72,3  | 271 | Male         | Sex            |
| 100.0 | 27,7  | 104 | Female       |                |
|       | 100,0 | 375 | Total        |                |
| 42.1  | 42,1  | 158 | Just         | Marital status |
| 100.0 | 57,9  | 217 | Married      |                |
|       | 100.0 | 375 | Total        |                |
| 64.0  | 64.0  | 240 | B            | Educational    |
| 93.9  | 29.9  | 112 | MA           |                |
| 96.3  | 2.4   | 9   | PHD          |                |
| 100.0 | 3.7   | 14  | AD           |                |
|       | 100.0 | 375 | Total        |                |
| 43.2  | 43.2  | 162 | Architecture | Field of study |
| 81.1  | 37.9  | 142 | Construction |                |
| 88.5  | 7.5   | 28  | Mechanic     |                |
| 100.0 | 11.5  | 43  | Power        |                |
|       | 100.0 | 375 | Total        |                |

In this table, displayed frequency percent, cumulative frequency percent, and qualitative variables (gender, marital, status, educational level and field of study). For example, the frequency of civil engineering 142, the frequency of 37.9 percent and 81.1 percent cumulative frequency of the class.

**Table 2**  
Descriptive

| S        | SD     | M     | F   | Variable                        |
|----------|--------|-------|-----|---------------------------------|
| 55.60685 | 7.457  | 33.35 | 375 | Age                             |
| 223.7417 | 14.958 | 76.06 | 375 | Creativity<br>(components 4)    |
| 20.09729 | 4.483  | 20.71 | 375 | Fluidity                        |
| 209.0337 | 14.458 | 21.70 | 375 | Flexibility                     |
| 21.44616 | 4.631  | 17.29 | 375 | Innovation                      |
| 20.11523 | 4.485  | 19.50 | 375 | Expansion                       |
| 13.49828 | 3.674  | 7.45  | 375 | Mental health<br>(components 4) |
| 1.68221  | 1.297  | 1.38  | 375 | Physical symptoms<br>(S)        |
| 3.3709   | 1.836  | 1.37  | 375 | Anxiety and insomnia<br>(A)     |
| 5.92923  | 2.435  | 4.18  | 375 | Social function (S)             |
| 1.58256  | 1.258  | .52   | 375 | depression (D)                  |
| 23.04    | 4.800  | 26.12 | 375 | N                               |
| 28.55834 | 5.344  | 29.74 | 375 | E                               |
| 46.06337 | 6.787  | 34.87 | 375 | O                               |
| 55.60685 | 7.457  | 33.35 | 375 | A                               |
| 223.7417 | 14.958 | 76.06 | 375 | C                               |

In the chart above we can see that the variables are presented descriptive data. The average age of 33.35 years, SD= 7.457 times the average creativity 76.06, and standard deviation 14.958 and the mean and standard deviation of and so many elements of creativity, mental health and the five personality factors.



**Table 3**  
**Correlations**

| C       | A       | O      | E       | N       | Expansion | Innovation | Flexibility | Fluidity | Creativity | Variable                           |
|---------|---------|--------|---------|---------|-----------|------------|-------------|----------|------------|------------------------------------|
| .251**  | .201**  | .284** | .291**  | -.293** | .816**    | .847**     | .330**      | .744**   | 1          | Pearson<br>Correlation Creativity  |
| .000    | .000    | .000   | .000    | .000    | .000      | .000       | .000        | .000     |            | Pearson<br>Correlation             |
| .273**  | .208**  | .160** | .240**  | -.243** | .483**    | .472**     | .215**      | 1        |            | Pearson<br>Correlation Fluidity    |
| .000    | .000    | .002   | .000    | .000    | .000      | .000       | .000        |          |            | Pearson<br>Correlation             |
| .062    | .146**  | .172** | .085    | -.184** | .184**    | .278**     | 1           |          |            | Pearson<br>Correlation Flexibility |
| .234    | .005    | .001   | .100    | .000    | .000      | .000       |             |          |            | P Value                            |
| .118*   | .098    | .188** | .201**  | -.246** | .608**    | 1          |             |          |            | Pearson<br>Correlation Innovation  |
| .022    | .057    | .000   | .000    | .000    | .000      |            |             |          |            | P Value                            |
| .232**  | .212**  | .301** | .251**  | -.160** | 1         |            |             |          |            | Pearson<br>Correlation Expansion   |
| .000    | .000    | .000   | .000    | .002    |           |            |             |          |            | P Value                            |
| -.413** | -.443** | .001   | -.566** | 1       |           |            |             |          |            | Pearson<br>Correlation N           |
| .000    | .000    | .985   | .000    |         |           |            |             |          |            | P Value                            |
| .575**  | .373**  | .129*  | 1       |         |           |            |             |          |            | Pearson<br>Correlation E           |
| .000    | .000    | .013   |         |         |           |            |             |          |            | P Value                            |
| .142**  | .072    | 1      |         |         |           |            |             |          |            | Pearson<br>Correlation O           |
| .006    | .163    |        |         |         |           |            |             |          |            | P Value                            |
| .418**  | 1       |        |         |         |           |            |             |          |            | Pearson<br>Correlation A           |
| .000    |         |        |         |         |           |            |             |          |            | P Value                            |
| 1       |         |        |         |         |           |            |             |          |            | Pearson<br>Correlation C           |
|         |         |        |         |         |           |            |             |          |            | P Value                            |

\* P &lt; 0.05,

\*\* P &lt; 0.01

According to table 3: the correlation between Neuroticism and Creativity and its components (fluency, flexibility, innovation, expansion) is significant and respectively - %29.3, - %24.3, - %18.4, - %24.6, - %16. So the correlation between Neuroticism and Creativity and all four of its components is significant and negative. The correlation between Extraversion and Creativity and 3 of its components (fluency, innovation, expansion) is a significant and positive respectively %29.1, %24, %20.1, %25.1 . The correlation between Openness and Creativity and all four of its components (fluency, flexibility, innovation, expansion) is positive and significant and it is respectively is %28.4, %16, %17.2, %18.8, %30.1. The correlation between Agreeableness and Creativity and three of its components included with (fluency, flexibility, and expansion) is positive and significant and it is respectively %20.1, %20.8, %14.6, and % 21.2. The correlation between Conscientiousness and Creativity and to behave with three of its components, including (fluency,



innovation, and expansion) is positive and significant and it is respectively %25.1, %27.3, %11.8, %23.2.

**Table 4**  
Correlation

| D | S       | A       | S      | Mental Health | Expansion | Innovation | Flexibility | Fluidity | Creativity | Variable                          |
|---|---------|---------|--------|---------------|-----------|------------|-------------|----------|------------|-----------------------------------|
|   |         |         |        |               |           |            |             |          | 1          | Pearson Correlation Creativity    |
|   |         |         |        |               |           |            |             |          |            | P Value                           |
|   |         |         |        |               |           |            |             | 1        | .744**     | Pearson Correlation Fluidity      |
|   |         |         |        |               |           |            |             |          | .000       | P Value                           |
|   |         |         |        |               |           |            | 1           | .215**   | .330**     | Pearson Correlation Flexibility   |
|   |         |         |        |               |           |            |             | .000     | .000       | P Value                           |
|   |         |         |        |               |           | 1          | .278**      | .472**   | .847**     | Pearson Correlation Innovation    |
|   |         |         |        |               |           |            | .000        | .000     | .000       | P Value                           |
|   |         |         |        |               | 1         | .608**     | .184**      | .483**   | .816**     | Pearson Correlation Expansion     |
|   |         |         |        |               |           | .000       | .000        | .000     | .000       | P Value                           |
|   |         |         | 1      | .102*         | .045      | -.052      | .038        | .043     |            | Pearson Correlation Mental health |
|   |         |         |        | .049          | .380      | .319       | .467        | .412     |            | P Value                           |
|   |         |         | 1      | .704**        | .032      | -.027      | -.131*      | -.099    | -.062      | Pearson Correlation S             |
|   |         |         |        | .000          | .538      | .605       | .011        | .055     | .228       | P Value                           |
|   |         | 1       | .514** | .646**        | -.032     | -.023      | -.129*      | -.047    | -.071      | Pearson Correlation A             |
|   |         |         | .000   | .000          | .535      | .661       | .013        | .368     | .170       | P Value                           |
|   | 1       | -.336** | -.052  | .368**        | .185**    | .145**     | .156**      | .208**   | .222**     | Pearson Correlation S             |
|   |         | .000    | .316   | .000          | .000      | .005       | .002        | .000     | .000       | P Value                           |
| 1 | -.322** | .550**  | .374** | .535**        | -.049     | -.086      | -.129*      | -.120*   | -.137**    | Pearson Correlation D             |
|   | .000    | .000    | .000   | .000          | .344      | .097       | .013        | .020     | .008       | P Value                           |

According to table 4: the correlation between creativity (four factors), and mental health component including (social functioning and depression) and significant, respectively is %22.2, - %13.7 the correlation coefficient between the fluency and the mental health component including (social functioning and depression) and significant, respectively is %20.8, - %12 The correlation between flexibility and mental health components including (physical symptoms, anxiety and insomnia, social functioning, and depression) and significant respectively is - %13.1, - %12.9, %15.6, - %12.9. The correlation between creativity (innovation) and mental health component (social functioning) of %14.5 is significant. The correlation between expansion and mental health component (social functioning) of %18.5 is significant. So according to this component was concluded between creativity and mental health component, there was a significant relationship and the correlation is negative except social function.

**Table 5**  
Variables Entered / Accepted / Added

| Method                          | Significant variables in the model accepted                                    | Variables added                              | Variables entered  | Model |
|---------------------------------|--|--|--|-------|
| Progressive stepwise regression | Neuroticism  |  | Social function, Depression, Neuroticism, Extraversion, Agreeableness, Openness, Conscientiousness | 1     |
| Progressive stepwise regression | Neuroticism<br>Openness  | Openness (components of personality factors) | Social function, Depression, Neuroticism, Extraversion, Agreeableness, Openness, Conscientiousness | 2     |
| Progressive stepwise regression | Neuroticism<br>Openness<br>(components of personality factors)<br>Extraversion | Extraversion                                 | Social function, Depression, Neuroticism, Extraversion, Agreeableness, Openness, Conscientiousness | 3     |

**Table 6**  
Model Summary

| Std. Error of the Estimate | Adjusted R Square | R Square | R    | Model |
|----------------------------|-------------------|----------|------|-------|
| 14.322                     | .083              | .086     | .293 | 1     |
| 13.693                     | .162              | .167     | .408 | 2     |
| 13.612                     | .172              | .179     | .423 | 3     |

**Table 7**  
ANOVA

| P    | F      | Mean Square | DF  | Sum of squares | Model      |
|------|--------|-------------|-----|----------------|------------|
| .000 | 34.937 | 7166.522    | 1   | 7166.522       | Regression |
|      |        | 205.129     | 373 | 76513.302      | Residual 1 |
|      |        |             | 374 | 83679.824      | Total      |
| .000 | 37.162 | 6967.409    | 2   | 13934.818      | Regression |
|      |        | 187.487     | 372 | 69745.006      | Residual 2 |
|      |        |             | 374 | 83679.824      | Total      |
| .000 | 26.876 | 4979.723    | 3   | 14939.168      | Regression |
|      |        | 185.285     | 371 | 68740.656      | Residual 3 |
|      |        |             | 374 | 83679.824      | Total      |

The above table shows Goodness of fit test for the three models. According to the F-test and the value of P is significant in all three models,

but we consider a model that despite significant predictor variables known more.

**Table 8**  
Coefficients

| P    | T      | Standardized Unstandardized |              |        | Model      |
|------|--------|-----------------------------|--------------|--------|------------|
|      |        | Coefficients                | Coefficients |        |            |
|      |        | Beta                        | SD           | B      |            |
| .000 | 40.787 |                             | 2.159        | 88.043 | Constant 1 |
| .000 | -5.911 | -.293                       | .103         | -.608  | N          |
| .000 | 14.854 |                             | 4.369        | 64.903 | Constant   |
| .000 | -6.189 | -.293                       | .098         | -.609  | N 2        |
| .000 | 6.008  | .284                        | .148         | .886   | O          |
| .000 | 8.321  |                             | 6.462        | 53.765 | Constant   |
| .000 | -3.784 | -.217                       | .119         | -.450  | N 3        |
| .000 | 5.605  | .267                        | .148         | .832   | O          |
| .020 | 2.328  | .135                        | .136         | .317   | E          |

According to the table of coefficients, we have the following regression model: Extraversion (0.317)+Flexibility(0.832)+Neuroticism(0.45)-53.765 = Creativity.

## Conclusion

Creativity is observed in all human group and individual activities. The level of "potential" and growth there are in all human beings and can be fostered by applying the principles and determined techniques and create new attitudes, ideologies and a suitable environment.

The first hypothesis of this study imply that the there is a significant correlation between creativity (fluency, flexibility, innovation, expansion) and neurosis of engineers engineering organization of Kermanshah province. According to the results of the statistical analysis are presented in table 3, has confirmed the hypothesis at a significance level of %95 confidence, this means that there is a significant negative correlation between creativity and neurosis, the findings of the research findings sale Mansouri, Mohammadifar and Najafi (2015), Jowkar and Alborzi (2016) is co- ordinate and consistent. The second hypothesis of this study imply that there is a significant relationship between creativity (fluency, innovation, expansion) and extraversion engineers engineering organization of Kermanshah province, according to the results of the analysis of the data presented in table 3, has confirmed the hypothesis at a significance level of %95 confidence, this means that there is a significant positive correlation between creativity and extraversion. The finding of the theory to the research findings Jowkar and Alborzi (2016) is co- ordinate and consistent. The third hypothesis of this study imply that there is a significant relationship between the creativity (fluency, flexibility, innovation, expansion) and openness of engineers engineering organization of Kermanshah province. According

to the results of the analysis of the data presented in table 3 confirmed this hypothesis at a significance level of %95 confidence. This means that there is a significant positive correlation between creativity and openness. The results of the present hypothesis Rezai and colleagues (2013) is co- ordinate and consistent. The fourth hypothesis of this study implies that the creativity (fluency, flexibility, expansion) with agreeableness engineers engineering organization of Kermanshah showed a significant relationship. The results of the data analysis are presented in table 3; this hypothesis has been approved in ensuring the meaningful level %95, this mean that there is a significant correlation between creativity and agreeableness engineers. Fifth hypothesis of this study imply that the creativity (fluency, innovation, expansion) with conscientiousness engineers engineering organization of Kermanshah province there is a significant relationship. The results of the data analysis are presented in table 3; this hypothesis has been approved in ensuring the meaningful level %95. The positive and significant correlation between creativity and conscientiousness engineers there. Sixth hypothesis of this study imply that there is a significant relationship between creativity and mental health. According to the results of data analysis are presented in table 4, has confirmed the hypothesis at a significance level of %95 confidence, so, the correlation between creativity (four factors), and mental health component including (social functioning and depression) is significant. And the correlation between fluid and mental health component including (social functioning and depression) and correlation between flexibility and mental health components including (physical symptoms, anxiety and insomnia, social functioning and depression), and the correlation between innovation and expansion with mental health component including (social functioning) were significant. In this hypothesis, the correlation between the components of creativity (fluency, flexibility, innovation, expansion) with mental health component (somatic symptoms, anxiety and insomnia, depression) were negative, except for social functioning components. Thus, according to the results of data analysis, as well as on the results of the regression we can conclude that: based on the five personality factors and mental health can be predict creativity and best model to creativity predict is the neuroticism, extraversion, and flexibility.

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