

A CROSS-SECTIONAL ANALYSIS OF PERSONALITY DIFFERENCES BETWEEN ARTS & SCIENCE AND ENGINEERING STUDENTS

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Abstract

Personality plays an undeniable role in shaping an individual's particular behaviour and widely accepted that it can be predicted. With this framework and intent the present study was done to gauge and capture such uniqueness and differences of personality dimensions especially in student's community based on their academic pursuit and gender. A multiple cross-sectional, survey design under conclusive research is adopted by employing 371 samples drawn from Arts & Science¹ and Engineering students². A questionnaire consists of personality self-report items from the International Personality Item Pool (Goldberg, 1999) with two more demographic variables, was developed. The results showed a preponderance presence of 'Agreeableness' over other personality factors in the chosen sample. Further, Academic Pursuit (Arts & Science¹ and Engineering²) led to significant differences in one of the personality factor 'Openness', and Gender played a role in causing the significant differences in 'Extraversion' and 'Agreeableness'.

Keywords: Personality, Big Five personality factors, Arts & Science, Engineering, Students.

1. INTRODUCTION

Personality is the impression an individual makes on others. It is a set of traits which are found in an individual with relative stability and allows other to be able to partially predict behavior and identify difference from other. (Gangi, 1999). Addressing Human universals, Individual differences and Individual uniqueness are the three-part focus of personality psychologists. They attempt to understand how different aspects of an individual's psychological life are related to each other, and also relate the society and culture in which the person lives (Magnusson, 2012) by breaking them in to whole, integrated, coherent and unique individual.

Almost all personality psychologists believe that personality play an undeniable role in shaping an individual's particular behaviour and its prediction is possible with the identification of personality (Eskandar, 2012; Kaviani, 2007), by way of organizing those individual differences in terms of five broad, bipolar dimensions (John, Naumann & Soto, 2008; McCrae & Costa, 2008), known as Big Five. "Big" was meant to refer to the finding that each factor subsumes a large number of more specific traits such as Neuroticism (N), Extraversion (E), Openness (O), Agreeableness (A), and Conscientiousness (C). All these factors together develop a complete set of behavior orientation, constant feelings, and cognition patterns (T.Chamorro-Premuzic, V.Swami, A.Furnham and I.Maakip, 2009), although it is unlikely to have an internal correlation among them. The factor definitions in Table 1 are based on the work by Costa and McCrae (1992). The definitions suggested by other researchers are quite similar.

Table 1. The Big Five Trait Factors and Illustrative Scales

Personality Factor	Characteristics of the High scorer	Characteristics of the Low scorer
Neuroticism (N)	Worrying, Nervous, Emotional, Insecure, Inadequate	Calm, Relaxed, Unemotional, Hardy, Secure, Self-satisfied
Extraversion (E)	Sociable, Active, Talkative, Person-Oriented, Optimistic, Fun-Loving, Affectionate	Reserved, Sober, Unexuberant, Aloof, Task-Oriented, Retiring, Quiet
Openness (O)	Curious, Broad Interests, Creative, Original, Imaginative, Untraditional	Conventional, Down-To-Earth, Narrow Interests, Unartistic, Unanalytical
Agreeableness (A)	Soft-Hearted, Good-Natured, Trusting, Helpful, Forgiving, Gullible, Straightforward	Cynical, Rude, Suspicious, Uncooperative, Vengeful, Ruthless, Irritable, Manipulative
Conscientiousness (C)	Organized, Reliable, Punctual Hard-working, Self-Disciplined, Neat, Ambitious, Persevering	Aimless, Unreliable, Lazy, Careless, Lax, Negligent, Weak-Willed, Hedonistic

Source: Costa and McCrae (1992)

With the above framework several studies have been undertaken by sampling various respondents like students, investors, doctors, engineers, etc. No doubt, the number of publications dealing with cross-cultural differences is increasing in manifold. As one among those numerous research, the objective of this study was to gauge and capture such uniqueness and differences of personality dimensions of student's community based on academic pursuit and gender. If personality dimensions are measured and explored well, the results could be used for determining their attitude, behaviour and for the purpose of recruitment, selection and their career development. Therefore, 25 personality self-report items from the International Personality Item Pool were included as part of this study.

2. METHODOLOGY

2.1 Research Design

A multiple cross-sectional, survey design under conclusive research is adopted as it permits to draw samples from a population at a particular point in time. (Shaughnessy & Zechmeister, 1997)

2.2 Sample

A total of 418 students participated by completing the given survey questionnaire on personality. Only data from participants that remain fully answered or (and) valid were considered for analysis. Hence, 47 questionnaires were rejected and concluded with a response acceptance rate of 88.75%. 187 Arts & Science and 184 Engineering students comprised the total sampling unit of 371. Out of the total 139 males and 232 females were drawn as samples from twelve different academic institutions located in Coimbatore, Tamil Nadu.

2.3 Measurement

25 personality self-report items from the IPIP (Goldberg, 1999) were taken as part of the study with an additional two demographic variables such as Gender and Educational Profile. Personality dimensions viz Agreeableness, Conscientiousness, Extraversion, Neuroticism, and Openness were measured based on a six point likert-scale response ranging from: Very Inaccurate (1) to Very Accurate (6). Scores for individual items (Reverse coded where it is required) from each sub scale were summed up to produce a total score. In order to ensure the scale free from random error its internal consistency was checked by Cronbach's coefficient alpha as shown in table 2. All personality dimensions had high reliability except openness. The marginally acceptable reliability should be above 0.60 (Gliner & Morgan, 2000). According to that all measures of this study are above 0.60 which demonstrates reliability. Therefore the result of reliability analysis is in tandem with the prescription. Another personality related investigative study by Sherry, Hewitt, Flett, Lee-Baggley, Hall (2007) had internal consistencies at A = .75, C = .83, E = .80, N =.85 and O = .68.

Table 2. Cronbach's Alpha Reliability of Arts & Science and Engineering Students for IPIP

Personality Factors	Arts & Science (N = 187)	Engineering (N = 184)
Agreeableness	.75	.72
Conscientiousness	.74	.74
Extraversion	.81	.74
Neuroticism	.79	.79
Openness	.66	.63

Source: Author's computation

2.4 Data Analysis

All statistical analysis was made with IBM SPSS 20. Descriptive statistics (Table 3) were used to analyse the results. Scale Reliability got verified with Cronbach alpha coefficients for all personality dimensions. Pearson product-moment correlation coefficient was computed to gauge the degree to which two variables go together: T-test and One-way ANOVA were used to dissect the personality differences between samples. Eventually the structure underlying a group of personality factors (uniqueness) among the cross-sectional samples was attempted.

Table 3. Descriptive Statistics (Mean) for the personality scale

Personality Construct	Arts & Science (N = 187)	Engineering (N = 184)	Male (N = 139)	Female (N = 232)
A1	2.22	2.15	2.50	2.00
A2	4.70	4.87	4.42	5.00
A3	4.42	4.62	4.27	4.67
A4	4.54	4.58	4.48	4.60
A5	4.57	4.58	4.51	4.61
C1	4.59	4.51	4.52	4.57
C2	4.28	4.31	4.29	4.30
C3	4.29	4.41	4.30	4.38
C4	2.53	2.72	2.82	2.50
C5	3.43	3.43	3.53	3.37
E1	3.09	2.91	3.32	2.81
E2	3.30	3.03	3.36	3.05
E3	3.84	4.22	3.91	4.10
E4	4.25	4.29	4.24	4.29
E5	4.34	4.59	4.35	4.53
N1	2.69	2.89	2.76	2.80
N2	3.27	3.45	3.22	3.44
N3	3.13	3.25	2.97	3.32
N4	3.31	3.28	3.40	3.23
N5	2.82	2.77	2.44	3.01
O1	4.71	5.08	5.06	4.79
O2	2.56	2.29	2.26	2.53
O3	4.55	4.73	4.68	4.61
O4	4.99	4.96	4.99	4.97
O5	2.35	2.28	2.34	2.31
Neuroticism	3.04	3.12	2.95	3.16
Extraversion	3.55	3.73	3.47	3.74
Openness	4.08	4.30	4.28	4.14
Agreeableness	4.40	4.49	4.23	4.57
Conscientiousness	3.83	3.81	3.75	3.87

Source: Author's computation

3. RESULTS

The arrangement of mean values of personality constructs in Table 3 reveals that no much difference is felt between the personality factors of Arts & Science¹ and Engineering students² (Constructs scoring top most and least) and no difference between the personality factors of Male and Female students of Arts & Science¹ and Engineering². In case of Arts & Science¹ students the construct “Spend time reflecting on things” (O4) scored a highest mean of 4.99 and “Am full of ideas” (O1) scored a mean of 5.08 in case of Engineering students². The construct “Am full of ideas” (O1) scored a highest mean of 5.06 in case of Male students and “Inquire about others' well-being” (A2) scored a highest mean of 5.00 by Female students. In all cases the construct “Am indifferent to the feelings of others” (A1) has scored a least mean excepting for male category. They scored very less mean of 2.26 for “Avoid difficult reading material” (O2).

Cohen (1988) suggests that a correlation coefficient between ± 0.30 and ± 0.49 is medium, which occurs between Extraversion and Agreeableness as the highest shown by Table 4 for Arts & Science¹ students. Further the statistical significance of the difference between the groups was tested by converting r values into z scores based on McCall (1990). If the obtained Z_{obs} is between -1.96 and $+1.96$, the proposed null hypothesis cannot be rejected. So it is concluded that there is a statistically significant difference in the strength of the correlation between Neuroticism and Extraversion, Extraversion and Conscientiousness, Openness and Conscientiousness (Shaded part in table) for Arts & Science¹ and Engineering students².

Table 4. Correlations among the personality factors of IPIP

Academic Pursuit of the Student	Personality Factors	1	2	3	4	5
Arts & Science (N = 187)	1. Neuroticism	-	-.353**	-.087	-.171*	-.138
	2. Extraversion		-	.205**	.443**	.314**
	3. Openness			-	.008	.191**
	4. Agreeableness				-	.230**
	5. Conscientiousness					-
Engineering (N = 184)	1. Neuroticism	-	-.116	-.097	-.122	-.277**
	2. Extraversion		-	.285**	.436**	.160*
	3. Openness			-	.168*	.420**
	4. Agreeableness				-	.279**
	5. Conscientiousness					-
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						

Source: Author's computation

Further, the study of statistical significance of the differences between personality factors based on gender in Table 5 revealed a Z_{obs} outside the specified bounds which led to the rejection of null hypothesis. Hence a statistically significant difference in the strength of the correlation between Extraversion and Conscientiousness exists for males and females.

Table 5. Correlations among the personality factors of IPIP

Gender of the Student	Personality Factors	1	2	3	4	5
Male (N = 139)	1. Neuroticism	-	-.316**	-.074	-.086	-.327**
	2. Extraversion		-	.209*	.485**	.398**
	3. Openness			-	-.003	.292**
	4. Agreeableness				-	.262**
	5. Conscientiousness					-
Female (N = 232)	1. Neuroticism	-	-.219**	-.082	-.221**	-.146*
	2. Extraversion		-	.285**	.393**	.129*
	3. Openness			-	.169**	.298**
	4. Agreeableness				-	.235**
	5. Conscientiousness					-
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						

Source: Author's computation

To find out whether there is a significant difference of personality factors based on Academic pursuit an independent sample T test was conducted. As shown in Table 6 the openness had a significant difference in scores for Arts & Science¹ ($M=4.08$, $SD=0.959$) and Engineering students² [$M=4.30$, $SD=0.789$]: $t(369) = -2.45$, $p <= 0.05$]. The magnitude of the differences in the means was small ($\eta^2 = 0.016$).

The possibility of significant difference of personality factors based on Gender was examined through an independent sample T test. As shown in Table 6 Extraversion had a significant difference in scores for Males ($M=3.47$, $SD=1.18$) and Females [$M=3.74$, $SD=1.13$]: $t(369) = -2.14$, $p <= 0.05$]. The magnitude of the differences in the means was small ($\eta^2 = 0.012$). Agreeableness had a significant difference in scores for Males ($M=4.23$, $SD=0.98$) and Females [$M=4.57$, $SD=0.83$]: $t(369) = -3.45$, $p <= 0.05$]. The magnitude of the differences in the means was small ($\eta^2 = 0.031$).

Table 6. T Test among the personality factors of IPIP

Personality Factors	Based on Academic Pursuit	Difference in Mean	Based on Gender	Difference in Mean
	t – value (df = 369)		t – value (df = 369)	
Neuroticism	-.69	Not Significant	-1.70	Not Significant
Extraversion	-1.54	Not Significant	-2.14	Significant*
Openness	-2.45	Significant*	1.52	Not Significant
Agreeableness	-1.01	Not Significant	-3.45	Significant*
Conscientiousness	.234	Not Significant	-1.19	Not Significant

*. The mean difference is significant at the 0.05 level.

Source: Author's computation

One-way between-groups analysis of variance was done by checking the Ns for each group as the intention is to know the group difference. Hence a new four-way category of samples was made to meet the requisites of one-way ANOVA. The re-defined sample groups are Male; Arts & Science, Female; Arts & Science, Male; Engineering and Female; Engineering. Thereafter Levene's test for homogeneity of variances got verified whether the variance in personality factors scores is the same for each of the four groups as given below in Table 7. Existence of statistically significant difference means can be found for Openness and Agreeableness.

Table 7. One-way ANOVA of differences between personality factors based on Academic pursuit and Gender

Personality Factors	Levene's Test	ANOVA	Mean Differences
	Sig.	Sig.	
Neuroticism	0.792	0.181	Not Significant
Extraversion	0.142	0.067	Not Significant
Openness	0.062	0.010	Significant*
Agreeableness	0.080	0.001	Significant*
Conscientiousness	0.950	0.528	Not Significant

*. The mean difference is significant at the 0.05 level.

Source: Author's computation

Post-hoc comparisons using the Tukey's Honestly Significant Difference test indicated that the mean score of the Group *Female; Engineering* (M=4.30, SD=0.76) towards 'openness' was significantly different (Higher) from *Female; Arts & Science* group (M=3.96, SD=0.99). No difference is observed for the remaining groups.

The mean score of 'Agreeableness' for the Group *Female; Engineering* (M=4.66, SD=0.74) was significantly different from *Male; Arts & Science* (M=4.27, SD=0.98) and *Male; Engineering* (M=4.18, SD=0.98). *Female; Arts & Science* group did not differ significantly from either group. Computed effect size (Eta Squared) in the terms of Cohen (1988) for the sample groupings were 0.01, 0.02, 0.03, 0.04 and 0.006 indicating a small effect.

4. DISCUSSION

A noteworthy similarity between the groups created for one-way ANOVA was explored through descriptive statistic measure of Means. Both males learning Arts & Science¹ and Engineering² have scored the personality construct "Am full of ideas" (O1) at a maximum and "Avoid difficult reading material" (O2) at a lowest level. Probably it reflects their attitude towards reading. In the same way both females learning Arts & Science¹ and Engineering² have scored the personality construct "Am indifferent to the feelings of others" (A1) at a miniscule level.

Table 8. Descriptive Statistics for the IPIP personality score

Mean values of Personality Factors				
	Arts Male	Arts Female	Engineering Male	Engineering Female
	N = 74	N = 113	N = 65	N = 119
Agreeableness	4.27	4.48	4.30	4.66
Openness	4.26	3.96	4.18	4.30
Conscientiousness	3.71	3.92	3.79	3.86
Extraversion	3.46	3.61	3.49	3.82
Neuroticism	2.83	3.18	3.09	3.14

Source: Author's computation

Table 8. captures the participants nature to describe themselves as more agreeable and more open. This attribute prevails in a predominant manner in all groups irrespective of the academic pursuit and gender.

A significant, medium correlation was found between 'Extraversion' and 'Agreeableness' in case of Arts & Science¹ and Engineering² students. A significant, medium correlation was also found between 'Extraversion' and 'Agreeableness' in case of Male and Female students. Probably their more 'social' in nature during their young age incline them to agree things as it is irrespective of their branch of study and gender.

Analysis of data with the help of T test has concluded that Academic Pursuit (Arts & Science¹ and Engineering²) led to significant differences in one of the personality factor 'Openness', and Gender played a role in causing the significant differences in 'Extraversion' and 'Agreeableness'. In both scales of 'Extraversion' and 'Agreeableness' females outnumbered their counterparts which is quite impressive. Growing importance of girl's education and their inevitable stronger role in society, changing life style, and increased social-relations might have changed female's attitude in a practical way. No differences were found in other personality factors. In an earlier study by Colin Silverthorne, (2001) 'openness' revealed personality differences between groups, a matching outcome of this study.

With the re-defined four-way category of samples (*Male; Arts & Science, Female; Arts & Science, Male; Engineering* and *Female; Engineering*) the adopted One-way between-groups analysis of variance has disclosed significant differences on 'Openness' between females pursuing their academics at Arts & Science¹ and Engineering². To say clearly, females pursuing their academics in Engineering stream (M=4.30) are seems to be more of 'open type' than their counterparts (M=3.96). It may be due to the amount of confidence; team-work, the necessity of networking with others might have shaped them. No differences were found in other groups.



In terms of 'Agreeableness' a significant differences was found for the three enlisted groups viz Female; *Engineering, Male; Arts & Science and Male; Engineering*. No differences were found in case of female students pursuing Arts & Science¹ stream.

5. CONCLUSION

In this paper an attempt was made to gauge and capture uniqueness and differences of personality dimensions of student's community based on their academic pursuit and gender. The results show that the personality factors 'Agreeableness' and 'Openness' are present notably high in all the participants. Based on the choice of the academic pursuit of the student and gender statistically significant differences were observed for the personality factors like 'Agreeableness', 'Openness' and 'Extraversion'. Based on the analysis of data and findings following suggestions are offered. The degree of 'Agreeableness' by the samples seem to be relatively on the higher end which needs to be toned down. Excepting the males pursuing Arts & Science stream for the remaining 'Neuroticism' score is more. A low score on 'Neuroticism' combined with a high score on 'Conscientiousness' will enable their career pathway much easier, smoother and successful.

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