International Review of Social Sciences and Humanities
Vol. 7, No. 1 (2014), pp. 16-25
www.irssh.com
ISSN 2248-9010 (Online), ISSN 2250-0715 (Print)

Comparison of Cognitive Intelligence and Creativity of Educated Men and Women Working in Government Offices in Behbahan

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(Received: 23-12-13 / Accepted: 8-2-14)

Abstract

The aim of this study was to compare cognitive intelligence and creativity of educated men and women working in government offices in Behbahan, Iran. The participants in the study were 200 randomly selected volunteers (100 males and 100 females) from educated individuals working offices in this city. The tools used in this study were Raven's advanced progressive Matrices test and Torrance's creativity questionnaire. The research design was a comparative type. In order to analyzing data, both descriptive statistics such as mean, standard deviation, minimum and maximum scores and inferential statistics such as multivariate analysis of variance (MANOVA) were used. Results of the multivariate analysis (MANOVA) indicated that there are no significant cognitive differences between educated men and women in terms of their intelligence ($F=1.27$, $P<0.260$); however, there was a significant difference between educated men and women in terms of creativity ($F=8.36$, $P<0.004$).In other words, the means of the two groups proved that educated men were more creative than educated women.

Keywords: Cognitive intelligence, Creativity.

Introduction

Terms like creativity, imagination, exploration, invention, and intelligence are frequently used in our daily language. However, the terms free imagination and creative imagination have been distinguished from each other since Kant (1922). Creative imagination has long been the topic of talents (Kafayat, 1373).

Torrance (1959) argues that self-conscious and unconscious images of the future are the major driving forces behind the gains in future. The positive images of the future are, in fact,

the powerful magnetic energies which make us move forward to the excitement, towards facilities, solutions and new achievements. In addition to being able to develop our imagination and create positive images of the future, we need to foster our creativity which it is inevitable in our life. So in today's complicated world, we witness very intense competitions of all communities to access the newest technologies and power sources. Consequently, only smart and creative people with new ideas will be of great value as the most valuable social asset (Kafayat, 1994).

Man has always been faced with different needs which have been his propelling force of his movement, effort, and behavior in a way first to recognize them and then to provide appropriate conditions and opportunities to enable him to meet those needs. This can help him to prevent not only his daily problems, but also his physical and mental disarrays on the one hand, and they cause him to flourish more and more, on the other.

Concerning children and young people, Torrance's (1998 and 1980) concluded that the basis of the personality of creative people is characterized as: independence of thought, fascination with the favorite activities, courage, honesty, curiosity, willingness to take risks, being irritated from repetitive tasks of thinking and addressing several issues at a time, looking beyond performing one's tasks, trying to do things in an unusual way, fast and accurate understanding of the relationship between the phenomena, being independent and being indifferent if he seems abnormal to others, being imaginative and flexible. As Davis, Patterson and Farley (1973) holds that a creative person is strongly interested in artistic and aesthetic activity, while s/he may not be an experienced and skilled creative artist or writer, and / or may not have an expertise in that field. Yet, we normally see that music or dramatic arts are very common among such people. (Baron (1968) found that creative people are not only highly aware of the current issues, but they are also interested in visual issues. They are finally initiative, ambitious, energetic, and bold, while non-creative ones are cohort, indifferent, nonchalant, having vague and blurred thoughts. Their destiny is, in fact, to be banal in personality.

There have always existed people among different societies who have revealed their special and prominent *c*apabilities which have been stimulating the curiosity of others and have followed both their suspicion and encouragement (Afrooz, 1992). This has led to several studies to be done on genius, creativity and intelligence. Many terms such as creativity, imagination, exploration, invention, intelligence, and the like are frequently used in our daily language. In order to recognize the term 'creativity', we can compare it with intelligence. Of course, risk-taking and hesitation will provoke creative thinking. While, creative thinkers have been characterized as being innovative, investigative, and adventurous, non-creative thinkers have been characterized as being cautious, conservative and methodologically-based. In fact, this sort of thinking fuses new issues with old ones and spreads the existing taxonomies regardless of any new categorization. Gtzls and Jackson (1962) write while one tends to learn the predetermined, the other one tends to revise the known things, to discover the unknown, and make what could exist. A typical person of the first process is basically someone who is essentially-disposed to be more conventional, but a typical person of the second type tends to go with innovations and thought-provoking event. One likes stability, but the other likes risk-taking. Gilford calls these two schools of thought convergent and divergent thinking; however, Rogers (1969) describes these two trends in thinking as defensive and acceptance. The non-creative thinking is mostly measured by IQ tests which necessitate, as a rule, the correct answer to a given question.

The application of IQ tests as a measure of convergent thinking is quite practical. But they have not been designed to call all aspects of mental ability. Of course, in recent years educators have recognized the limitations of such tests. Thurston (1938) and Gilford have been considered as the stimuli to such an assessment. However, in 1940 these limitations

were noted by Paul Mann (1940) in an article on "considerations in the education of gifted children" (as quoted from Drekson et al, 2000).

Astabrvk (2005), Frvdntalr (2007), Nyvbayr (2000) concluded in their researches that there is no difference between male and female in terms of their cognitive intelligences (as quoted from Veisi, 1390).

Veisi (1390) conducted a study on the comparison between male and female high school students in Behbahan, Iran, in terms of their cognitive intelligence. He found that there was no significant difference between male and female students in their cognitive intelligence.
Oujinejad (2006 quoted by Mahmoudi, 2011) in a study found that between the mean scores of girls and boys taught with modern teaching methods there was a significant difference in terms of their creativity.

Khanmohammadi (1386, quoted by Mahmoudi, 2011) in a research entitled as 'the relationship between self-disciplined learning strategies, motivational beliefs and creativity' found that there is no significant difference between male and female students in terms of creativity.

Noori (2007, quoted by Mahmoudi, 2011) found that there is no difference among boys and girls in the total scores of creativity and its components, separately. Indeed, Mahmoudi (2011) conducted a research at Payam-e-Noor University of Behbahan, Iran-entitled as the comparison of creativity in male and female students- found that there is a significant difference between male and female students in terms of their creativity; in a word, the creativity of males overweighed that of females.
In the present study, we attempted to compare cognitive intelligence and creativity of educated men and women employed in the public services to determine if there exists a significant difference between the educated males and females in their cognitive intelligence and creativity. Thus, the study tested the following hypotheses and research backgrounds.

1) There are not significant differences between the educated men and women working in government offices in terms of their cognitive intelligence.
2) There are not significant differences between the educated men and women working in government offices in terms of their creativity.

2-1) There are not significant differences between the educated men and women working in government offices in terms of their fluid component of creativity.
2-2) There are not significant differences between the educated men and women working in government offices in terms of their expansion component of creativity.
2-3) There are not significant differences between the educated men and women working in government offices in terms of their initiative component of creativity.
2-4) There are not significant differences between the educated men and women working in government offices in terms of their flexibility component of creativity.

Methodology

Participants

The participants participating in this study were 200 differently educated women and men who were randomly selected from all educated men and women, with varying academic degrees ranging from a minimum degree of BA or BS, to post-graduate ones, working in government offices in Behbahan, Iran, in 2012. The sample consisted of 200 women and men. Some characteristics of the sample are presented in Tables 1 and 2.

Table 1: Distribution of subjects according to gender

Gender	frequency	percentage	frequency
Female	100	50%	50
Male	100	50%	50
Total	200	100%	

As Table 1 shows, each male and female subject accounted equally for 50% of the sample though as you see in Table 2 the distribution of genders are variously distributed in terms of their education levels.

Table 2: Distribution of subjects according to educational degree

Education level	Group					
	Educated females		Educated males		Total of educated ones	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
AA. / AS.	18	18%	20	20%	38	19%
BA. / BS.	46	46%	55	55%	101	50.5%
MA./ MS.	14	14%	9	9%	23	11.5%
Ph.D.	22	22%	16	16%	38	19%
Total	100	100%	100	100%	200	100%

As Table 2 shows, the group of educated women with a BA degree accounted for the highest frequency (46%), while participants with post-graduate education showed the lowest frequency (14%). They were formed more of males rather than females. However, those BA holders accounted for the highest frequency (55%). As it is clearly shown in the table above, those with post-graduate education formed the lowest frequency (9%) of the sample.

Instruments

In this study, two scales, Raven's cognitive intelligence scale and creativity scale, formed the variables which were measured.

Raven's Cognitive Intelligence Scale

Progressive matrices are of non-verbal tests of general intelligence which were published by British psychologist 'Raven' (1938) and its revised form in 1956 which is now being used by psychologists. Raven's progressive matrices test which was designed shortly before the WWII and since that time it has been revised several times. The revised form is even now used to measure intelligence at all levels of ability (from 5 year-olds to excelled adult children). The questions raised in these matrices are all of one type, all models show pictures or diagrams which are categorized in terms of certain logic.

Participants must discover the logic on which the pattern of each question is based, and then choose the image as a possible choice under each pattern to fill in the bank in the stem. The items in the above-stated test are arranged from easy to difficult order. That is, the items at the final quarter of Raven's test are so difficult that only a few can answer them in the right time. The content of the Raven's test items is so subjective that requires inferential process of reasoning and logic to discover the principles governing relations between the components of the matrix models. Therefore, it mostly measures the current intelligence.

Raven matrices have been designed in such a way that they seem to all participants to be similar to each other. So having a better educational and social status does not influence answering the questions. Despite these, the verbal factors have been found to be effective in finding right answers to the questions because naming the shapes and patterns as well as verbal reasoning patterns together lead to exploring the relationships between components much easier. So far, it has not been proven that this test is completely independent of culture. However, researches have shown that the current intelligence plays a more fundamental role in answering the questions of this test. The components of Raven's test in different cultures are more appropriate than any other tests in which verbal and cultural factors play a role in its content. One major limitation of the Raven's test is that its questions do not have much variety. As a result, those who are more capable of answering questions related to specific factors (factor S Spearman) generally gain more benefits than those who are less of answering them. That is why Raven himself suggests that most of the verbal tests which mostly measure crystallized intelligence are better to be used along with his matrix. Cattell's test has largely overcome this problem. Because Cattell's disclosed culture with its four subtests of the test questions that follow each built on a separate logic and model (Sharifi, 1997).

Chappari (1995, quoted by Veisi, 2011) estimated the correlations between Raven's test scores and the grade point average obtained from the scores in mathematics, experimental sciences, and Persian literature. He found out that the coefficients were in the range of 0.51and 0.71 and the coefficients of each subject as stated above were 0.56 through 0.72.
The age groups were compared in terms of the partial means of different age groups. It was found that the scores were correlated with age. That is, with increasing age of the sample, their scores changed in a way that a significant difference was observed between the mean ages of 12 to 14 years; however, no significant difference was found between the mean ages of 15 and 18 years.

On the other hand, nearly 30 studies have been reported regarding the validity of the test, and these studies all have been conducted on subjects of different age groups. The test reliability has been estimated through different methods. The coefficients in all these studies have been reported completely satisfactory (Kooshki, 2001, quoted Veisi, 2011). Chappari (1995) conducted an experiment on 2561 students (1238 girls, 1323 boys) through split-half, retest and KR20 procedures; he estimated the coefficients for age groups of 12 to 18-years.

1. The coefficients of the split-half way of estimating reliability for groups of 12 to 18 years were 0.91, 0.91, 0.92, 0.90, 0.88, 0.89, and 0.88.
2. The coefficients of the test-retest way of estimating reliability with a time interval of 4 to 5 weeks for open trial verdict groups of 12 to 18 years were 0.91, 0.85, 0.93, 0.76, 0.85, 0.90, and 0.80.

In the present study, the reliability of the cognitive intelligence scale was calculated through Cronbach's Alpha and split-half way. The reliability indices for the two were 0.94 and 0.92, for the total scale, respectively. In effect, these indices of reliability generally reflect the values of the questionnaire are acceptable.

Torrance Creative Scale

The original test was translated by Dr. Mohammad Kafayat (2004) in the School of Education and Psychology at Shahid Chamran University, Iran. It had three sections or activities. The first activity of the test was called illustration in which the test-taker was required to bond the curve which was clear in color in a desired location on the white sheet of paper. While this location could be a starting point, the test-taker was required to draw a special picture depicting an exciting and interesting story to tell. Completion of the test images (the second activity) included ten pictures which were half finished or unfinished. In fact, test-takers had

to use them to complete the pictures. The third activity included 36 circles. Using them as a starting point, test-taker was required to draw multiple images. Instructions of this test activity emphasize more unusual ideas. In scoring such tests, instead of the artistic quality of images, the creative characteristics have to be considered.

Based on the research results reported in the test manual, the test reliability has been estimated to be between 0.80 and 0.90 (Abedi 1993).

The index of reliability for creativity scale was calculated, using Cronbach's Alpha and split-half technique. It was 0.65 and 0.73, respectively. The general reliability indices of mean of the total scales through the two ways were reported 0.65 and 0.73, respectively. These indices imply that the questionnaire coefficients estimated through the two ways were at an acceptable level (See Table 3).

Table 3: The reliability coefficients of questionnaire pertinent to Creativity scale

Method of reliability estimation		Micro-Scales
Split-half	Cronbach's Alpha	
0.73	0.65	Creativity
0.63	0.50	Indeterminacy
0.30	0.36	Development
0.50	0.25	Initiative
0.34	0.29	Flexibility

As data presented in Table 3 show, reliability coefficients for the creativity scale and its micro-scales fluctuated between 0.25 through 0.73.

Results and Analyses

Descriptive Results

The descriptive results of the current research included statistical indices such as mean, standard deviation, and minimum as well as maximum scores for all the variables under study shown in Table 4.

Table 4: Mean, Standard deviation, the minimum and maximum scores for cognitive intelligence, emotional intelligence, creativity of educated males and females

Variable / Sample	Statistical index	Mean	Std.	Minimum score	Maximum score	Number
Cognitive Intelligence	Educated Women	105.36	4.97	93	117	100
	Educated Men	104.58	4.78	93	120	100
	Mean	104.97	4.88	93	118.5	100
Creativity	Educated Women	112.93	9.03	93	152	100
	Educated Men	116.99	10.78	93	145	100

	Mean	114.96	10.13	93	148.5	100

As Table 4 shows that the statistical indices of mean and standard deviation for the variable of cognitive intelligence for educated women in each one of the groups was 105.36 and 4.97, respectively. However, the mean and standard deviation for the variable of cognitive intelligence for the educated men in each one of the groups was 104.58 and 4.78, respectively. This is while the statistical indices of mean and standard deviation for the total sample regarding the cognitive intelligence group were 104.97 and 4.88, respectively. Regarding creativity, the above-stated indices for educated women in each one of the groups were 112.93 and 9.03, respectively. However, the indices of mean and standard deviation for the educated men were 116.99 and 10.78, respectively. This is while those indices for the total sample regarding the creativity group were 114.96 and 10.13, respectively.

Results Relevant to Hypotheses

To put the research hypotheses to test, the collected data were analyzed using statistical test of multiple analyses of variance, MANOVA. The relevant results dealing with the research hypotheses are presented in Tables 5 through 8.

Table 5: Results of MANOVA test on the data concerning cognitive intelligence and creativity of the educated men and women across test types

Test type	amount	Df of hypotheses	Df of errors	F	Sig.
Pylayy test	0.048	3	196	3.30	0.021
Wilks Lambda test	0.952	3	196	3.30	0.021
Hotelling test	0.051	3	196	3.30	0.021
Largest root test	0.051	3	196	3.30	0.021

As can be seen in Table 5, the significant levels of all tests applied in the current research imply that there is a significant difference between educated men and women in terms of at least one of the two dependent variables, cognitive intelligence and creativity. In order to understand the above-stated difference in results between the groups, the relevant data are presented in Table 6.

Table 6: Results of IQ scores between subjects in terms of cognitive, emotional intelligences and creativity of educated men and women

Variables	Chi-Square	df	MS	F	Sig
Cognitive Intelligence	30.42	1	30.42	1.27	0.260
Creativity	827.95	1	827.95	8.36	0.04

As can be seen in Table 6, there is no significant difference between educated men and women in terms of their cognitive intelligence (P=0.260 and F=1.27). Therefore, the first null hypothesis cannot be rejected because the mean of the two groups of educated men and women show the same cognitive intelligence. However, there is a significant difference between educated men and women in terms of creativity (P=0.04 and F=8.36). Then, the second null hypothesis can be rejected. In other words, regarding the creativity variable, taking the average of the two groups (educated men and women) into account, the educated men showed more creativity than educated women.

Table 7: Results of multivariate analysis of variance (MANOVA) on components of creativity scores of educated men and women

Test type	Amount	Hyp. df	Error df	F	Sig
Pylayy test	0.091	4	195	4.88	0.001
Wilks Lambda test	0.909	4	195	4.88	0.001
Hotelling test	0.100	4	195	4.88	0.001
Largest root test	0.100	4	195	4.88	0.001

As can be seen in Table 7, the significance levels of all tests indicate that there is a significant difference between educated men and women in at least one of the dependent variables (components of creativity). In order to understand the above-stated difference, the results of such effects between the groups are shown in Table 8.

Table 8: Results of the ANOVA test on components scores between the educated men and women in terms of creativity

Group	Mean	Vari-ables	SS	df	MS	F	Sig
Females	41.45	fluid	414.08	1	414.08	19.44	0.0001
Males	44.32						
Females	20.51	Development	10.80	1	10.80	1.23	0.268
Males	20.97						
Females	30.04	Initiative	27.55	1	27.55	1.67	0.197
Males	30.78						
Females	20.93	Flexibility	33.36	1	33.36	3.43	0.065
Males	21.74						

As can be seen in Table 8, there is a significant difference between educated men and women in terms of fluid component of creativity. Therefore, the null hypothesis 2-1 is rejected. In other words, regarding the mean of the two groups, the average of the educated men was more in fluid component than that of the educated women. However, no significant difference was observed between educated men and women in terms of creativity in components of the expansion, innovation and flexibility. Therefore, the null hypotheses 2-2, 2-3 and 2-4 are not rejected. In other words, educated men and women are the same in such components as expansion, innovation and flexibility.

Conclusion

The results of this analysis showed that there is no significant difference between educated men and women in terms of cognitive intelligence (P=0.260 and F=1.27). Thus, the first null hypothesis cannot be rejected by the findings of this research. In other words, the mean of the two groups of educated men and women is nearly the same in terms of cognitive intelligence. In effect, the findings of the current study are consistent and coordinated with the findings of the researches conducted by Astabrok (2005), Frodentalr (2007), Neobayer (2000) and Veisi (2011) and it confirm their findings. The studies conducted yet to compare male and female intelligence have reached the conclusion that there is no difference between the sexes in terms of general intelligence. However, the results of these studies have shown that there are certain

differences in sexes in terms of some cognitive and motor abilities. For example, girls are better than boys in verbal fluency, reading and understanding, agile fingers and secretarial skills. On the other hand, in terms of mathematical reasoning, visual spatial ability, logical reasoning, speed, and coordination of large muscle movements, boys are preferred over girls. It seems that most of these differences in sexes are due to cultural factors and the methods of training male and female rather than hereditary and biological factors. As in most cultures, girls are expected to have more verbal and social skills. Jobs positions such as secretarial, nursing, and social services are assigned more to girls. On the other hand, it is expected that boys do better than girls in technical and mathematical problems, and men are seen mainly responsible for the technical and scientific jobs (Sharifi, 1997).

In explaining the results obtained in this study, it can be said that two parameters which play important roles in the quotient of intelligence are heredity and environment. That there is no difference between the two groups of men and women in terms of cognitive intelligence can be attributed to the cultural environment of such a city. We can draw conclusion that the environmental factors and stimuli have been similar for both educated male and female groups. In other words, the stimuli needed to reach the potential intelligence in this city, Behbahan, Iran, have been equally distributed among both educated male and female groups.
Of revealing findings of this study was the significant difference which was found between the educated men and women in terms of their creativity (P=0.004 and F=8.36). Therefore, the second null hypothesis is rejected. In other words, regarding the means of the two groups, the educated men proved to be more creative than the educated women. These findings are not only in line with and supportive of the findings of the studies conducted by Ojinejad (2006) and Mahmoudi (2011) but also confirm them. As seen in Table 8, between educated men and women, there was only a significant difference in the fluid component of creativity (P=0.0001 and F=19.44). Therefore, the null hypothesis 1-2 is also rejected. In other words, the means of the two groups showed that the educated men were more fluent than educated women.

But no significant difference was observed between the sexes in terms of the components of elaboration, originality and flexibility. Therefore, the results of this study cannot reject the null hypotheses 2-2, 3-2 and 4-2. In other words, educated men and women were found to be similar in terms of such components as expansion, innovation and flexibility. Notwithstanding, the findings of this study are inconsistent with the findings of the studies conducted by Noori (2007) and Khan (2007). The reason for this lack of correlation could be due to differences in the selected communities. Gray and Davis (1977) characterize creative people as follows:

1- Creative people have a lot of confidence and independence.
2- Creative people are not only aware of especially their tendencies towards atonal stuff but they are also aware of their own creativity.
3- Creative people have not only an extraordinary and unusual creative energy, and self-motivation but they also have a great adventure and curiosity.
4- Creative people are more flexible than others.
5- Sustainability: creativity requires sustainability because one must often be hard for a long time in obstacles.
6- Self-confidence: a creative person must confide in the value of his work.

Numerous studies have been conducted to date on personality characteristics that can make the trend of creativity fast or slow. Among the innovative features that will lead to greater efficiency in creativity, we can name the following properties as follows: interest in experimentation, independence, self-confidence, willingness to risk, sense of humor and wit, sensitivity, sense of security, personal courage, initiative, strength, flexibility, tendency to complex tasks, self-control, perseverance, express, tolerance for ambiguity, motivation (Shellcross translated by Javadian, 1999). As can be seen in the literature features such as

autonomy, self-confidence, flexibility, stability and fluid characteristics are required for creativity. In other words, if these features do not exist in creative people, no creativity will emerge from them.

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