

## **Assessing the Impact of Personality Characteristics on Students' Visual Perception for Landscapes**

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**Abstract:** *As landscape plays a crucial role in people's lives, it is of great importance that landscape is designed based on people's interest. Therefore, identification of the landscapes that people prefer and the factors that influence their perception are imperative. This research attempts to investigate the contribution of personality characteristics towards students' landscape perception in Isfahan, Iran. In this aspect, students' characteristics of extroversion/ introversion, intelligence, and creativity were measured by using Cattell's 16PF Questionnaire. Also, the respondents were asked to express their feeling of satisfaction and happiness towards six common landscape types of Iran, by rating 30 images of mountainous, urban, forest, desert, water, and farmland landscapes. The results of Pearson Correlation Coefficient indicated that extroverted students have a greater feeling for both mountainous and urban landscapes than introverts. Also, less creative students preferred mountainous, urban, and farmland landscapes. Moreover, perception for farmland landscape was negatively correlated with intelligence among students.*

**Keywords:** *Cattell's 16PF Questionnaire, visual perception survey, extroversion/introversion, intelligence, creativity, Iran*

**Abstrak:** Lanskap memainkan peran penting dalam kehidupan manusia, sehingga sangat penting untuk merancang lansekap berdasarkan minat orang. Oleh karenanya, proses identifikasi lanskap yang disukai orang dan faktor yang mempengaruhi persepsi mereka terhadap lanskap menjadi sangat penting. Penelitian ini mencoba untuk menyelidiki kontribusi karakteristik kepribadian siswa terhadap persepsi lansekap di Isfahan, Iran. Dalam aspek ini, karakteristik siswa yang meliputi ekstroversi / introversi, kecerdasan dan kreativitas diukur dengan menggunakan kuesioner Cattell's 16PF. Selain itu, responden diminta untuk mengungkapkan kepuasan dan kesenangan mereka terhadap enam tipe lanskap umum di Iran, dengan memberi peringkat terhadap 30 gambar pemandangan pegunungan, perkotaan, hutan, padang pasir, air dan lahan pertanian. Hasil uji korelasi koefisien Pearson menunjukkan bahwa siswa ekstrovert memiliki perasaan lebih besar terhadap lanskap pegunungan dan perkotaan daripada introvert. Selain itu, siswa yang kurang kreatif lebih memilih pemandangan pegunungan, perkotaan, dan lahan pertanian. Selain itu, persepsi terhadap lanskap lahan pertanian berkorelasi negatif dengan kecerdasan di kalangan siswa.

**Kata Kunci:** Kuesioner 16PF Cattell, Survei persepsi visual, Ekstroversi / introversi, kecerdasan, kreativitas, Iran

### **1. INTRODUCTION**

It is true that there is a deep relationship between human beings and landscape (Swanwick 2009). Indeed, it was stated that the quality of public open space and landscape design play an extremely

important role in an urban life (Helfand et al. 2005; Min 2011). This general agreement, that specific landscapes are instinctively favored, works as a supporter for landscape theory, and makes visual perception investigation an enormously significant

issue (Levy 2009). That is the reason of researchers' growing interest to discover why people like some landscapes better than others. Hence, widespread academic studies and investigations have been done in an effort to discover what factors lay behind people's perception and judgment for landscapes (Sevenant and Antrop 2006). However, according to Relph (1976) and Augé (1995), one of the main problems related to modern landscaping and urbanization is disregarding the close and sensitive connection between landscape and people's interest and feeling. Indeed, much criticism encompasses physical experience and visual characteristics of contemporary landscapes; but, there are very few analyses concerning the interests and perceptions of people living within those landscapes. Meanwhile, it is expected that in creation and development of landscapes, people's feeling and desire are taken into considerations which may result in satisfied and happy society. Therefore, gaining deep insight into how individuals perceive landscape and which landscape they prefer is considered important.

In this context, a great number of factors were studied that include demographic factors (e.g., gender, age, culture, education), environmental factors (e.g., living environment, environmental experience and familiarity), and emotional factors (e.g., aesthetics, well-being and health). However, literature towards people's innate disposition such as personality characteristics which can be the primary source of individuals' landscape perception, has far less been investigated and very limited research has been conducted in this setting.

In this view, Maciá (1979) studied five personality scales including control, extroversion, paranoia, sincerity, and amount of doubts among 226 respondents who were selected from university students of the arts in Spain. The results revealed that respondents with different personality characteristics distinctly show different patterns of perception. Based on his findings, extroverted students prefer humanized landscapes, and students who scored high in emotional control prefer pleasant landscapes.

However, previous research (e.g. Maciá 1979) just covers some of the characteristics of personality; while they are varied and large in number which require numerous examinations to study whole the characteristics in contribution of people's landscape perception.

In this context, Abello and Bernaldez (1986) examined the influence of three personality types, namely common traits, emotional stability, and responsibility on preference towards three landscape types of fertility, rhythms, and defoliation among Spanish university students (N=128). They found that people who are assorted less 'emotionally stable' prefer those landscapes with structural rhythms and recurrent patterns. According to their results, people who scored high in 'sense of responsibility' are not interested in hostile, defoliated, and wintery landscapes.

Considering the fact that most studies in the scope of landscape perception and personality have been conducted in European countries (e.g. Abello and Bernaldez 1986; Maciá 1979), much research into this issue is required to be conducted in Asian countries and cultures where the volume of related literature is still very low. More specifically, to date, no related investigation has been done in Iran.

During an investigation with the aim of studying the correlation between evaluative responses to roadside design and personality factors, Winkel et al. (1969) found personality characteristic as an influential factor on the choice of landscape among university students in Washington (N=80).

Nonetheless, another literature gap is that most previous research puts a great emphasis on examining adults and university students (e.g. Abello and Bernaldez 1986; Maciá 1979; Winkel et al. 1969). However, very few studies with a sample of school children and teenagers were carried out; while it was mentioned in cognitive development theory that children and teenagers have different perceptions and preferences from adults (Piaget 1964; Saif 1996).

Therefore, to bridge these gaps, the present study focuses on the influence of personality characteristics on landscape perception among Iranian high school students. In this regard, three characteristics including extroversion/ introversion, intelligence, and creativity were examined in this research. This is for the reason that the mentioned characteristics are all categorized as 'source traits' and 'common traits' by Cattell (Schultz and Schultz 1994). This means that they are stable, permanent traits and also known as the basic essential factors of personality and apparently, they have a true structural effect on personality. Furthermore, everyone possesses these traits to some extent (Aiken 2003; Engler 2003; Schultz and Schultz 1994). As a result, it seems that the sample population of this research can be broadened to a larger population with the same age in terms of personality characteristics and also the results of the current study will be inalterable and reliable. In addition, Eysenck (1965) believed that intelligence and extroversion are two figures to get the closest estimation of the person's genuine nature.

In terms of landscape perception, the present research focuses on six common landscape types of Iran, which are urban, forest, water, desert, farmland, and mountainous landscapes. In this context, Rajabi (2008) defined that landscape types of Iran refer to mountainous areas, urbanized areas, forests, desert plains, wetlands and water, and lastly farmlands and agricultures. Consequently, this study attempts to answer the following question:

Is there any link between extroversion/ introversion, intelligence, and creativity with landscape perception among high school students in Iran?

## 2. MATERIALS AND METHODS

The current investigation is a descriptive form of survey study. Quantitative method was used to collect data. In this study extroversion / introversion, intelligence, and creativity are perceived as the independent variables. Meanwhile, students' perception towards urban, forest, water, desert, farmland, and mountainous landscapes are also evaluated as the research dependent variables.

The study area of the present study is Isfahan city, Iran (Figure 1). Isfahan city, popularly known as 'half of the world', is the capital of Isfahan province located in the center of Iran. Among the states of Iran, Isfahan is situated in the center of the central plateau of the country. It covers a large area (6.57%) of Iran and is in an appropriate geographical location in terms of landscape diversity. The abundant rainfall in some parts and a considerable difference in altitude as well as the mountainous regions in the West, together with the extended desert plains in the East create variable weather conditions, which make Isfahan has diverse landscapes (Justice Ministry of Isfahan 2008; Majd 2007). The prominent feature of landscape diversity (including urban, forest, water, desert, farmland, and mountainous landscapes) in Isfahan distinguishes it from other provinces of Iran and encourages the researchers to choose this city as the study area.



Figure 1. Map of Isfahan city as the area of study

This research targets all high school students of Isfahan city as the study population. Based on the

census released in 2013 by the Education Department of Isfahan (2013), the total number of 72,217 students (including 38,268 girls and 33,949 boys) were studying at high school level in that year. According to Krejcie and Morgan's (1970) table of sample size, a total of 384 volunteer students (192 girls and 192 boys) with the mean age of 16.3 years were selected by using stratified random sampling technique to participate in this investigation. Through this technique, students from different parts of the city could take part in the study. Therefore, this study exploited the geographical breakdown of Isfahan which was done by the Education Department of Isfahan (2013). According to this department, there are six areas of Zone 1, Zone 2, Zone 3, Zone 4, Zone 5, and Zone 6 in Isfahan city (Figure 2).

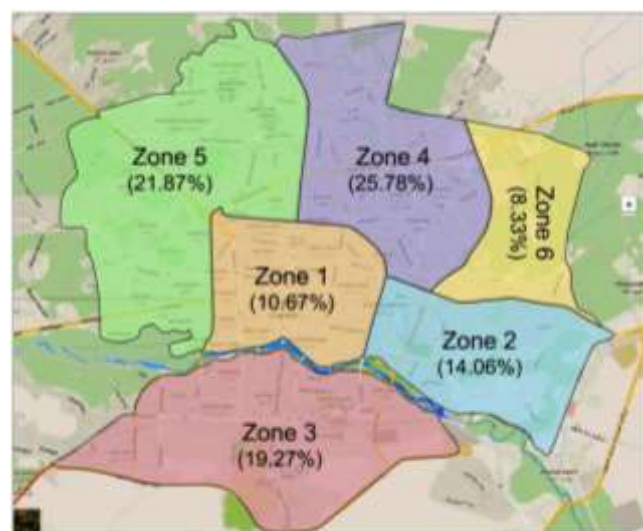


Figure 2. Educational breakdown of study area and percentage of sample taken from each zone

Consequently, the study samples were randomly taken from all these zones in order that the sample population could represent the bigger population. It is worth mentioning that in order to determine the number of included students from each area to the study, attention was paid to the ratios of the number of students in each zone and the number of students involved in the study (Table 1).

Table 1. Research Sampling Frame

Number of high school students	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Total
Girl students in the area	3580	5750	7360	9506	8718	3354	38268
Girl students involved in the study	18	29	37	47	44	17	192
Boy students in the area	4058	4446	6538	9152	7102	2653	33949
Boy students involved in the study	23	25	37	52	40	15	192

In the current research, two instruments were applied to collect data. Firstly, in order to identify respondents' personality characteristics, Sixteen Personality Factor Questionnaire Form C (16PF-C) developed by Cattell (1956) was applied. C Form of Cattell's questionnaire was found suitable to be applied in the present research for the sample of school students as this form is briefer and simpler than other forms. Thus, it helps reduce testing time. C form consists of 100 three-choice items, including roughly 6 items for each of the 16 primary factors that totally requires approximately 20 minutes for testing (Cattell 1956). Three desired characteristics of personality, namely extroversion/introversion, intelligence, and creativity were specified by using 10 primary scales of this questionnaire, including warmth, liveliness, social boldness, self-reliance, reasoning, dominance, sensitivity, abstractedness, privateness, and openness-to-change (Cattell and Mead 2008; Cattell and Schuerger 2003; Fathi-Ashtiani and Dastani 2012). Finally, to examine respondents' landscape preference, visual perception survey was conducted. A series of 30 color slides of six different landscape types (five images for each type) of Iran, including urban, forest, water, desert, farmland, and mountainous landscapes were presented to the students by projecting the photos onto a screen (Appendix 1).

The respondents were asked to rank the images based on their feeling of satisfaction and happiness towards the pictures of landscapes on a 7-point Likert scale. On this scale, point 1 represented the 'least preference and satisfaction' and point 7 represented the 'most preference and satisfaction' towards landscapes. The reliability coefficient of the instrument was examined by using Cronbach's alpha, which

showed that the visual perception survey is averagely 0.84 reliable.

### 3. RESULTS AND DISCUSSION

Before testing the research question, the minimum and maximum values of the variables were tested to be assured no typing error occurred during data entering (Table 2). The value of extroversion/ introversion ranges from -1.2 to 12.3; intelligence value ranges from 1 to 9, and the value of creativity ranges from -5.7 to 16.5. Landscape preference value also ranges from 1 to 7. The results of Table 2 indicate that the lowest and the highest amounts of studied variables are not more or less than the mentioned ranges in related questionnaires. Consequently, no typing mistake occurred.

To measure the distribution of sample in each variable, the values of skewness and kurtosis come into consideration. According to Table 2, except for forest and water landscapes, the skewness values of all the variables are ranged between -1.0 to +1.0 which represents an excellent symmetrical distribution of the data. Though, a skewness value between -3.0 to +3.0 is also acceptable (Kline, 2009). This shows that distributions of forest and water landscapes are also considered as normal shapes.

Measuring of kurtosis, on the other hand, shows that except for forest and water landscapes, the values of all the variables are ranged between -1.0 to +1.0 which indicates an excellent symmetrical distribution of the data. However, a kurtosis value under 10 is also acceptable (Kline, 2009). This specifies that distributions of forest and water landscapes are also considered as normal shapes.

Table 2. Central tendency, dispersion, and distribution indicators of research independent and dependent variables

	Variable	Extroversion /Introversion	Intelligence	Creativity	Mountainous	Urban	Forest	Desert	Water	Farmland
Central tendency	Mean	6.70	3.75	4.27	4.55	4.21	6.29	4.25	6.25	5.18
	Median	6.90	4	4.20	4.60	4.20	6.60	4.20	6.40	5.40
	Mode	7.5	4	3.50	4.8	3.8	7	5.4	7	5.18
Dispersion	Std. Deviation	2.55	1.98	2.15	1.15	1.15	.81	1.42	.83	1.17
	Variance	6.52	3.95	4.65	1.34	1.34	.66	2.03	.70	1.37
	Range	13.1	8	12	5.4	6	5.8	6	6	5.4
	Minimum	-.8	1	-1.5	1.6	1	1.2	1	1	1.6
	Maximum	12.3	9	10.5	7	7	7	7	7	7
Distribution	Skewness	-.38	.35	.16	-.07	-.37	-2.21	-.14	-2.48	-.58
	Kurtosis	-.09	-.41	.01	-.45	-.03	7.57	-.71	9.73	-.13
	Percentiles (25)	5.10	2	2.82	3.60	3.45	6	3.25	6	4.40
	Percentiles (75)	8.50	5	5.70	5.40	5	6.80	5.40	6.80	6

The important conclusions of Table 2 are as follows:

- Mode index with the larger value than median, and median index with the larger value than mean reveal that extroversion/introversion variable is unequally distributed. This variable is in a domain of maximum to minimum values which demonstrates that respondents are distributed in a range from the smallest to the largest values of the related variable. Negative value of skewness (caused by larger value of mode index than median and mean) and negative value of kurtosis indicate that the distribution is somewhat flat. This implies that there is a high distribution in the responses.

- Regarding intelligence variable, the smaller value of mean index than mode and median shows an unbalanced distribution. The values of this variable range from minimum to maximum scores. Positive value of skewness reveals that most of respondents obtained lower scores than average. Negative value of kurtosis illustrates that the distribution is relatively even. This implies that there is a high distribution in the responses.

- The higher value of mean of creativity in comparison with median and the higher value of median than mode show that the distribution of creativity is positively skewed. This means that most of the scores are accumulated at the left side of mean (lower scores). The values of this variable range from minimum to maximum scores. Positive and near to zero value of kurtosis of creativity shows a slightly raised shape of the distribution. This implies that the responses are accumulated in some data points.

- Respecting the research dependent variables, as Table 2 displays, forest landscape possesses the highest value of mean; meanwhile, urban landscape has the lowest value among the students. This shows that most of the respondents gave high scores to forest landscape, while urban landscape mostly received low scores. The respondents' scores to landscape preference range in a domain of minimum to maximum. All the landscapes have negative skewnesses. This means that most of the respondents' scores are more than the average. Forest and water landscapes have positive kurtoses (slightly raised shapes of distribution); meanwhile, the rest of landscapes have negative kurtoses (somewhat flat shapes of distribution). This implies that except for forest and water landscapes, the distributions of responses to landscape preference are high.

For descriptive part, the normality test was also conducted. The normal Quantile-Quantile (Q-Q) plot was applied to examine the normality of research independent variables. Q-Q plot checks whether the assumed set of data follows a normal distribution. In this plot, the observed value for each score should be plotted against the expected value from the normal distribution (Heiberger & Holland, 2004). The outcome showed that the values are laid around the reference lines and reasonable straight lines are made. This means that research independent variables

(extroversion/ introversion, intelligence, and creativity) are normally distributed (Appendix 2).

### 3.1. Result 1

This part focuses on the examination of significant relationship between personality characteristics (extroversion/ introversion, intelligence, and creativity) and landscape preference among high school students in Isfahan, Iran. Pearson's Correlation Coefficient was utilized to study this relationship. Table 3 reports the related estimations.

Table 3. Pearson's Correlation Coefficient estimations of links between personality characteristics and landscape preference

		Extroversion/ Introversion	Intelli gence	Creati vity
Landscape Preference	Pearson Correlation	.135**	-.060	-.144**
	Sig (2- tailed)	.008	.242	.005
	N	384	384	384

\*\* Correlation is Significant at the 0.01 level (2-tailed)

According to Table 3, there is not any significant correlation between intelligence variable and landscape preference in the research sample ( $p > 0.05$ ). However, as Table 3 and Figure 3 show, there is a significant correlation between extroversion/introversion and landscape preference among the students,  $r = 0.135$  ( $p < 0.01$ ).

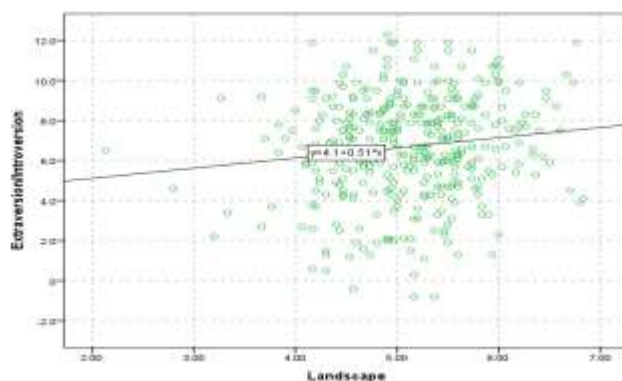


Figure 3. Scatterplot of relationship between extroversion/ introversion and landscape preference

In other words, extroverted students preferred landscapes more than introverted students. Although the correlation between these two variables is weak (Field, 2009), the correlation between extroversion/introversion and landscape preference is meaningful.

With regards to Table 3 and Figure 4, there is a significant negative relationship between creativity variable and landscape preference among the students,  $r = -0.144$  ( $p < 0.01$ ). This means that more creative students revealed less preference towards landscape. Although the correlation between these two variables is weak, the relationship between creativity and landscape preference is meaningful.



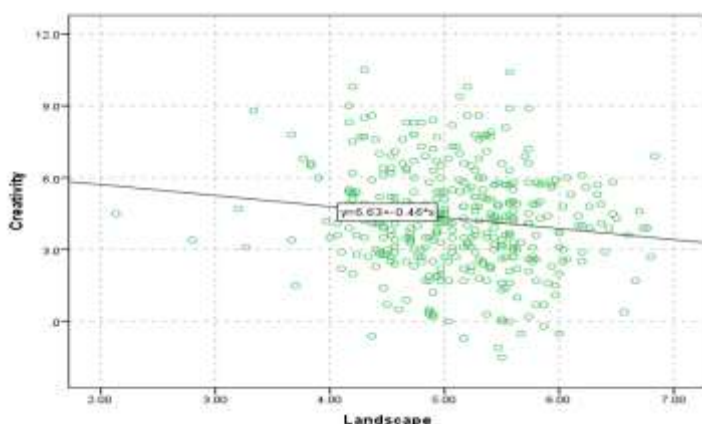


Figure 4. Scatterplot of relationship between creativity and landscape preference

### 3.2. Result 2

This part focuses on the examination of significant relationship between personality characteristics

(extroversion/ introversion, intelligence, and creativity) and students' satisfactory feelings and preference towards mountainous, urban, forest, desert, water, and farmland landscapes by applying Pearson's Correlation Coefficient (Table 4). Based on the results, there is no significant correlation between extroversion/introversion and perception towards forest, desert, water, and farmland landscapes in the sample of the study ( $p > 0.05$ ). However, a significant weak correlation was found between extroversion/introversion and perception of mountainous landscape among the students,  $r = 0.154$  ( $p < 0.01$ ). It shows that extroverts were more satisfied with viewing mountainous landscape in comparison with introverted students. Moreover, a significant weak correlation was found between extroversion/introversion and perception of urban landscape among the students,  $r = 0.118$  ( $p < 0.05$ ). This means that extroverted students perceived and preferred urban landscape more than introverted students.

**Table 4.** Relationship of extroversion/introversion, intelligence, and creativity with landscape perception

Correlations		Mountainous	Urban	Forest	Desert	Water	Farmland
Extroversion/ Introversion	Pearson Correlation	.154**	.118*	.043	.027	.096	.067
	Sig (2- tailed)	.003	.021	.401	.601	.060	.187
	N	384	384	384	384	384	384
Intelligence	Pearson Correlation	.009	-.065	.015	-.005	-.076	-.103*
	Sig (2- tailed)	.866	.203	.765	.929	.138	.044
	N	384	384	384	384	384	384
Creativity	Pearson Correlation	-.189**	-.126*	-.013	-.013	-.064	-.119*
	Sig (2- tailed)	.000	.014	.804	.792	.208	.020
	N	384	384	384	384	384	384

\*\* . Correlation is Significant at the 0.01 level (2-tailed)

\* . Correlation is Significant at the 0.05 level (2-tailed)

One possible explanation for this finding is as regards, extroverted people are adventurous, group-dependent, and they look for much excitement than introverts, mountainous landscape may remind them of mountain climbing which is mostly a group sport and full of excitement. Then, it would be expected that extroverts perceive and prefer mountainous landscape more than introverts. In support of the mentioned explanation, Egan and Stelmack (2003) also found that mountain climbers acquire higher scores in extroversion.

Moreover, based on the results of this research, unlike introverts, extroverted students revealed more satisfaction for urban landscape. This result can be explained by the fact that extroverted people are more sociable, outgoing, and prefer to talk to others. These features make them to be more in deal with city areas and urban landscapes in comparison with introverts. By contrast, introverted individuals are more reserved, aloof, and not interested in people. Then urban

environments to introverts may be equal to being in society and communication with others which is against their interests. As a result, it was expected that extroverts disclose more satisfaction for urban landscapes than introverts. This finding is also in line with the result proposed by Maciá (1979). He measured a number of personality factors, including extroversion, and found that the participants with high scores in extroversion factor have a greater preference for humanized or manmade landscapes.

The results also demonstrated that there is no significant relationship between intelligence and perception towards mountainous, urban, forest, desert, and water landscapes in the research sample ( $p > 0.05$ ). However, a significant negative correlation was found between intelligence and perception of farmland landscape among the students,  $r = -0.103$  ( $p < 0.05$ ). This reveals that less intelligent students were more satisfied with farmland landscape.

Additionally, the findings revealed that there is no significant correlation between creativity and perception towards forest, desert, and water landscapes in the research sample ( $p > 0.05$ ). However, a significant negative relationship was found between creativity and perception of mountainous landscape among the students,  $r = -0.189$  ( $p < 0.01$ ). This shows that as creativity grew among students, mountainous landscape was preferred less to them. Furthermore, there was a significant negative correlation between creativity and perception of urban landscape among the students,  $r = -0.126$  ( $p < 0.05$ ). This shows that less creative students had a greater satisfaction towards urban landscape. It was also found that creativity and students' perception of farmland landscape is significantly correlated,  $r = -0.119$  ( $p < 0.05$ ). In other words, farmland landscapes carried more creative students to a less satisfactory feeling.

Although no literature was found to directly examine the relationship between landscape preference with intelligence and creativity; however, there are some implications which indirectly support the findings of the current study. It was initially shown that preferences for mountainous and urban landscapes are negatively correlated with introversion. Therefore, it could be expected that creative people who mostly have introverted orientation may not be in favor of these two landscapes as well. In line with this outcome of the research, the results of an experiment conducted by Maciá (1979) revealed that respondents with sensitive personality also expose more preference towards natural landscapes. Sensitivity is a primary scale of creativity, it can therefore be concluded that manmade landscape which is in contrast with natural landscape, is possibly more favorable to those who are less creative.

The results of the current study also showed that less intelligent students are more satisfied with farmland landscape. One probable reason for this finding might be that farmland landscape which is very open, simple, plain, not complicated, and less-detailed can be preferable to less intelligent people whose characteristics are more compatible with this type of landscape. This explanation also supports the reason why perception and preference towards farmland landscape which negatively correlates with intelligence, is also a favorite type to less creative students. In fact, this finding might be due to the positive relationship between creativity and intelligence (e.g. Kim et al. 2010; Reddy and Jyothi 2005; Sternberg and O'Hara 1999). This result is also supported by Bergum and Cooper (1977), who believed that preference for agriculture landscape is negatively correlated with creativity.

#### 4. CONCLUSION

The outcomes of the present research highlighted the importance of students' personality characteristics in choosing their favorite landscape type. It was

revealed that extroversion has a positive correlation with perception of mountainous and urban landscapes. Moreover, less intelligent students showed more satisfaction for farmland landscape. This was also found that creativity is negatively correlated with perception of mountainous, urban, and farmland landscapes among students.

Therefore, it is recommended that by exploiting the findings of this study, with the aim of providing satisfactory favorable environments for students, designers and landscape architects innovatively design and build the landscapes to be in accordance with students' preferences.

It is worth mentioning that among the tested variables creativity considered as the strongest contributor in students' landscape perception. Meanwhile, intelligence revealed a slight influence on the respondents' choice of landscape.

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## APPENDIX 1

Six different landscape types of Iran including urban (heritage and modernity), forest (natural and planted), water, desert, farmland, and mountainous landscapes



Urban heritage landscape of Isfahan  
(<http://www.cityimg.persianguig.com>)





Urban modernity landscape of Isfahan  
(<http://www.travelist.biz>)



Desert landscape of Isfahan (<http://www.wikimapia.org>)



Natural forest landscape of Isfahan (Alizadeh, 2013)



Farmland landscape of Isfahan  
(<http://www.kermanfarda.com>)



Planted forest landscape of Isfahan



Mountainous landscape of Isfahan  
(<http://www.fereydanna.ir>)



Water landscape of Isfahan  
(<http://www.zfisher.blogspot.com>)

## APPENDIX 2

Normal Q-Q plots of research independent variables  
extroversion/introversion, intelligence, and creativity)

