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Does Personality Measured by NEO-FFI Consist of Five Dimensions?

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Abstract

This study aimed to explore the validity of the Persian 60-statement Five Factor Inventory (NEO-FFI) developed by Costa and McCrae (1992) by employing schema theory and factor analysis. To this end, its 24 reverse statements were rendered positive and administered to six hundred and ten grade three senior high school (G3SHS) students in Mashhad, Iran. The first analysis of the inventory showed that the 254 words and 60 statements of the inventory referred to as schema types and species dropped to 210 and 45, respectively. The acceptable loading of 45 species on factors extracted by principal axis factoring and rotated via Varimax with Kaiser Normalization showed that instead of five factors, 17 genera underlie G3SHS students' personality, i.e., Extravert, Relaxed, Conscientious, Organized, Thorough-Going, Open, Field-Dependent, Unorthodox, Domineering, Agreeable, Friendly, Welcoming, Respectful, Fast-Paced, Proud, Considerate, and Curious. The results are discussed and suggestions are made for future research.

Keywords: Personality, domain, genera, species, schemata

1. Introduction

In an attempt to provide language test designers with a sound rationale to explain what texts should be chosen and what types of alternatives should be developed to measure their construct of interest, Khodadady (1997, 1999, 2004, 2009) reviewed the literature and suggested schema theory as the best and most viable rationale. Along with his associates he argued that although many language educators have tried to apply the schema theory to the measurement of language achievement in general and language proficiency in particular, they have been largely unsuccessful because of their conceptualization of schema as a macro structure (e.g., Khodadady, Alavi & Khaghaninejad, 2011, 2012; Khodadady, Alavi, Pishghadam & Khaghaninezhad, 2012; Khodadady & Elahi, 2012; Khodadady & Hesarzadeh, 2014).

Almost all scholars subscribing to the macro structural view of schema theory assume that a text dealing with a specific field addresses a distinct macro schema which is not addressed by texts dealing with other fields (e.g., Mc Neil, 1984; Moy, 1975; Poplin, 1988; Shoham, Peretz &Vorhaus, 1987; Yekovich & Walker, 1988). Clapham (1996), for example, developed three IELTS modules on texts concerned with life and medical sciences, physical science and technology, and business studies and social sciences and administered them to 842 non-native English speakers preparing to start undergraduate and postgraduate studies at English medium universities. Each student took the test closest to her/his future field of study. Her results did not support the hypothesis that the students who take the module dealing with their own field will perform significantly better than those whose fields are different from what the module measures.

To render schema theory conducive to the measurement of reading comprehension ability, Khodadady (1997) offered its microstructural approach in which each and all the ***words*** comprising texts are viewed as ***schemata*** representing reader's collective as well as personally acquired knowledge of words as they are used together within a specific text. He believes since taking psychological measures depends on their takers' reading comprehension ability, they will perform differently on the test not because of their fields of study but because of their differences in the background knowledge represented by the constituting schemata of texts.

The differences will manifest themselves linguistically and cognitively if they are to be validated theoretically and empirically. This study has, therefore, adopted the microstructural approach of schema theory to explore grade three senior high school (G3SHS) students' personality by revising and validating the NEO-FFI designed by Costa and McCrae (1992).

While Costa and McCrae (1992) approach personality as a fixed macro schema (Cattell & Mead, 2007) consisting of five dimensions or factors, i.e., Agreeableness, Conscientiousness, Extraversion, Neuroticism, and Openness, the present study approaches it from a microstructural perspective. It is argued that Costa and McCrae employed 253 schemata and combined them together in certain order and numbers to produce 60 statements representing 60 concepts broader than schemata called species. The comprehension, application, analysis, synthesis and evaluation of the schemata and species through G3SHS students' strong disagreement, disagreement, expressing no idea, agreement and strong agreement with the schemata and species as presented in the inventory brings about factors called genera in this study. If microstructural approach towards personality holds true, the number of species and genera constituting G3SHS students' personality will be different from those established by Costa and McCrae.

2. Methodology

2.1 Participants

Six hundred and ten, 359 (58.9%) female and 251 (41.1%) male, grade three senior high school (G3SHS) students participated in the present study voluntarily. They were majoring in humanities (n = 159, 26.1%), sciences (n = 195, 32.0%) and mathematics (n = 256, 42.0%) in state (n = 274, 44.9%0), private (n = 131, 21.5%), nemooneh dolati (n = 91, 14.9%), shahed (n = 91, 14.9%) and talented (n = 23, 3.8%) G3SHSs. The schools were chosen from 15 senior high schools in the educational districts of 1, 2, 3, 4, 5, 6 and Tabadkan. They were speaking Persian (n = 595, 97.5%), Turkish (n = 6, 1.0%), English (n = 4, 0.7%), Arabic (n = 2, 0.3%), Kurdish (n = 2, 0.3%), and Torkaman (n = 1, 0.2%) as their mother language and were 15 to 19 years old (mean = 17.01, SD = .493).

2.2 Instrumentation

Two instruments were employed in this study: a Demographic Scale and the revised NEO-FFI called the Personality Inventory. (The participants' scores on their centrally held final English examination were also obtained from schools. These scores were however used for writing up a second paper to be published soon.)

2.2.1 Demographic Scale

Following Khodadady and Mirjalili (2012) and Khodadady and Zabihi (2011), a Demographic Scale (DS) was developed to collect the data related to the participants' age, school name, type of school, field of study, educational district, gender and mother language.

2.2.2 Personality Inventory

The Persian Personality Inventory (PI) administered in this study is based on the English NEO Five Factor Inventory (NEO-FFI) developed by Costa and McCrae (1992) and translated into Persian by Garousi, Mehryar and Ghazi Tabatabayi's (2001) [henceforth GM&G] and revised by present researchers. According to its designers, the self-report NEO-FFI covers five dimensions of personality, each consisting of 12 statements, i.e., Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. Each statement is presented on a Likert scale of five points with which the inventory takers have to strongly disagree, disagree, express no idea, agree and strongly agree.

Table 1 presents the descriptive statistics as well as the reliability estimates of the Persian NEO-FFI reported by Khodadady and Mirjalili (2013, p. 196). As can be seen, the highest reliability level of the inventory was reported by GM&T, i.e., $\alpha = .86$. The alpha coefficient did, however, drop to 0.81 and 0.69 in Khodadady and Zabihi's (2011) [henceforth K&Z] and Khodadady and Mirjalili's (2012) [henceforth K&M12] studies, respectively, indicating that the reliability of NEO-FFI varies from study to study. While GM&G administered the inventory to 1717 university students studying various fields of study, K&Z's participants were 167 and 219 undergraduate and graduate students of the Persian and English languages, respectively. The participants in K&M12's study were, however, 118 teachers of English language.

Table 1: Descriptive Statistics of the Persian NEO FFI Reported by Khodadady and Mirjalili (2013)

Dimensions	# of items	Mean	Std. Deviation	KM12 Alpha	K&Z Alpha	GM&G Alpha
Agreeableness	12	43.92	5.636	.64	.65	.68
Conscientiousness	12	46.26	6.638	.81	.79	.87
Extraversion	12	42.68	5.486	.65	.75	.73
Neuroticism	12	32.50	6.215	.68	.83	.86
Openness	12	40.80	6.384	.71	.48	.56
NEO-FFI	60	206.16	14.360	.69	.81	.86

In this study the name Persian PI has been used instead of the NEO-FFI because the 24 reverse statements comprising the NEO-FFI have been rendered positive by adding or changing certain schemata comprising the statements, i.e., 8, 9, 12, 14, 15, 16, 18, 23, 24, 27, 29, 30, 31, 33, 38, 39, 42, 44, 45, 46, 48, 54, 55, and 59. The reverse statement eight forming the openness dimension of the NEO-FFI, for example, reads: "Once I find the right way to do something, I stick to it". The Persian schema-based translation of this statement reads: وقتی راه درست انجام کاری را پیدا می کنم، همیشه از آن پیروی می کنم (VAGHTI RAHE DOROSTE ANJAME KARI RA PEIDA MIKONAM, HAMISHE AZ AN PEYRAVI MIKONAM. This statement was rendered positive by adding the prefix ن (don't) to the verb schema پیروی می کنم (stick) resulting in پیروی نمیکنم (*don't* stick). The back translation of the positive Persian statement thus reads: Once I find the right way to do something, I ***don't*** stick to it.

The statements comprising the Persian PI were presented as the stem of sixty multiple choice items (Khodadady, 1999) to elicit the participants' responses objectively. The stem of the first item, for example, reads MAN SHAKHSEH NEGARANI NISTAM [من شخص نگرانی نیستم] (I am not a worrier.) The G3SHS students participating in this study were required to read the stem and choose one of the five choices, i.e., completely disagree, disagree, express no idea, agree or completely disagree, depending on their personality. According to Costa and McCrae (1992) the first statement "I am not a worrier" along with other eleven form the neurotic dimension of personality.

2.3 Procedures

The Persian PI developed in this study was treated as a schema-based scale whose successful functioning depends on its takers' background knowledge of each and all words constituting its sixty statements. In order to determine whether the participants had the required background knowledge related to the concepts represented by the schemata, Khodadady and Hessarzadeh (2014) were followed and the statements were parsed one by one and their constituting schema tokens and types were specified, codified and assigned to semantic, syntactic and parasyntactic linguistic domains. The schemata of each domain were also assigned to their genera as shown in Table 2.

Table 2: Schemata Comprising the Linguistic Genera and Domains of Statements Used in the PI

Domain	Genera	Tokens		Types	
		Frequency	Percent	Frequency	Percent
Semantic	Adjectives	59	10.6	58	22.9
	Adverbs	18	3.2	11	4.3
	Nouns	68	12.3	50	19.8
	Verbs	116	20.9	63	24.9
Syntactic	Conjunctions	36	6.5	8	3.2
	Determiners	41	7.4	10	4.0
	Prepositions	40	7.2	14	5.5
	Pronouns	99	17.9	17	6.7
	Syntactic verbs	16	2.9	7	2.8
Parasyntactic	Abbreviations	9	1.6	2	.8
	Para-adverbs	35	6.3	12	4.7
	Particles	17	3.1	1	.4
	Total	554	100.0	253	100.0

As can be seen in Table 2 above, the PI consists of 554 schema tokens of which 261 are semantic in nature, i.e., 59 adjectives (10.6%), 18 adverbs (3.2%), 68 nouns (12.3%), and 116 verbs (20.9%). The types of these schemata were also specified and then each type was closely checked against the schemata used in G3SHS students' school textbooks dealing with various subjects in general and Persian in particular. For example, among the 59 adjectives used in the statements of the PI, only the schema type "cheerful" had a token of two, i.e., it had been used two times. The other 57 adjective schema types having a token of one were able, abstract, active, angry, anxious, blue, calculating, clean, clear, cold, considerate, controversial, courteous, cynical, dependable, depressed, different, discouraged, egotistical, fast-paced, fearful, foreign, good, great, hard, hard-headed, helpless, high-spirited, human, inferior, intellectual, interested, intrigued, jittery, light-hearted, lonely, methodical, moral, neat, necessary, new, orderly, organized, own, productive, reliable, religious, right, sad, selfish, skeptical, tense, thoughtful, tough-minded, willing, worthless, and wrong.

Upon ensuring that none of the schema types comprising the sixty statements of PI were unknown to G3SHS students, the second researcher contacted her colleagues in various schools and asked for their cooperation. Most teachers who were familiar with the researcher agreed to encourage their students to participate in the study and they did secure their oral approval near the end of school year in 2013. Certain dates were therefore set to administer the DS and Persian PI to the participants. The second researcher attended the classes on those dates and administered the two instruments in person. While the participants were taking the PI, she walked along aisles and interacted with them by answering their questions and reminding them to answer all the items on both the DS and PI. The instruments were collected after all the participants had completed them within approximately 30 minutes.

2.4 Data Analysis

Following K&Z as well as K&M, the descriptive statistics of the items comprising the PI was calculated to determine how well they had functioned. Since each statement on the PI is presented with five choices, they were collapsed to three for the ease of presentation. The first choice was formed by collapsing "completely disagree" and "disagree" into one as were "agree" and "completely agree" to establish the third. The second point was formed by collapsing the "missing" responses with those who "had no idea". Based on Khodadady and Hashemi's (2010) suggestion, Principal Axis Factoring was utilized to extract the factors underlying the inventory after it had been administered to the participants of this study. The initial eigenvalues of one and higher were adopted as the main criteria to determine the number of factors to be extracted. They were then rotated via Varimax with Kaiser Normalization. The descriptive statistics of the factors along with their reliability levels were also estimated. The latent variables were finally correlated with each other to explore their go togetherness. All the statistical analyses were conducted via IBM SPSS Statistics 20 to test the hypotheses below:

H1: The number of genera established in this study will be different from that of Costa and McCrae (1992)
H2: Not all species comprising the PI will load on the genera established in this study.
H3: The genera forming the domain of personality will relate to each other differently.

3. Results

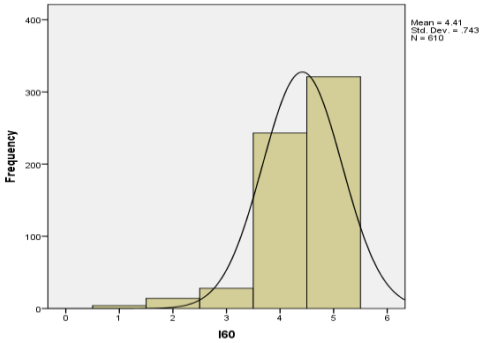
Following King (2008) and Khodadady and Dastgahian (2015), the descriptive statistics of items comprising the PI are presented in Table 3. As can be seen, most mean values have generally clustered above the expected value of three. These values show that G3SHS students have agreed with the majority of statements (n = 50, 83.3%) and thus possess the personality species described, i.e., 2, 3, 4, 5, 7, 9, 11, 12, 13, 14, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, 37, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 58, 59, and 60. Statement (S) 60, for example, requires the G3SHS students to indicate whether they "strive for excellence in everything they do". As can be seen, 92% of G3SHS students have agreed (A) with S60 and thus its mean value has become 4.41.

Table 3: Descriptive Statistics of the Items Comprising PI (N = 610)

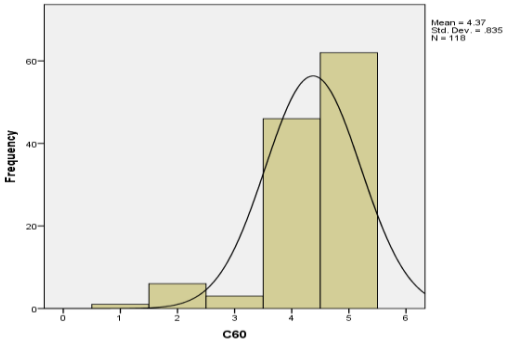
S	Mean	SD	D%	NI%	A%	S	Mean	SD	D%	NI%	A%
1	2.89	1.208	46	16	39	31	3.06	1.288	39	14	47
2	3.77	1.112	16	15	69	32	3.74	1.107	16	17	67
3	3.12	1.238	35	24	41	33	3.76	.936	9	26	65
4	4.30	.826	4	9	87	34	4.07	.895	4	20	75
5	4.05	.992	10	13	77	35	3.78	.976	12	19	69
6	2.60	1.175	51	25	24	36	3.15	1.213	37	16	47
7	3.91	1.064	13	14	73	37	3.78	.988	12	24	65
8	2.65	1.203	50	18	32	38	2.86	1.388	45	19	36
9	3.72	1.153	19	16	65	39	3.35	1.092	20	36	44
10	3.02	1.158	38	23	39	40	4.13	.891	6	12	82
11	3.58	1.171	20	20	60	41	3.32	1.144	29	19	52
12	3.62	1.027	15	28	57	42	3.84	1.010	12	17	71
13	3.71	1.072	12	28	60	43	3.71	1.200	16	20	64
14	3.32	1.136	24	33	43	44	3.45	1.005	18	29	53
15	2.56	1.273	57	13	30	45	4.17	.846	4	12	84
16	3.01	1.261	39	18	43	46	3.12	1.257	37	17	47
17	3.96	.922	6	20	74	47	3.78	1.125	15	19	66
18	3.00	.975	23	51	26	48	3.83	1.098	11	24	65
19	3.63	1.144	20	17	64	49	4.35	.754	3	7	90
20	4.15	.895	6	11	83	50	3.59	.979	12	32	56
21	3.04	1.238	39	17	44	51	3.24	1.166	30	24	47
22	3.55	1.125	16	29	55	52	3.58	1.014	15	29	56
23	3.51	1.299	23	20	57	53	4.03	.978	8	17	75
24	3.26	1.190	31	21	48	54	3.64	1.255	22	12	66
25	3.66	1.047	14	24	62	55	3.73	1.099	17	12	71
26	3.24	1.359	31	20	49	56	3.61	1.048	16	23	61
27	3.53	1.126	21	16	63	57	2.81	1.201	43	27	30
28	3.23	1.182	27	30	43	58	3.31	1.193	24	28	47
29	2.40	1.193	58	22	20	59	4.02	1.186	14	14	72
30	2.84	1.198	46	18	35	60	4.41	.743	3	5	92

A comparison of G3SHS students' performance on species 60 with that of 118 EFL teachers who participated in Khodadady and Mirjalili's (2012) study reveals almost the same pattern of responses as shown in Figure 1. (The K&M12's descriptive statistics were obtained from the corresponding author through personal communication.) As can be seen, the mean value of students' S60, "I strive for excellence in everything I do" i.e., 4.41, is very close to that of EEL teachers, i.e., 4.37. Future research must show whether the inclusion of statement such as 60 which do not differentiate between students and teachers' personality contributes to its assessment.

Figure 1: G3SHS Students and EFL Teachers' Performance on Species 60



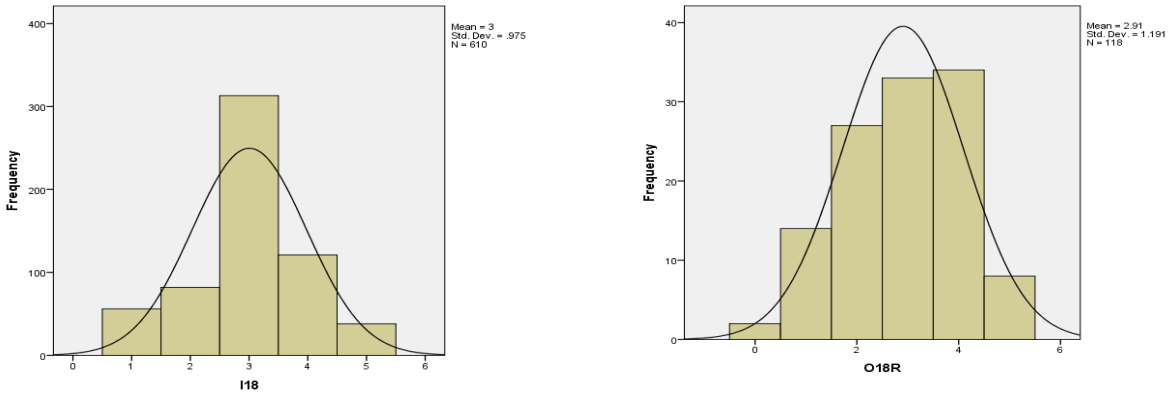
G3SHS students



EFL teachers

Among the 60 statements forming the PI, only S18, "I **do not** believe letting students hear controversial speakers can only confuse and mislead them" has attracted the "no idea" (NI) response of 51 percent of G3SHS students. It is one of reverse species in the NEO-FFI which has been rendered positive in this study. Its original wording was "I believe letting students hear controversial speakers can only confuse and mislead them" requiring reverse scoring. However, as the results presented in Figure 2 illustrate, the positive wording has brought about almost the same responses on the part of G3SHS students as compared to EFL teachers because the mean values of responses are almost the same, i.e., 3.0 and 2.91, respectively. The independent samples T-Test does in fact show that the mean values do not differ from each other significantly (t = .963, df = 726, p <.336). The two groups do, however, differ from each other in terms of the distribution of their disagreement (23% vs. 35%), expressing no idea (51% vs. 30%) and agreement (26% vs. 35%).

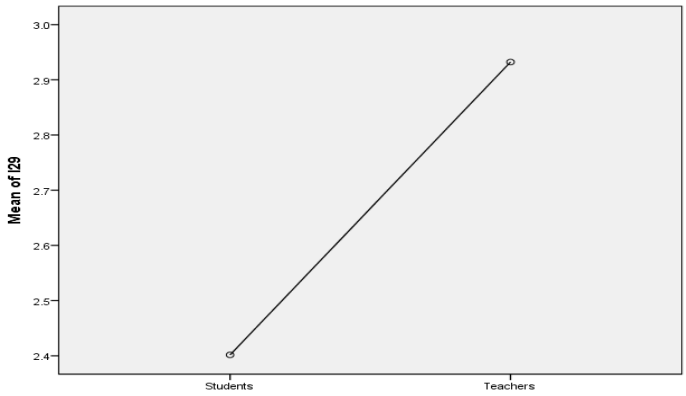
Figure 2: G3SHS Students and EFL Teachers' Performance on Species 18



G3SHS students EFL Teachers

Among the sixty statements comprising the PI, eight have elicited the G3SHS students' highest percentage of disagreement (D), i.e., S29 (58%), S15 (57%), S06 (51%), S08 (50%), S01 (46%), S30 (46%), S38 (45%), and S57 (43%) as compared to the percentage of their agreement with these statements. Fifty eight percent of the students have, for example, disagreed with S29, "I believe that most people will **not** take advantage of you if you let them". However, in K&M12's study, 42% of 118 EFL teachers have disagreed with S29 resulting in a difference in the mean values of the students and teachers on this species of personality domain as shown in Figure 3. (The One-Way ANOVA analysis shows that the two mean values are significantly different from each other, i.e., F(1, 726)=20.287, p<.001).

Figure 3: Mean Plot of Students and Teachers Responses Given to Species 29



Upon scrutinizing the functioning of items comprising the PI, KMO and Bartlett's test were run to determine the adequacy of sampling. The estimation of index is important because it reflects the degree to which it is likely that common factors explain the observed correlations among the variables. The KMO statistic of this study proved to be .86. Since it is in the .80s considered as "meritorious" by Kaiser and Rice (1974 as cited in DiLalla & Dollinger, 2006, p. 250), the sample selected in this study is adequate to run factor analysis.

The value obtained by Bartlett's Test of Sphericity was also significant, i.e., $X^2 = 79658.195$, $p < .001$), indicating that the correlation matrix was not an identity matrix.

Table 4 presents the initial (I) and extraction communalities (ECs) of items comprising thePPI. As can be seen, the ECs range from .12 (item 18), "I do not believe letting students hear controversial speakers can only confuse and mislead them", to .63 (item 5), "I keep my belongings clean and neat". Tabachnick and Fidell (2007) argued that communality values lower than .20 indicate "considerable heterogeneity among the variables" (p. 660), i.e., species 18 contributes little, if any, to the measurement of G3SHS students' personality. For its having the lowest EC, it does not load acceptably on any factors extracted in this study. As discussed before, this particular species is the only statement regarding which 51 percent of G3SHS students have stayed neutral. (Unfortunately, the present researchers could not find any other study where its reported communalities could be compared with those of the present. Replicating this study may, therefore, help future researchers investigate the functioning of species 18 with grade three or four senior high school students' responses.) Although Costa and McCrae (1992) consider species 18 as a subordinate schema of openness genus, it did not load on any factor in this study as will be discussed shortly.

Table 4: The Initial and Extraction Communalities of Items Comprising the PI

Item	Initial	Extraction	Item	Initial	Extraction	Item	Initial	Extraction
1	.250	.257	21	.318	.402	41	.289	.364
2	.299	.364	22	.187	.204	42	.446	.518
3	.229	.260	23	.279	.389	43	.328	.467
4	.235	.289	24	.189	.333	44	.148	.205
5	.441	.627	25	.440	.580	45	.263	.347
6	.195	.300	26	.189	.233	46	.464	.545
7	.254	.375	27	.277	.400	47	.162	.193
8	.192	.306	28	.191	.263	48	.268	.423
9	.184	.209	29	.151	.203	49	.227	.305
10	.352	.406	30	.331	.413	50	.303	.396
11	.239	.284	31	.304	.346	51	.286	.424
12	.423	.450	32	.466	.529	52	.414	.535
13	.282	.470	33	.234	.301	53	.278	.392
14	.169	.188	34	.281	.328	54	.148	.235
15	.501	.618	35	.476	.615	55	.424	.556
16	.362	.462	36	.238	.281	56	.217	.302
17	.396	.496	37	.490	.601	57	.182	.215
18	.118	.119	38	.205	.489	58	.231	.265
19	.196	.267	39	.200	.338	59	.224	.323
20	.341	.417	40	.298	.355	60	.374	.463

Extraction Method: Principal Axis Factoring

Table 5 presents the number of and variances explained by the factors extracted from the 60 statements comprising the PI. Following Clark and Watson (1995), Khodadady and Tabriz (2012), and Worthington and Whittaker (2006), the *initial* eigenvalues of one and higher have been adopted in this study to retain nineteen rotated factors. They explain 57% of variance in the initial extraction and 37.1% of variance in rotated extraction of genera underlying the species brought up by the inventory. These results *confirm* the first hypothesis that *the* number of genera established in this study will be different from that of Costa and McCrae (1992).

Table 5: Total and Cumulative (C) Variance (V) Explained by the Factors (F) Underlying the PPI

F	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of V	CV %	Total	% of V	CV %	Total	% of V	CV %
1	6.625	11.041	11.041	6.075	10.125	10.125	2.910	4.850	4.850
2	3.385	5.642	16.683	2.821	4.701	14.826	2.306	3.843	8.693
3	3.094	5.157	21.841	2.491	4.152	18.978	2.091	3.485	12.178
4	1.933	3.221	25.062	1.296	2.160	21.139	2.021	3.369	15.547
5	1.667	2.778	27.840	1.038	1.731	22.869	1.779	2.965	18.512
6	1.602	2.669	30.510	.992	1.653	24.522	1.515	2.526	21.037
7	1.559	2.598	33.107	.933	1.555	26.077	1.291	2.151	23.188
8	1.473	2.455	35.562	.894	1.491	27.568	.837	1.395	24.583
9	1.350	2.249	37.811	.705	1.175	28.743	.800	1.333	25.916
10	1.331	2.219	40.030	.674	1.123	29.866	.738	1.230	27.146
11	1.243	2.072	42.102	.608	1.014	30.880	.732	1.221	28.367
12	1.241	2.068	44.170	.592	.986	31.866	.713	1.188	29.555
13	1.192	1.986	46.157	.540	.900	32.766	.693	1.155	30.710
14	1.166	1.944	48.100	.505	.842	33.608	.664	1.106	31.816
15	1.148	1.913	50.014	.494	.823	34.431	.661	1.102	32.918
16	1.066	1.777	51.791	.438	.730	35.161	.660	1.100	34.017
17	1.058	1.763	53.554	.401	.668	35.829	.649	1.082	35.099
18	1.026	1.711	55.264	.386	.643	36.472	.649	1.082	36.181
19	1.006	1.677	56.941	.358	.596	37.068	.532	.887	37.068

The rotated 37.1% of variance explained by nineteen factors underlying the PI is lower than the 44.2% of variance explained by the eight factors Khodadady, Fakhrabadi and Azar (2012) extracted from the English Language Teachers' Attribute Scale (ELTAS). They designed and validated the ELTAS with 1328 female G3SHS students in Mashhad, The percentage of variance explained by the factors increased to 48.4% when Khodadady and Dastgahian (2015) administered the scale to 1483 female and G4SHS students and extracted 15 rotated factors from their responses, indicating that the domain of personality as measured by the PI is a relatively weaker scale compared to the ELTAS as a measure of teacher effectiveness domain.

Table 6 presents the rotated factor matrix for the 60 species comprising the PI. As can be seen, six species loaded acceptably on more than one factor, i.e., 7, 3, 17, 50, 51, and 52. The higher loading of these species was used to determine its sole contribution to the factor upon which it had loaded and it was removed from the other factors upon which it had a lower but acceptable loading. For example, species seven, "I laugh easily", had the loadings of .37 and .43 on factors one and sixteen, respectively. Since its loading on the latter factor was higher, species seven was removed from the list of other species which had loaded acceptably on factor one. This procedure resulted in having only one species loading on one factor. Spices eight, "Once I find the right way to do something, I don't stick to it" and fifteen, "I am not a very methodical person", however, loaded acceptably but negatively on factors seventeen (-0.50) and five (-0.71), respectively. These two species were removed from all statistical analyses because they did not contribute to the assessment of G3SHS students' personality.

Table 6: Rotated Factor Matrix[a]

S	Factors																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
2	*	*	*	*	*	*	.44	*	*	*	*	*	*	*	*	*	*	*	*
3	*	*	.33	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5	*	*	*	.70	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
6	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
7	.37	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.43	*	*	*
8	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-.50	*	*
9	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10	*	*	.39	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12	.59	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13	*	*	*	*	*	.46	*	*	*	*	*	*	*	*	*	*	*	*	.41
14	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15	*	*	*	-.71	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16	*	.59	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17	.34	*	*	*	*	*	.45	*	*	*	*	*	*	*	*	*	*	*	*
18	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19	*	*	*	*	*	*	.37	*	*	*	*	*	*	*	*	*	*	*	*
20	*	*	*	*	.53	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21	*	.58	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23	*	*	*	*	*	.57	*	*	*	*	*	*	*	*	*	*	*	*	*
24	*	*	*	*	*	*	*	*	*	*	*	*	.53	*	*	*	*	*	*
25	*	*	.69	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
26	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
27	*	*	*	*	*	*	.60	*	*	*	*	*	*	*	*	*	*	*	*
28	*	*	*	*	*	*	*	.42	*	*	*	*	*	*	*	*	*	*	*
29	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
30	*	*	.49	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
31	*	.48	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
32	.63	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
33	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.35	*	*	*
34	.36	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
35	*	*	.73	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
36	*	.36	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
37	.74	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
38	*	*	*	*	*	*	*	.63	*	*	*	*	*	*	*	*	*	*	*
39	*	*	*	*	*	*	*	*	*	*	.53	*	*	*	*	*	*	*	*
40	*	*	*	*	.33	*	*	*	*	*	*	*	*	*	*	*	*	*	*
41	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
42	.52	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
43	*	*	*	*	*	.63	*	*	*	*	*	*	*	*	*	*	*	*	*
44	*	*	*	*	*	*	*	*	*	.39	*	*	*	*	*	*	*	*	*
45	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
46	*	.65	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
47	*	*	*	*	*	*	*	*	*	*	*	*	*	.38	*	*	*	*	*
48	*	*	*	*	*	.37	*	*	*	*	*	*	*	*	*	*	*	*	*
49	*	*	*	*	.40	*	*	*	*	*	*	*	*	*	*	*	*	*	*
50	*	*	*	*	.35	*	*	*	.34	*	*	*	*	*	*	*	*	*	*
51	*	.35	*	*	*	*	*	*	*	*	*	*	*	*	.34	*	*	*	*
52	.41	*	*	*	*	*	*	*	.35	*	*	*	*	*	*	*	*	*	*
53	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.48	*
54	*	*	*	*	*	*	*	*	*	*	*	.45	*	*	*	*	*	*	*
55	*	*	*	.66	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
56	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.42	*	*	*	*
57	*	*	*	*	*	*	*	*	.37	*	*	*	*	*	*	*	*	*	*
58	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
59	*	*	*	*	.38	*	*	*	*	*	*	*	*	*	*	*	*	*	*
60	*	*	*	*	.55	*	*	*	*	*	*	*	*	*	*	*	*	*	*

Extraction Method: Principal Axis Factoring. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 23 iterations. * loadings less than .32

As it can be seen in Table 6 above, adopting the minimum magnitude of .32 for acceptable loading reduces the number of species comprising the PI from 60 to 45 because statements one, "I am not a worrier, four, "I try to be courteous to everyone I meet", six "I often feel inferior to others", eight "Once I find the right way to do something, I don't stick to it", nine, "I often do not get into arguments with my family and co-workers", eleven "When I'm under a great deal of stress, sometimes I feel like I'm going to pieces, fourteen, "**No one** thinks I'm selfish and egotistical", fifteen "I am **not** a very methodical person", eighteen, "I **do not** believe letting students hear controversial speakers can only confuse and mislead them", twenty two, "I like to be where the action is", twenty six "Rarely I feel completely worthless", twenty nine, "I believe that most people **will not** take advantage of you if you let them", forty one, "Too often, when things go wrong, I **do not** get discouraged and feel like giving up", forty five, "Sometimes I'm not as dependable or reliable as I should be" and fifty eight, "I often enjoy playing with theories or abstract ideas" do not load on any factor acceptably showing that they do not form a part of G3SHS students' personality. These results *confirm* the second hypothesis that *not all species comprising the* PI will load on the genera established in this study.

The adoption of initial eigenvalues of one and higher shows that G3SHS students' personality consist of nineteen factors. However, only one species had a higher, positive and acceptable loading on factors seventeen and nineteen. While species eight loaded acceptably but negatively on the former (-0.50), species thirteen cross loaded on the latter (0.41) as it loaded higher on factor six (0.46), necessitating the removal of its lower cross loading. The removal of species eight and thirteen from factors seventeen and nineteen resulted in their being irrelevant to personality domain and had to be removed as a consequence, decreasing the number of factors underlying the PI from nineteen to seventeen.

In addition to providing empirical evidence to establish the personality of G3SHS students as a cognitive domain consisting of more than five genera, the results of this study show that species eight, "once I find the right way to do something, I don't stick to it" and species 15, "I am not a very methodical person", are irrelevant to their personality domain because they load negatively on two factors. The results, therefore, suggest the removal of negative acceptable loadings as well as low but acceptable cross loadings as two important additional criteria to determine factors underlying psychological measures such as the PI.

Table 7 presents the descriptive statistics as well as the reliability estimates of Persian PI and its seventeen underlying factors. As can be seen, the number of species comprising the factors ranges from one (Domineering, Agreeable, Friendly, Welcoming, Respectful, Fast-Paced, Proud and Curious) to six (Extravert, Relaxed and Thorough-Going). The 45-item Persian PI itself provides researchers and educators with a highly reliable measure of G3SHS students' personality because its alpha reliability coefficient (RC) is .81. The alpha RC of the Persian PI is higher than the RC reported by K&M12, i.e., $\alpha = .69$ and the same as the RC reported by K&Z, i.e., $\alpha = .81$, indicating that revising the PI by rendering its reverse items positive results in an inventory whose constituting items are fewer, i.e., 45 vs 60, but more reliable than its original version administered to 118 EFL teachers by K&M12.

Table 7: Descriptive Statistics and Reliability Estimates of PI and Its Underlying Factors (N = 610)

No	Factors	# of items	Mini	Maxi	Mean	SD	Skewness	Kurtosis	Alpha
1	Extravert	6	9	30	22.62	4.187	-0.359	-0.256	0.78
2	Relaxed	6	6	30	18.61	4.71	-0.255	-0.309	0.70
3	Conscientious	5	5	25	16.41	3.753	-0.236	-0.253	0.69
4	Organized	2	2	10	7.78	1.779	-0.79	0.114	0.62
5	Thorough-Going	6	12	30	24.65	3.256	-0.619	0.353	0.63
6	Open	4	4	20	14.77	3.145	-0.43	-0.229	0.59
7	Field-Dependent	4	4	20	14.89	2.858	-0.664	0.638	0.57
8	Unorthodox	2	2	10	6.09	2.007	-0.006	-0.755	0.35
9	Domineering	1	1	5	2.81	1.201	0.147	-0.9	-
10	Agreeable	1	1	5	3.45	1.005	-0.4	-0.374	-
11	Friendly	1	1	5	3.35	1.092	-0.202	-0.536	-
12	Welcoming	1	1	5	3.64	1.255	-0.721	-0.57	-
13	Respectful	1	1	5	3.26	1.19	-0.195	-0.99	-
14	Fast-Paced	1	1	5	3.78	1.125	-0.724	-0.261	-
15	Proud	1	1	5	3.61	1.048	-0.571	-0.267	-
16	Considerate	2	2	10	7.67	1.53	-0.588	0.251	0.28
17	Curious	1	1	5	4.03	0.978	-0.936	0.432	-
18	PI	45	102	206	161.42	15.966	-0.214	0.243	0.81

The alpha RC of Domineering, Agreeable, Friendly, Welcoming, Respectful, Fast-Paced, Proud and Curious factors could not be estimated because they consisted of one species each. While traditional approaches towards validation of psychological measures try to ignore the factors consisting of one species as irrelevant, microstructural approach of schema theory treats them as concepts broader than schemata whose functioning as the constituting units of genera underlying the domains under study must be accepted as relevant to the measurement of personality. Since they are a part of the Persian PI whose reliability is already established through their contribution, these one-species factors become reliable as well.

The alpha RC of the remaining nine factors ranges from 0.28 (Considerate) to .78 (Extravert). Although the literature in testing points to a positive relationship between the number of items comprising a given test and its reliability level (e.g., Thorndike & Hagen, 1977), the results of this study partially challenges the assumption. As can be seen in Table 8 above the Extravert, Relaxed and Thorough-Going factors each consist of six species but enjoy the alpha RC of 0.78, 0.70 and 0.63, respectively. Similarly, the Organized, Unorthodox, and Considerate factors consist of two species each but their alpha RCs prove to be 0.62, 0.35 and 0.28, respectively. If we accept Gay's (1990) argument that "a valid test is always reliable" (p. 136), then it can safely be said that all the factors extracted in this study are reliable irrespective of their varying alpha RCs.

Table 8 presents the correlation coefficients obtained between the factors underlying the Persian PI. As can be seen, they all correlate significantly with the PI, indicating that as genera they are all related to personality as a cognitive domain. The correlation coefficients (CCs) of factors with each other, however, range from .145 (Unorthodox) to .746 (Extravert) confirming the *third* hypothesis that *the genera forming the domain of personality will relate to each other differently*. The patterns of relationships found between the genera may help design future research projects on personality. For example, as the first factor, the *Extravert* genus does not relate significantly to *Agreeable*, *Welcoming*, and *Unorthodox* factors established in this study, indicating that extravert G3SHS students are not necessarily agreeable and welcoming within the Iranian society where unorthodox individuals play a little social role, if any.

Table 8: Correlation Coefficients Obtained between the Factors Underlying the PI (N= 610)

PI & Its Factors	Factors								
	1	2	3	4	5	6	7	8	9
PI	.743**	.581**	.534**	.370**	.590**	.415**	.518**	.145**	.183**
1 Extravert	1	.374**	.277**	.136**	.319**	.197**	.442**	.034	.151**
2 Relaxed	.374**	1	.306**	.127**	.143**	-.022	.190**	-.040	.017
3 Conscientious	.277**	.306**	1	.333**	.348**	.030	.050	.002	-.036
4 Organized	.136**	.127**	.333**	1	.341**	.142**	.047	-.069	-.093*
5 Thorough-Going	.319**	.143**	.348**	.341**	1	.233**	.169**	-.048	.058
6 Open	.197**	-.022	.030	.142**	.233**	1	.159**	.039	.096*
7 Field-Dependent	.442**	.190**	.050	.047	.169**	.159**	1	.063	.155**
8 Unorthodox	.034	-.040	.002	-.069	-.048	.039	.063	1	.088*
9 Domineering	.151**	.017	-.036	-.093*	.058	.096*	.155**	.088*	1
10 Agreeable	.069	.032	-.029	-.011	.074	.094*	.021	.018	.083*
11 Friendly	.173**	.144**	-.022	-.031	.103*	.060	.151**	.029	.089*
12 Welcoming	.036	.097*	.042	.075	.119**	.025	.050	-.006	-.084*
13 Respectful	.141**	.135**	.073	.031	.092*	.041	.093*	-.087*	-.007
14 Fast-Paced	.219**	.124**	.044	.022	.054	.059	.146**	-.004	-.014
15 Proud	.110**	.174**	.208**	.120**	.169**	.045	.146**	.043	.010
16 Considerate	.249**	.003	-.066	-.010	.129**	.247**	.157**	.118**	.059
17 Curious	.250**	-.040	-.011	.049	.180**	.271**	.121**	.046	.056

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

* Correlation is significant at the 0.05 level (2-tailed)

Table 8 (Continued): Correlation Coefficients Obtained Between the Factors Underlying the PI (N= 610)

PI & Its Factors	Factors							
	10	11	12	13	14	15	16	17
PI	.157**	.248**	.180**	.237**	.241**	.298**	.294**	.271**
1 Extravert	.069	.173**	.036	.141**	.219**	.110**	.249**	.250**
2 Relaxed	.032	.144**	.097*	.135**	.124**	.174**	.003	-.040
3 Conscientious	-.029	-.022	.042	.073	.044	.208**	-.066	-.011
4 Organized	-.011	-.031	.075	.031	.022	.120**	-.010	.049
5 Thorough-Going	.074	.103*	.119**	.092*	.054	.169**	.129**	.180**
6 Open	.094*	.060	.025	.041	.059	.045	.247**	.271**
7 Field-Dependent	.021	.151**	.050	.093*	.146**	.146**	.157**	.121**
8 Unorthodox	.018	.029	-.006	-.087*	-.004	.043	.118**	.046
9 Domineering	.083*	.089*	-.084*	-.007	-.014	.010	.059	.056
10 Agreeable	1	.068	.047	.110**	.016	-.040	.106**	.044
11 Friendly	.068	1	.013	.092*	.036	-.005	.121**	.078
12 Welcoming	.047	.013	1	.087*	-.031	.071	.022	-.007
13 Respectful	.110**	.092*	.087*	1	.043	.129**	-.014	.057
14 Fast-Paced	.016	.036	-.031	.043	1	.071	.050	.037
15 Proud	-.040	-.005	.071	.129**	.071	1	-.040	.012
16 Considerate	.106**	.121**	.022	-.014	.050	-.040	1	.169**
17 Curious	.044	.078	-.007	.057	.037	.012	.169**	1

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

4. Discussions and Conclusion

While Costa and McCrae (1992) approached personality as a macro schema (Cattell & McCrae, 2007) consisting of five factors and sixty statements, the results of this study showed that their conceptualization could not be empirically confirmed with G3SHS students' responses elicited with the same statements whose reverse ones had been rendered positive. The present authors argue that personality does not exist by itself as a prescriptively established domain through which all people at all educational levels everywhere in the world can be assigned into five categories. It is instead a cognitive domain whose validity is established factorially by the individuals who activate 254 schema types in their mind, apply them to their personal life within the context of sixty species, and analyze and synthesize them one by one in order to decide whether they apply to their personality.

G3SHS students' comprehension of schema types and the species brought up in the NEO-FFI, reduces their numbers from 254 to 210 and 60 to 45, respectively. The 45 species which describes G3SHS students' personality load not on five factors but seventeen genera, supporting Khodadady's (2013) argument that there are no macro schemata such as fields and genres. These are concepts represented by the words employed by writers and speakers which interact with each other within the species expressed to build macro schemata of fields and genres in general and genera and domain in the case of psychological measures such as NEO-FFI. This process has in fact resulted in the irrelevance of Costa and McCrae's 15 species as regards G3SHS students' personality while the remaining 45 cluster together under 17 genera to reveal its complexity, i.e., Extravert, Relaxed, Conscientious, Organized, Thorough-Going, Open, Field-Dependent, Unorthodox, Domineering, Agreeable, Friendly, Welcoming, Respectful, Fast-Paced, Proud, Considerate and Curious.

Following Khodadady and Hesarzadeh's (2014) position that a schema is a dynamic concept because its constituting features change as a result of their readers' construction of "semantic and discoursal relationships it holds with other schemata constituting the context/text" (p. 150), each of the seventeen genera established in this study is defined not in general terms but in terms of the schemata which constitute the species (S) loading acceptably on that genus. The first genus of the PI, therefore, specifies *Extravert* G3SHS students as individuals who are cheerful, high-spirited (S37), busting with energy (S32), light hearted (S12), optimistic (S42), active (S52) and liked by others (S34).

The second genus characterizes *Relaxed* G3SHS students as individuals who are rarely sad or depressed (S46). They rarely feel lonely or blue (S16), tense or jittery (S21), fearful or anxious (S31). Neither do they get angry at the way people treat them (S36) nor do they feel helpless and want someone else to solve their problems (S51). *Conscientious* G3SHS students are, however, individuals who work hard to accomplish their clear set of goals (S35 and 25) and do not waste a lot of time before settling down to work (S30). They are pretty good about pacing themselves so as to get things done on time (S10) and don't like to waste my time daydreaming (S3).

Organized genus identifies G3SHS students as individuals who do in fact keep their belongings clean and neat (S5) and are often able to get organized (S55). *Thorough-Going* G3SHS students, however, strive for excellence in everything they do (S60) try to perform all the tasks assigned to them conscientiously (S20), and try to be thoughtful and considerate (S49). They are not willing to manipulate people to get what they want even if it is necessary (S59), are productive people who always get the job done (S50) and when they make a commitment, they can always be counted on to follow through (S40).

As the sixth factor underlying the PI, *Open* genus deals with G3SHS students who feel a chill or wave of excitement when they are reading poetry or looking at a work of art (S43) and are influenced by poetry (S23). Not only are they intrigued by the patterns they find in art and nature (S13) they are also interested in speculating on the nature of the universe or the human condition (S48). As the seventh factor, the *Field-Dependent* genus typifies G3SHS students as individuals who usually prefer to do things with others (S27), really enjoy talking to people (S17), like to have a lot of people around them (S2)", and would rather cooperate with others than compete with them (S19).

G3SHS students who believe they should not look to their religious authorities for decisions on moral issues (S38) and often try new and foreign goods (S28) establish the *Unorthodox* genus as the eighth factor underlying the PI. Their *Domineering* peers are also distinct in that they would rather be a leader of others than go their own way (S57) as *Agreeable* G3SHS students are in not being hard-headed and tough-minded in their attitudes (S44).

Similar to *Agreeable* genus, the *Friendly* genus consists of a single species, i.e., 39, "No one thinks of me as cold and calculating". However, in contrast to *Agreeable* genus whose main character is the respondent himself judging his own attitudes, the *Friendly* genus requires the PI takers to put themselves in the shoes of others and then judge themselves in terms of their view as regards their not being cold and calculating. Similarly, the *Welcoming* genus as the twelfth factor underlying the PI considers G3SHS students who do not let people know when they don't like them (S54) as individuals having a distinct personality of their own.

Respectful genus forms the thirteenth dimension of personality when it distinguishes G3SHS students who do not tend to be cynical and skeptical of others' intentions (S24) as individuals having their own specific personality as does species 47, "My life is fast-paced" single out the fourteenth genus called *Fast-Paced*. Similarly, species 56, "I have rarely been so ashamed I just wanted to hide" identifies the fifteenth genus of the PI called *Proud*.

The sixteenth factor of PI, however, bestows *Considerate* personality on those G3SHS students who laugh easily (S7) and often notice the moods or feelings that different environments produce (S16). And finally, the *Curious* genus distinguishes G3SHS students who have a lot of intellectual curiosity (S53) as individuals enjoying personality of their own. Out of 12 species forming Costa and McCrae's (1992) Openness factor, species 8, 18 and 58 did not load on any genera established in this study while three (13, 23, 43 and 48) and two (28, 38) loaded on *Open* and *Unorthodox* genera, respectively. Species 3, 33 and 53, however, singled out the *Conscientious*, *Considerate*, and *Curious* genera, respectively. These findings show that similar to other four factors, the Openness dimension is a heterogeneous superordinate schema which does not stand replication validity. According to Cattell, and Mead (2007),Although proponents of the other five-factor models have done much in the last decade to try to bring about a consensus in psychology about the existence of five global factors, their particular set of traits have been found to be problematic. In the development process, the NEO Big Five factors were forced to be statistically uncorrelated or orthogonal for reasons of theoretical and statistical simplicity. However, few have found this as a satisfactory approach for defining the basic dimensions of human personality. (pp. 141-142)

The results of the present study do, however, challenge Cattell, and Mead's (2007) quotation above blaming the orthogonal approach adopted by Costa and McCrae (1992) as their method of extraction, i.e., orthogonal vs oblique solution. Similar to Costa and McCrae an orthogonal approach was adopted in this study. However, instead of five, seventeen factors were extracted.

It is, therefore, argued that these are the schemata employed in the species which bring about factors underlying given domains, not the methods of extraction employed in statistical analyses. (Though it must be acknowledged that following different extraction methods do bring about slight differences in results.) Since the activation and application of the schemata within the context presented in the species of PI depend directly on its takers' personal experiences, the factors which are extracted from the species will depend on participants' age and educational level to name few. It is, therefore, suggested that the present study be replicated with grade four senior high school students to test the argument.

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