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IS OPENNESS TO EXPERIENCE AN INDEPENDENT PERSONALITY  
DIMENSION? CONVERGENT AND DISCRIMINANT VALIDITY OF THE  
OPENNESS DOMAIN AND ITS NEO-PI-R FACETS.

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**Summary:** The Openness to Experience personality dimension has been challenged by the lack of independence from other personality constructs. In order to test whether Openness is an independent trait, the following psychometric tests were applied to a sample of 1006 non-psychologist university students: NEO-PI-R, EPQ-RS, ZKPQ-III-R, and SSS-V. Results suggest that most of the Openness variance remains to be explained. Therefore, this domain can be considered independent within the personality area, although Extroversion and, above all, Sensation Seeking presented significant relationships with the Openness scales. Each NEO-PI-R Openness facets show a different pattern of relationships with other personality constructs proposed by the Five-Factor, Eysenck's, and Zuckerman's theories. Those relationships are discussed.

**Keywords:** Openness to Experience, Fantasy, Aesthetics, Feelings, Actions, Ideas, Values, NEO-PI-R, EPQ-RS, ZKPQ-III-R, SSS-V.

## INTRODUCTION

One of the challenges to the Five Factor model (FFM) has been the nature, independence, and validity of the Openness to Experience (or simply Openness) dimension as proposed by Costa and McCrae. They refer to it as "...receptiveness to new ideas, approaches, and experiences" (McCrae, & Costa, 1990; p. 41-42), and it involves the tendency to fantasize, sensitivity to art and beauty, awareness of one's emotions, preference for novelty, intellectual curiosity, and a tendency to be liberal in values (Costa & McCrae, 1992b). They defended that this factor agreed with a fifth factor (named Culture) derived previously by other theorists of the FFM (Norman; 1963; Tupes & Christal, 1961/1992). Also, this factor would be similar to Goldberg's "Intellect" factor (Goldberg, 1992). The "Intellect" factor is measured by adjectives like curious, creative, cultured, and intellectual. However, this view is strongly linked to the more cognitive forms of Openness, and other aspects of the construct as aesthetics, search for novelty, or liberal thoughts are not considered (Costa & McCrae, 1992a).

On the other hand, Openness is not considered as a basic dimension of the human personality by other personality models. Thus, Zuckerman's "Alternative Five" model (Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993) does not include a dimension matching the Openness concept, although the Impulsive-Unsocialized Sensation Seeking factor would cover it to some extent, especially in regard to the search for varied and exciting experiences (Aluja, García, & García, 2003; Zuckerman, 1994). Eysenck also rejected the nature of the Openness factor as a basic dimension of the human personality (Eysenck, 1992).

Although the FFM supposes independent (i.e. non-correlated) factors, correlations around 0.4 are usually found between Openness and Extroversion (Aluja et al., 2003; Costa & McCrae, 1992b). In this sense, when both dimensions were factor-analyzed altogether, they grouped on the same dimension in a three-factor solution (Aluja, García, García, 2002, 2004; Zuckerman et al., 1993), but when five factors were explicitly requested, Openness measures loaded on a separate factor (Aluja et al., 2002; 2004; Zuckerman et al., 1993).

Openness has been related to the Psychoticism and Sensation Seeking constructs. With respect to Psychoticism, Openness was hypothesized as the opposite end of a continuum to Psychoticism (Eysenck & Eysenck, 1985), a definition rejected by McCrae and Costa (1985) due to the low correlation (0.05) between both dimensions (-0.06 in McCrae's study, 1987). In any case, if Eysenck's hypothesis is correct, a non-linear relationship between Openness and Psychoticism should be found. Considering Sensation Seeking, it would not be surprising to find strong correlations with Sensation Seeking scales, since both concepts are defined by the need of novelty sensations and the search for exciting and unusual activities (Costa & McCrae, 1992b; Zuckerman, 1979).

The aim of the present paper is to investigate the independence of the Openness dimension from Costa & McCrae's Five Factor, Eysenck's PEN, and Zuckerman's Alternative Five personality models. It is intended to explore the convergent and discriminant validity of the Openness domain and its NEO-PI-R facets. As far as we know, this issue has not been explored yet. Aluja et al. (2003) only reported relationships between Sensation Seeking, Extraversion, and Openness. Thus, the present paper goes beyond the scope of Aluja et al. (2003), including other personality scales and using different statistical approaches.

## **MATERIALS AND METHOD**

### *Subjects*

Participants were 1,006 undergraduate non-psychologist students (367 males and 639 females) enrolled in different fields: Law, Medicine, Pedagogy, and Physical Education. The average age was 22.25 (S.D.: 4.98; range: 17-52). The questionnaires were administered in the respective classrooms. As participation was voluntary, an individual personality profile was offered to each subject in order to empower motivation.

## Measures

Spanish versions of the following questionnaires were used in this study: the NEO Personality Inventory Revised, form S (NEO-PI-R); the short version of the Eysenck Personality Questionnaire-Revised (EPQ-RS), the Zuckerman-Kuhlman Personality Questionnaire (ZKPQ-III-R), and the Sensation Seeking Scale, form V (SSS-V).

The NEO-PI-R has 240 items and measures the Big-Five personality factors: Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. A Spanish translation with good psychometric properties and appropriate factor structure was used (Aluja et al. 2002). Alpha reliabilities were 0.84 for the Openness domain. NEO-PI-R facets reached the following reliabilities in the present sample (in parentheses): O1-Fantasy (.78), O2-Aesthetics (.72), O3-Feelings (.53), O4-Actions (.41), O5-Ideas (.79), and O6-Values (.38). The coefficients were similar to those found in American samples (Costa & McCrae, 1992b). We also administered the Spanish 48-item short version of the Eysenck Personality Questionnaire Revised (EPQ-RS; Eysenck & Eysenck, 1997). Each of the four scales is integrated by 12 items, EPQ-E: Extraversion; EPQ-N: Neuroticism; EPQ-P: Psychoticism, and EPQ-L: Lie. The Lie scale was not included in further analyses. In order to incorporate Zuckerman's personality dimensions, the Spanish version of the ZKPQ-III-R (Romero, Luengo, Gómez-Fraguela, & Sobral, 2002) was applied in the current study. It contains 99 items and measures the following personality dimensions: Impulsive-Unsocialized Sensation Seeking (*ImpSS*), Neuroticism-Anxiety (*N-Anx*), Aggression-Hostility (*Agg-Hos*), Activity (*Act*), and Sociability (*Sy*). The ZKPQ-III-R includes a sixth scale, Infrequency (*Inf*) that has not been analyzed in the present study. Only 5% of the subjects scored higher than 4 on the *Inf* scale. Finally, the Spanish version of the Sensation Seeking Scale-Form V (Pérez & Torrubia, 1986) was administered as well. This test has 40 items and includes the total Sensation Seeking score and four facets: Thrill and Adventure Seeking (*TAS*), Experience Seeking (*ES*), Disinhibition (*Dis*), and Boredom Susceptibility (*BS*). Additional information about descriptives and reliabilities of the personality scales is available at Aluja, García, and García (2004).

### *Analysis*

Two kinds of analyses were carried out. The first one was a linear regression (stepwise method) taking the global score of the NEO-PI-R Openness and, successively, the six facets as dependent variables. In a first phase, global personality domains (NEO-N, NEO-E, NEO-A, NEO-C, EPQ-N, EPQ-E, EPQ-P, ImpSS, N-Anx, Ang-Hos, Sy, Act, and SSS) were included as independent variables. Further, facets from the NEO-PI-R (excluding those of Openness), and the SSS-V (TAS, ES, Dis, and BS) replaced them as independent variables. The regression models based on the facets allow us for a more fine-grained view of the relationships among Openness and the personality domains. This analysis also reveals the importance of other scales when the Extroversion and Sensation Seeking domains were taken into account.

The second kind of analysis was intended to explore non-linear relationships, with special emphasis on cases of curvilinearity, with the middle group either highest or lowest. Concretely, the question which levels of the Openness continuum are more related to the personality constructs is analyzed. In this way subjects were split into three groups according to their scores on the Openness dimension and facets. Divisions were made taking half a standard deviation below and above the mean as cut-off scores. The three groups were coded as follows: Low group = 1; Medium group = 2; and High group = 3. Then, univariate ANOVAs were conducted for Openness and separately for every facet, including all personality variables (domains and facets) as dependent variables. Finally, significant differences between every pair of groups were tested by the Tukey's post-hoc statistical test.

## **RESULTS**

Results of the regression analyses are given in table 1. Standardized coefficients of every variable introduced in the final model as well as the R and the adjusted R<sup>2</sup> of such a model are reported. Note that personality scales analyzed did not account for a great amount of variance. In fact, only the original Openness, when predicted from facets, and O3-Feelings reached an adjusted

$R^2$  equal or higher than 0.3. In detail, NEO-E was the scale most clearly related to Openness and its facets, except for O4-Actions and O6-Values. SSS also reached high-standardized coefficients, especially for O4-Actions. Note that the Sy scale of the ZKPQ-III-R usually had a high negative Beta. Regarding the NEO-PI-R and the SSS-V facets, ES usually yields the highest coefficient. It should be remarked that other facets were included in the final regression models, although with less importance. As the size of the standardized beta coefficients depends on the correlations between the independent variables considered in the regression equation, zero-order correlations would be helpful. Table 2 shows the zero-order correlations between Openness scales and all independent variables. In general, correlations reproduced the patterns found in the regression analyses.

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These results suggest that Openness is an independent construct not well explained by other personality concepts included in the NEO-PI-R, EPQ-R, ZKPQ-III-R, and SSS-V. Besides, Extraversion and, above all, Sensation Seeking were the most relevant constructs. This statement was corroborated when SSS and ES were removed. In this case, ImpSS and E5 largely increased their importance. The fact that E5 was the Extraversion facet most strongly related to Openness suggests that the Sensation Seeking component of Extraversion is mainly responsible for the relationship between both personality dimensions. This statement is supported by the negative relationship between Sociability, as measured by the ZKPQ-III-R, and Openness. Low reliabilities could raise doubts about these results, nevertheless, the Openness dimension presents a high alpha, and the adjusted  $R^2$  is very similar in all facets irrespective of the reliability coefficients (low for O3-Feelings, O4-Actions, and O6-Values).

Results of the ANOVA are presented in table 3. The number of subjects was 320, 378, and 308 for groups 1, 2, and 3, respectively. As expected, Extraversion and Sensation Seeking scores usually increased as Openness scores did. Neuroticism scales had a trend to being positively related

to O3-Feelings and negatively to O6-Values. A1, A3, and A6 facets were directly related to Openness groups, but subjects classified on group 3 scored lower on A2, A4, and A5. Finally, Conscientiousness facets scarcely differ according to Openness levels. An exception was O1-Fantasy. High scores on this facet were linked to lower scores on the Conscientiousness facets.

**PLEASE INSERT TABLE 3 ABOUT HERE**

A curvilinear relationship appeared only twice (E2 for O2-Aesthetics, and N-Anx for O4-Actions). This proportion, 2 out of 246 tests, is clearly within the bounds of chance. However, as a reviewer suggested, this result could be due to the extremely low statistical power, as two significant differences are required to prove a curvilinear relation. So, a new analysis was conducted in order to explore non-linear tendencies. A regression analysis with Openness and Openness-square as the predictor variables (and, successively, the six facets) and each personality scale as the dependent variable was carried out. The  $R^2$  was not significant for the majority of the personality scales, and when the beta coefficient for the quadratic term of the equation was significant, the percentage of variance accounted for by the equation was negligible, with the exceptions of E1 (8%), E4 (14%), and E5 (15%) predicted by the Openness domain (E1), and O3-Feelings (E4 and E5). It should be remarked that the  $R^2$  was generally not significant for the Extraversion (NEO-E and EPQ-E) and the Sensation Seeking (ImpSS, SSS, E5, Tas, ES, Dis, BS) scales. So, those analyses support the absence of non-linear relationships.

Note that group 3 had a larger EPQ-P mean than the other two groups. High scores on Psychoticism could be linked to high scores on Openness. Besides, this pattern was also observed for O1-Fantasy, O3-Feelings, and O4-Actions. The absence of average differences between groups 1 and 2 can explain the negligible correlations found in other studies. Eysenck and Eysenck (1985) argued that both concepts would be the opposite poles of the same dimension. Our results suggest that both dimensions would be located on the same pole. Although small in size, the significant and positive correlations between Psychoticism and Openness (0.141;  $p < .001$ ) and with three facets

(O1: 0.226; O3: 0.127, and O4: 0.135;  $p < .001$ ) support this view. Moreover, the fact that both dimensions are related with creativity (Eysenck & Eysenck, 1985; McCrae, 1987), and that the F value associated with O1-Fantasy was the highest one for the EPQ-P suppose additional evidence in favour of this view.

## DISCUSSION

Openness to Experience is independent from the main personality constructs. Only Extraversion and Sensation Seeking were consistently related to Openness. The fact that the ES scale of the SSS-V was usually the best predictor reinforces that Openness has aspects of "*seeking of novel sensations...and social nonconformity*" (Zuckerman, 1994; p. 31). But no other conceptual characteristics linked to the remaining personality variables analyzed seem to be related to the Openness construct.

Regarding Openness facets, Extraversion and Sensation seeking played the main roles again. However, each facet presents particular relationships. Thus, high scores on O1-Fantasy were linked to high impulsivity, Psychoticism, hostility, and low agreeableness and conscientiousness. So, having a creative and vivid imagination seems to involve an antisocial tendency as well. On the contrary, O2-Aesthetics is positively related to some Agreeableness facets, especially with A6-Tendermindedness. It points out that sensitivity to art and beauty, and feelings of sympathy for others can be associated. Differences on the O3-Feelings groups draw a curious picture: High scores on Neuroticism, Psychoticism, Agg-Hos, A3, and A6, and low scores on A2, A5, and, above all, A4. It could be possible that experiencing one's own feelings contributes to experiencing anxiety, mood changes, and hostility, compared to a calm, cordial, and sincere person. O4-Actions was linked to impulsivity (Sensation Seeking) and low depression and social anxiety. O5-Ideas presented the same pattern of relationships with the Agreeableness facets as the Openness domain. Finally, O6-Values was strongly linked to differences on Neuroticism, anxiety, and, in general, on

all NEO-PI-R Neuroticism facets. So, people with liberal values seem to be less neurotic and anxious compared to conservative people.

Only personality variables have been analyzed in the present study. But, beyond the personality domain, another challenge to the independence of Openness is based on its relationships with intelligence. Thus, Openness has been linked to areas typically covered by cognitive abilities as knowledge achievement or creative thinking (McCrae, 1987). From this view, individual differences on Openness would be strongly related to intelligence. Nevertheless, correlations between Openness and cognitive measures were usually lower than 0.4. (Costa, & McCrae, 1992a). Moreover, correlations seem to be larger with crystallized than with fluid intelligence (Ashton, Lee, Vernon, & Jang, 2000; Goff, & Ackerman, 1992). This fact suggests that Openness is related to the specific investment of fluid intelligence (Cattell, 1987), although the causal direction between Openness and crystallized intelligence remains unclear.

Summing up, the Openness dimension and its facets are quite independent from other personality concepts, although consistent relationships with the Extraversion and Sensation Seeking constructs were replicated in the present study (Aluja et al., 2003). Each Openness NEO-PI-R facet presents a specific pattern of relationships. Therefore, it is expected that Openness facets will have a different predictive utility according to the work setting and target.

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Table 1. Standardized regression coefficients (B) of the variables included in the final regression models <sup>(a, b)</sup>.

PERSONALITY DOMAINS AS INDEPENDENT VARIABLES													
OPENNESS		O1-Fantasy		O2-Aesthetics		O3-Feelings		O4-Actions		O5-Ideas		O6-Values	
R = .490		R = .449		R = .350		R = .552		R = .371		R = .384		R = .266	
Adjusted R <sup>2</sup> = .235		Adjusted R <sup>2</sup> = .196		Adjusted R <sup>2</sup> = .115		Adjusted R <sup>2</sup> = .3		Adjusted R <sup>2</sup> = .133		Adjusted R <sup>2</sup> = .117		Adjusted R <sup>2</sup> = .068	
Variables	B	Variables	B	Variables	B	Variables	B	Variables	B	Variables	B	Variables	B
SSS	.282	ImpSS	.094	NEO-E	.262	NEO-E	.480	SSS	.228	SSS	.208	N-Anx	-.191
NEO-E	.425	Act	-.172	NEO-N	.194	EPQ-N	.120	EPQ-E	.163	NEO-C	.124	SSS	.155
Sy	-.269	SSS	.161	NEO-A	.169	SSS	.096	Sy	-.125	NEO-E	.304	NEO-A	.152
NEO-N	.120	NEO-E	.299	SSS	.128	NEO-C	.174	ImpSS	.110	Sy	-.267		
Act	-.09	NEO-C	-.149	Sy	-.163	NEO-N	.187	NEO-A	.080				
NEO-A	.088	NEO-N	.123	EPQ-E	.147	ImpSS	.129	Act	.068				
EPQ-E	.109	Sy	-.141	Act	-.111	Act	-.088						
				NEO-C	.092								

  

NEO-PI-R AND SSS-V FACETS AS INDEPENDENT VARIABLES													
OPENNESS		O1-Fantasy		O2-Aesthetics		O3-Feelings		O4-Actions		O5-Ideas		O6-Values	
R = .590		R = .470		R = .460		R = .584		R = .471		R = .506		R = .370	
Adjusted R <sup>2</sup> = .342		Adjusted R <sup>2</sup> = .213		Adjusted R <sup>2</sup> = .205		Adjusted R <sup>2</sup> = .332		Adjusted R <sup>2</sup> = .215		Adjusted R <sup>2</sup> = .246		Adjusted R <sup>2</sup> = .130	
Variables	B	Variables	B	Variables	B	Variables	B	Variables	B	Variables	B	Variables	B
ES	.443	N5	.142	ES	.325	E4	.155	ES	.385	ES	.314	ES	.296
E4	.110	ES	.163	A3	.151	E5	.161	E4	.095	A5	-.189	N3	-.108
E1	.089	E5	.125	N2	.086	N1	.128	A2	.124	C3	.077	BS	-.070
A5	-.133	C5	-.111	E1	.167	E1	.088	E5	.139	E3	.129	TAS	-.088
A3	.104	A5	-.097	Dis	-.126	ES	.150	C3	-.115	E2	-.129	A1	.054
E5	.133	TAS	.079	N3	.105	C1	.087	Dis	-.113	A3	.098	E3	-.115
Dis	-.095	C4	-.094	A5	-.089	N5	.101	N4	-.085	C6	.164	N4	-.100
E2	-.071	E1	.041	A6	.070	A3	.101	A1	-.075	E5	.097	E6	.073
N1	.100	N4	.064			N2	.094			Dis	-.108		
						E6	.100			C2	-.090		
						N3	.123			A4	-.078		
						N4	-.097			E4	.081		
						C4	.067			N3	.065		
										A6	.061		

(a) Variables were placed according to the order of successive regression models. Thus, the first one was the only variable in the first model, the second one was added in the second model, and so forth.

(b) All standardized coefficients were significant at the 0.05 level.

Table 2. Zero-order correlations between the Openness dimension and NEO-PI-R facets, and the domains and scales included in the study.

	OPENNESS	O1- FANTASY	O2- AESTHETICS	O3- FEELINGS	O4- ACTIONS	O5- IDEAS	O6- VALUES	
PERSONALITY DOMAINS	NEO-N	.015	.142	.065	.118	-.026	-.114	-.182
	NEO-E	.353	.179	.224	.444	.198	.201	.119
	NEO-A	-.002	-.118	.127	-.017	-.011	-.069	.126
	NEO-C	-.068	-.300	.029	.035	-.102	.096	.004
	EPQ-E	.286	.125	.207	.346	.209	.137	.098
	EPQ-N	.053	.106	.068	.156	-.004	-.014	-.160
	EPQ-P	.141	.226	.007	.127	.135	.040	-.009
	ImpSS	.322	.342	.109	.307	.288	.143	.033
	N-Anx	-.007	.077	.073	.100	-.040	-.106	-.179
	Agg-Hos	.082	.162	-.013	.157	.048	.027	-.098
	Act	.088	-.088	.020	.190	.151	.130	-.022
	Sy	.148	.089	.131	.276	.089	-.013	.022
	SSS	.372	.318	.155	.304	.324	.212	.107
NEO-PI-R AND SSS-V FACETS	N1	.009	.013	.073	.159	-.021	-.085	-.112
	N2	.060	.119	.048	.146	.021	-.014	-.129
	N3	.003	.084	.082	.076	-.063	-.060	-.176
	N4	-.144	.032	-.022	-.118	-.150	-.163	-.202
	N5	.189	.310	.082	.244	.113	-.010	-.047
	N6	-.055	.079	.025	.023	-.013	-.188	-.155
	E1	.266	.083	.262	.318	.063	.153	.132
	E2	.120	.039	.137	.218	.110	-.059	.066
	E3	.217	.081	.086	.233	.118	.261	.028
	E4	.274	.107	.152	.377	.168	.191	.071
	E5	.330	.296	.117	.360	.240	.204	.025
	E6	.233	.116	.163	.299	.095	.087	.164
	A1	.105	-.022	.132	.069	.016	.076	.144
	A2	-.090	-.148	.010	-.110	.017	-.117	.065
	A3	.182	-.011	.254	.209	.010	.119	.102
	A4	-.137	-.142	-.020	-.159	-.073	-.148	.065
	A5	-.149	-.131	-.034	-.111	-.024	-.228	.031
	A6	.142	.037	.197	.094	.029	.093	.062
	C1	.086	-.114	.080	.111	-.038	.199	.090
	C2	-.139	-.196	-.072	-.018	-.101	-.064	-.043
	C3	-.019	-.192	.065	.045	-.113	.113	-.008
	C4	.046	-.190	.086	.210	.004	.118	-.026
	C5	-.050	-.283	.019	.024	-.021	.082	.035
	C6	-.154	-.279	-.014	-.148	-.158	.022	-.014
	TAS	.256	.251	.097	.193	.241	.154	.024
	ES	.496	.295	.318	.283	.417	.322	.264
	Dis	.198	.234	.028	.224	.130	.066	.091
	BS	.101	.101	.006	.153	.127	.061	-.066

(a) Correlations higher than .062 and .082 were significant at the 0.05 and 0.01 levels, respectively.

Table 3. Statistical significance of ANOVAs and groups with significant differences <sup>(a)</sup>.

Scales	OPENNESS			O1-FANTASY			O2-AESTHETICS			O3-FEELINGS			O4-ACTIONS			O5-IDEAS			O6-VALUES		
	F	p	Groups	F	p	Groups	F	p	Groups	F	p	Groups	F	p	Groups	F	p	Groups	F	p	Groups
NEO-N	.363	.696	--	9.793	.000	3-1; 3-2	2.152	.117	--	6.827	.001	3-1; 3-2	2.809	.061	--	6.504	.002	1-3	16.89	.000	1-2; 1-3
NEO-E	51.01	.000	All	14.12	.000	3-1; 3-2	20.89	.000	All	92.75	.000	All	19.87	.000	All	19.06	.000	All	7.263	.001	3-1; 3-2
NEO-A	.532	.588	--	9.674	.000	1-3; 2-3	8.953	.000	2-1; 3-1	.770	.463	--	1.157	.315	--	1.856	.157	--	6.690	.001	3-1
NEO-C	2.19	.113	--	49.77	.000	All <sup>(b)</sup>	.313	.731	--	3.260	.039	2-1	2.628	.073	--	2.386	.093	--	.169	.844	--
EPQ-E	33.23	.000	All	6.162	.002	3-1; 3-2	16.60	.000	2-1; 3-1	49.73	.000	All	21.45	.000	2-1; 3-1	8.967	.000	3-1	5.411	.005	3-1; 3-2
EPQ-N	2.17	.115	--	6.757	.001	3-1	1.855	.157	--	14.00	.000	3-1	3.152	.043	1-2	.857	.425	--	15.58	.000	All <sup>(b)</sup>
EPQ-P	7.09	.001	3-1; 3-2	26.71	.000	3-1; 3-2	.381	.683	--	10.21	.000	3-1; 3-2	6.840	.001	3-1; 3-2	2.804	.061	--	.122	.885	--
ImpSS	41.99	.000	All	53.27	.000	All	6.174	.002	3-1	40.71	.000	All	38.82	.000	All	11.30	.000	3-1; 3-2	.512	.599	--
N-Anx	.154	.857	--	2.657	.071	--	2.433	.088	--	10.13	.000	3-1; 3-2	8.011	.000	1-2; 3-2	5.008	.007	1-3	18.69	.000	All <sup>(b)</sup>
Agg-Hos	3.10	.045	3-1	14.24	.000	3-1; 3-2	.838	.433	--	12.81	.000	3-1; 3-2	1.519	.219	--	1.518	.220	--	4.591	.010	1-3
Act	1.71	.182	--	3.294	.038	1-3	.595	.552	--	17.35	.000	All	11.27	.000	All	6.105	.002	3-1	.200	.819	--
Sy	7.87	.000	2-1; 3-1	2.696	.068	--	7.443	.001	2-1; 3-1	31.21	.000	All	2.430	.089	--	.173	.841	--	.186	.830	--
SSS	59.35	.000	All	46.22	.000	All	9.224	.000	3-1	38.23	.000	All	43.31	.000	All	20.47	.000	All	3.321	.037	3-1
N1	.121	.886	--	.167	.846	--	2.511	.082	--	10.58	.000	3-1; 3-2	.690	.502	--	4.486	.011	3-1	6.725	.001	1-2; 1-3
N2	1.88	.153	--	6.904	.001	3-1; 3-2	1.614	.200	--	9.938	.000	3-1; 3-2	1.751	.174	--	.655	.519	--	8.920	.000	1-2; 1-3
N3	.153	.858	--	4.138	.016	3-1	2.559	.078	--	5.799	.003	3-1; 3-2	4.850	.008	1-2; 1-3	1.516	.220	--	15.68	.000	All <sup>(b)</sup>
N4	6.02	.003	1-3	.732	.481	--	.123	.885	--	5.720	.003	1-2; 1-3	10.89	.000	1-2; 1-3	12.34	.000	3-1; 3-2	20.17	.000	1-2; 1-3
N5	14.21	.000	3-1; 3-2	44.53	.000	All	5.294	.005	3-2	23.13	.000	All	7.789	.000	3-1; 3-2	.168	.845	--	.631	.532	--
N6	1.002	.367	--	3.147	.043	3-1	.758	.469	--	.267	.766	--	1.447	.236	--	19.17	.000	All	13.41	.000	1-2; 1-3
E1	26.96	.000	All	3.732	.024	2-1	27.33	.000	All	44.61	.000	All	2.738	.065	--	10.04	.000	2-1; 3-1	9.987	.000	3-1; 3-2
E2	5.377	.005	2-1; 3-1	1.486	.227	--	8.032	.000	2-1; 2-3	24.18	.000	2-1; 3-1	6.283	.002	3-1	1.562	.210	--	1.665	.190	--
E3	18.69	.000	All	2.509	.082	--	3.394	.034	3-1	23.04	.000	All	6.823	.001	3-1	34.73	.000	All	3.171	.042	3-2
E4	33.16	.000	All	5.687	.004	3-1	9.922	.000	3-1; 3-2	63.27	.000	All	13.00	.000	3-1; 3-2	16.60	.000	All	2.898	.056	--
E5	50.23	.000	All	41.87	.000	All	6.087	.002	3-1	54.78	.000	All	25.45	.000	All	20.84	.000	3-1; 3-2	.016	.984	--
E6	18.95	.000	All	6.239	.002	3-1	11.99	.000	2-1; 3-1	37.83	.000	All	5.998	.003	3-1	3.687	.025	3-1	14.45	.000	3-1; 3-2

(a) The first Openness group stands for the group with the highest average on the corresponding scale.

(b) In this case, groups 1 and 3 had the highest and the lowest averages, respectively.

Table 3. Continued...

Scales	OPENNESS			O1-FANTASY			O2-AESTHETICS			O3-FEELINGS			O4-ACTIONS			O5-IDEAS			O6-VALUES		
	F	p	Groups	F	p	Groups	F	p	Groups	F	p	Groups	F	p	Groups	F	p	Groups	F	p	Groups
A1	4.808	.008	3-1	1.730	.178	--	4.969	.007	3-1	1.459	.233	--	.366	.694	--	3.215	.041	3-1	9.476	.000	3-1; 3-2
A2	4.561	.011	1-3	11.29	.000	1-3; 2-3	1.239	.290	--	3.274	.038	1-3	.440	.644	--	4.525	.011	1-3	2.786	.062	--
A3	10.61	.000	3-1; 3-2	3.957	.019	2-3	30.08	.000	2-1; 3-1	18.87	.000	2-1; 3-1	.486	.615	--	5.580	.004	3-1; 3-2	5.051	.007	3-1
A4	9.738	.000	1-3; 2-3	9.392	.000	1-3; 2-3	.771	.463	--	8.615	.000	1-3; 2-3	2.934	.054	--	9.514	.000	1-3; 2-3	1.737	.177	--
A5	8.078	.000	1-3; 2-3	6.022	.003	1-3; 2-3	5.101	.006	2-3	5.875	.003	1-3	.636	.529	--	23.90	.000	1-3; 2-3	.944	.390	--
A6	7.352	.001	3-1; 3-2	.303	.739	--	18.76	.000	All	4.193	.015	2-1; 3-1	.832	.435	--	3.948	.020	3-1	1.693	.184	--
C1	2.699	.068	--	9.295	.000	1-3; 2-3	3.023	.049	3-1	5.621	.004	3-1	1.214	.297	--	15.27	.000	3-1; 3-2	4.796	.008	3-1; 3-2
C2	8.166	.000	1-3	19.00	.000	1-3; 2-3	2.846	.059	--	1.478	.229	--	3.231	.040	1-3	2.525	.081	--	3.091	.046	1-3
C3	.414	.661	--	25.99	.000	1-3; 2-3	1.912	.148	--	1.731	.178	--	2.001	.136	--	5.744	.003	3-1; 3-2	.143	.867	--
C4	.614	.541	--	19.37	.000	1-3; 2-3	3.776	.023	3-1	21.41	.000	2-1; 3-1	.380	.684	--	4.153	.016	3-1	.711	.491	--
C5	1.159	.314	--	38.09	.000	All <sup>(b)</sup>	.102	.903	--	2.452	.087	--	.179	.836	--	1.428	.240	--	.455	.634	--
C6	9.049	.000	1-3; 2-3	38.87	.000	All <sup>(b)</sup>	.189	.828	--	8.727	.000	3-1; 3-2	11.54	.000	3-1; 3-2	.314	.731	--	.467	.627	--
TAS	29.50	.000	All	33.87	.000	All	4.588	.010	3-1	13.92	.000	3-1; 3-2	26.44	.000	All	10.34	.000	3-1; 3-2	.003	.997	--
ES	130.7	.000	All	37.58	.000	All	46.53	.000	All	36.25	.000	All	82.64	.000	All	55.81	.000	All	29.48	.000	All
Dis	14.90	.000	All	26.06	.000	All	.177	.838	--	19.67	.000	3-1; 3-2	3.860	.021	3-1	2.509	.082	--	2.222	.109	--
BS	4.108	.017	3-2	7.598	.001	3-1; 3-2	.514	.598	--	8.697	.000	3-1; 3-2	7.186	.001	3-1; 3-2	1.832	.161	--	5.629	.004	1-2; 1-3

(a) The first Openness group stands for the group with the highest average on the corresponding scale.

(b) In this case, groups 1 and 3 had the highest and lowest averages, respectively.