

Personality Traits across Academic Majors and Gender in University Students

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Personality influences multiple areas of an individual's life. The personality traits have been reported to vary across gender, academic majors and age, based on Western literature. This study aimed to look at the differences amongst personality traits across academic majors and gender in Pakistani undergraduate students. The sample consisted of 300 students (130 men, 170 women). It was hypothesized that there will be differences in personality traits (Agreeableness, Open Mindedness, Negative Emotionality, Extraversion, Conscientiousness) across academic majors (natural sciences, social sciences, humanities, business). The results supported previous literature as it was reported that Business students scored higher on Extraversion than Social Science students, whereas Agreeableness and Open Mindedness scores were found to be higher in Social Science students than Business students. It was also hypothesized that there would be differences in personality traits (Agreeableness, Open Mindedness, Negative Emotionality, Extraversion, Conscientiousness) across gender. Agreeableness, Open Mindedness and Negative Emotionality scores were found to be higher in women than men, while no differences were found in Conscientiousness and Extraversion scores. Further research needs to be conducted in Pakistan.

Keywords: personality psychology, Big Five, academic major, gender, group differences

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Personality has been studied by psychologists in order to gain insight into human behavior and the mind. Personality influences the way individuals perceive and view things (Schoen & Schumann, 2007), music choices (Rentfrow & Gosling, 2003) and perception of pain (Ibrahim, Weber, & Genevay, 2018). In industrial and organizational psychology, personality assessments are used to assess job performance and personnel selection (Rothstein & Goffin, 2006).

This study explored personality differences across academic majors and gender. For this study, personality traits were defined with the help of big five personality theory which includes Agreeableness, Conscientiousness, Extraversion, Open-Mindedness and Negative Emotionality (Soto & John, 2017). Agreeableness is defined as the quality of being kind, Conscientiousness as being goal-oriented, Extraversion as being sociable, Open-mindedness as showing interest in new experiences and Negative Emotionality as being moody and anxious (Schultz & Schultz, 2009). The variable of academic majors was divided into four categories: Natural Sciences, Social Sciences, Humanities and Business and the variable of gender was defined in terms of men and women.

Previous western literature has suggested that the personality traits vary across academic majors (Kidron, Kaganovskiy & Baron-Cohen, 2018). Holland's (1985) theory of person-environment fit argues that individuals choose academic majors which fit with their personality, hence, personality differences have been reported across academic majors (Porter & Umbach, 2006). Neuroticism, Agreeableness and Openness scores have been reported to be higher in Psychology majors than Law and Economics students (Vedel, Thomsen, & Larsen, 2015).

Personality differences have also been reported across gender. Neuroticism, Conscientiousness, Agreeableness and Openness scores were reported to be higher in women than men (Vedel, Thomsen, & Larsen, 2015). However, these personality traits have not been studied across gender in a Pakistani context.

Personality psychology is the branch concerned with human nature (Hogan, 1998). In the 1930s, personality psychology emerged due to the contributions of Gordon Allport (Schultz & Schultz, 2009). Personality includes all those internal and external traits, which remain stable over the course of life and may affect behavior. Before the traits approach, the psychoanalytic and neo-psychoanalytic approach existed

(Schultz & Schultz, 2009). Psychoanalytics proposed the three levels of personality: the unconscious, pre-conscious, and conscious (Schultz & Schultz, 2009). Furthermore, he proposed the three basic structures of personality: the id, which operates on the pleasure principle and requires immediate gratification, the ego, which mediates between id and superego to fulfill desires in a realistic way, and the superego, which operates on the morality principle and contains internalized messages from society, and culture (Koenane, 2014). Further building on Freud's theory, Jungian paradigm proposed two attitudes: Introversion and Extraversion. Introverts are more withdrawn, introspective and reflective, while extraverts are sociable and outgoing (Mahoney, 2018). Eysenck (1990), further, characterized Extraversion as being active, assertive, seeking out adventure and the external world and possessing a carefree attitude (Schultz & Schultz, 2009)

Furthermore, the Five-Factor model was proposed by Costa and McCrae (1992), which consist of five traits: Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness to Experience (Schultz & Schultz, 2009). Extraversion is characterized by focusing energy towards the outside, external world, while Agreeableness is characterized by possessing a kind, caring nature. Conscientiousness individuals are organized and goal-oriented and those high on Neuroticism are characterized by moodiness and anxiety and those high on Openness seek out new, fresh, creative experiences (Schultz & Schultz, 2009). Social learning theory was proposed by Bandura (1977) and argued that observational learning and modelling helps shape personality (Schultz & Schultz, 2009).

The personality traits have been related with academic major choices in many studies. Porter and Umbach (2006) explored personality traits in relation to Holland's theory of person-environment (1985). Six types of environments were explored: realistic (like Engineering), investigative (research like Sociology etc.), social (like Psychology etc.), enterprising (involving leaderships like Business etc.), artistic (like Music etc.) and conventional (like Accounting etc.) Personality traits were found to be congruent with academic environments based on the person-environment fit, as social majors like Psychology were likely to have social personality with interpersonal skills. Personality traits have been reported to vary across academic majors. Vedel, Thomsen and Larsen's (2015) study on university students reported that Agreeableness and Openness scores

were higher in Psychology students than Economics and Law students. Economics and Medicine students scored lower on Neuroticism than Psychology students. The most extraverted group was Economics students and for Economics students it was a strong GPA predictor, and Psychology students were the most Conscientious group and for Psychology students, Conscientiousness was a strong GPA predictor. Similar findings were reported by Vedel (2016), as Economics students scored the highest on Extraversion, whereas Economics students scored lower on the Openness trait than Psychology and Law students, and on Neuroticism, Psychology students scored the highest.

The dark triad traits can explain the variance in personality traits across academic majors (Vedel & Thomsen, 2017). Economics and Business students were reported to score highest on the dark triad traits and Psychology students scored the lowest on dark triad traits. Extraversion is associated with the dark triad traits and Economics students scored the highest on it. Agreeableness is not associated with Dark triad traits, as Agreeableness is characterized by kindness and Psychology students scored the highest on Agreeableness (Vedel & Thomsen, 2017). Pre-existing personality traits differences across academic majors were explored and it was reported that those who were highly introverted and conscientious preferred Humanities, Health Sciences and Art (Balsamo et al., 2012). Extraverted students preferred Economics and Law and the least Conscientious were Military students (Balsamo et al., 2012). Thus, personality traits are not due to socialization but due to pre-determining factors. However, Allred, Granger and Hogstrom (2013) reported that science majors are stereotyped as neurotic, however, science majors' Neuroticism scores were not found to be higher than Humanities and Business students. The question, thus remains whether these personality variances across academic major are due to socialization or pre-existing.

Furthermore, personality traits have also been found to vary across gender. Women have been reported to have higher Agreeableness, Neuroticism and Conscientiousness scores than men. No gender differences were found on the Extraversion and women were not more open-minded than men (Vedel, 2016). On the dark triad traits, men also scored higher than women while women were more conscientious and agreeable (Vedel & Thomsen, 2017). On Extraversion, men scored higher on intellect and excitement seeking and women scored higher on Neuroticism and Agreeableness than

men, which was attributed to stressful life circumstances like violence against women. (Kajonius & Johnson, 2018). Social role theory (Eagly & Wood, 2016) argues that society expects genders to act according to their traditional roles so women are more agreeable as they are expected to be nurturing, while men more extraverted as they are expected to be assertive.

Culture and age can also influence personality differences across gender as it was reported that women are higher on Neuroticism than men in the age range of 16-25 years and women showed a decrease in Neuroticism in the age range of 26-35 years due to marriage which is seen in a positive light in India (Magan et al., 2014). Men had an increase in Neuroticism in the age range of 36-45 years due to increase in stress and workload (Magan et al., 2014).

Gender differences have also been reported across the Big Five facets. Weisberg, DeYoung and Hirsh (2011) reported that compassion, politeness, volatility, openness, and enthusiasm scores were higher for women than men. However, intellect and assertiveness scores were higher for men. Enthusiasm facet scores in relation to Extraversion were higher amongst women, while assertiveness facet scores were higher in men, thus, highlighting that at the personality level, gender differences exist too. However, more research needs to be conducted in Pakistan to explore the differences in personality traits across academic majors and gender.

Objectives of the Study

- To explore the differences in personality traits (Agreeableness, Open Mindedness, Negative Emotionality, Extraversion, Conscientiousness) across academic majors (Natural Sciences, Social Sciences, Humanities, Business)
- To explore gender differences in personality traits (Agreeableness, Open Mindedness, Negative Emotionality, Extraversion, Conscientiousness)

Hypotheses of the Study

- There will be personality differences (Agreeableness, Open Mindedness, Negative Emotionality, Extraversion, Conscientiousness) across academic majors (Natural Sciences, Social Sciences, Humanities, Business).

- There will be gender differences in personality traits (Agreeableness, Open Mindedness, Negative Emotionality, Extraversion, Conscientiousness)

Method

Research Design

A comparative research design was used to compare the variance of mean scores of personality traits across academic majors and gender.

Sample

The population was university students from a private university located in Lahore, Pakistan. The sample consisted of 300 participants (130 men, 170 women) including 97 freshmen, 58 sophomores, 67 juniors and 78 seniors. The sampling strategy was stratified random sampling. The age range was 18-23 years. Double majors were not selected based on the exclusion criteria.

Assessment Measures

Demographic Profile Form. The demographic profile form asked information regarding age, gender, academic major and academic year.

Big Five Inventory-2 [BFI-2, Soto & John, 2017]. The Big Five Inventory-2 measured personality using a 60-item inventory, which had 12 items per trait: Extraversion, Agreeableness, Conscientiousness, Negative Emotionality and Open-mindedness. A 5-point Likert-type response scale measures all the items (1=disagree strongly, 2=disagree a little, 3=neutral, 4=agree a little, 5=agree strongly). The BFI-2 was administered in English and was freely available online. The Cronbach alpha coefficient was reported to be .83 (Soto & John, 2017).

Procedure

The research was reviewed by the Board of Studies Department and the Institutional Review Board (IRB) before data collection started. The questionnaire was given to the participants to be

filled out and it contained the informed consent, which explained the purpose of the study. It contained the demographic profile form and personality inventory and participants were informed that it would take about 5-10 minutes to fill the questionnaire. Consent was taken through signature and provision of initials, but if the participant was not comfortable then only verbal consent was obtained.

Data collection took place over the course of 3 months. The Social Sciences Department building was visited and every 4th person was approached from the crowd, they were asked to fill a questionnaire, provided with a clipboard and pen and on return of the questionnaire, the items were reviewed. Participants were asked to fill out any unfilled items, but if they were not comfortable, then they were thanked for their time and cooperation. The same procedure was repeated for the Natural Sciences building.

After data collection, the questionnaires were brought into the supervisor's office to be numbered, coded and added into the Statistical Package for the Social Sciences (SPSS) (Version 20).

Ethical Considerations

Informed consent was taken from the participants and no deception or harm to the participants was involved. Confidentiality and anonymity of responses were maintained. The right to withdraw was given.

Results

Data was entered into SPSS (Version 20) and statistical analysis was run on it. For descriptive statistics, measure of central tendency (mean) and frequencies and percentages were computed. For inferential statistics, a one-way between-groups ANOVA was used to explore differences in personality traits across the academic majors. An independent-samples t-test was computed to explore the mean score variance of personality traits across gender.

Table 1

Frequency and Percentages of Gender, Academic Year, Academic Major and Self-selected Major (N=300)

Variables	<i>f</i> (%)
Gender	
Men	130 (43)
Women	170 (57)
Total	300 (100)
Academic Year	
Freshman	97 (32)
Sophomore	58 (19)
Junior	67 (22)
Senior	78 (26)
Total	300 (100)
Academic Major	
Natural Sciences	102 (34)
Social Sciences	73 (24)
Humanities	50 (17)
Business	75 (25)
Total	300 (100)
Self-selected Major	
Yes	289 (96)
No	11 (4)
Total	300 (100)

Frequencies and percentages of gender, academic year and academic major are highlighted in Table 1. There are 97 freshmen (32%), 58 sophomores (19%), 67 juniors (22%) and 78 seniors (26%). There were 130 men (43%) and 170 women (57%). There are 102 natural science majors (34%), 73 social science majors (24%), 50 humanities majors (17%) and 75 business majors (25%).

Table 2

Means and Standard Deviations of Age and the Big Five Personality Traits and Cronbach's Alpha for the Big Five Personality Traits (N=300)

Variables	<i>M</i>	<i>SD</i>	α
Age	20.83	1.71	-
Extraversion	37.71	7.59	.752
Agreeableness	41.78	5.89	.610
Conscientiousness	38.69	6.87	.701
Negative Emotionality	39.02	8.30	.800
Open Mindedness	42.82	5.82	.538

Table 2 highlights means and standard deviations. The mean age was 20.83 (*SD*=1.71). The mean score for Extraversion was 37.71 (*SD*=7.59), Agreeableness was 41.78 (*SD*=5.89), Conscientiousness was 38.69 (*SD*=6.87), Negative Emotionality was 39.02 (*SD*=8.30) and Open-mindedness was 42.82 (*SD*=5.82). Cronbach alpha coefficients were calculated and high internal consistency was reported for Extraversion (α =.75), Conscientiousness (α =.70) and Negative Emotionality (α =.80). Low internal consistency was reported for Agreeableness (α =.61) and Open Mindedness (α =.54).

Table 3

Means and Standard Deviations for ANOVA for Academic Major with the Big Five Personality Traits as the dependent variables (N=300)

BFI Traits	Groups	<i>M</i>	<i>SD</i>
Extraversion	Natural Sciences	37.53	7.03
	Social Sciences	35.59	9.16
	Humanities	39.18	6.84
	Business	39.01	6.69
Agreeableness	Natural Sciences	41.13	6.05
	Social Sciences	43.47	5.79
	Humanities	40.96	5.57
	Business	41.57	5.77

(continued)

BFI Traits	Groups	<i>M</i>	<i>SD</i>
Conscientiousness	Natural Sciences	38.75	6.26
	Social Sciences	38.68	8.46
	Humanities	37.84	6.81
	Business	39.17	5.99
Negative Emotionality	Natural Sciences	38.92	8.37
	Social Sciences	39	8.92
	Humanities	40.36	8.29
	Business	38.29	7.64
Open Mindedness	Natural Sciences	42.06	5.54
	Social Sciences	44.47	5.47
	Humanities	42.88	6.39
	Business	42.20	5.91

Table 4

Summary of ANOVA for Academic Major with the Big Five Personality Traits as the dependent variables (N=300)

	<i>df1</i>	<i>df2</i>	<i>p</i>
Extraversion	3	295	.019
Agreeableness	3	296	.040
Conscientiousness	3	296	.768
Negative Emotionality	3	296	.597
Open Mindedness	3	296	.037

Table 4 indicates the results of the one-way between-groups ANOVA, which was computed to see the variance of personality traits mean scores (dependent variables) across academic majors (independent variable). A statistically significant difference was found at the $p < .05$ level in Extraversion scores [$F(3, 295) = 3.4, p = .02$], Agreeableness scores [$F(3, 296) = 2.8, p = .04$] and Open Mindedness scores [$F(3, 296) = 2.9, p = .04$] for the four academic major groups. Eta squared indicated a small effect size of .03 for Extraversion, Agreeableness and Open Mindedness. This indicates that there were only small differences in the mean scores of Extraversion, Agreeableness and Open-mindedness.

For the post-hoc comparisons, the LSD test was used. For Extraversion scores, participants with Social Science majors ($M = 35.53, SD = 9.16$) scored significantly different from Humanities

($M=39.18$, $SD=6.84$; $p=.01$) and Business majors ($M=39.01$, $SD=6.69$; $p=.01$). Agreeableness scores for Social Science majors ($M=43.47$, $SD=5.79$) were found to be significantly different than Natural Sciences ($M=41.13$, $SD=6.05$; $p=.01$), Humanities ($M=40.96$, $SD=5.57$; $p=.02$) and Business majors ($M=41.57$, $SD=5.77$; $p=.05$). On Open Mindedness, Social Science majors ($M=44.47$, $SD=5.47$) also scored significantly different from Natural Sciences ($M=42.06$, $SD=5.54$; $p=.01$) and Business majors ($M=42.20$, $SD=5.91$; $p=.02$).

Table 5

Means, Standard Deviations, df, p, Cohen's d, LL and UL values of Men (N=130) and Women (N=170) Across Five Traits of BFI-2 (N=300)

BFI-2 Traits	Men		Women		df	p	Cohen's d	LL	UL
	M	SD	M	SD					
Extraversion	37.44	7.12	37.91	7.95	297	.60	.02	-2.21	1.28
Agreeableness	40.79	5.12	42.54	6.34	297.11	.01	.4	-3.05	-.44
Conscientiousness	38.35	6.83	38.95	6.89	298	.45	.03	-2.18	.97
Negative Emotionality	37.18	7.62	40.44	8.54	290.94	.00	.7	-5.10	-1.41
Open Mindedness	41.60	5.78	43.75	5.69	298	.00	.6	-3.46	-.83

Table 5 shows gender differences in personality scores through the results of the independent-samples t-test. Agreeableness scores were found to be significantly different for men ($M=40.79$, $SD=5.12$) and women [$M=42.54$, $SD=6.34$; $t(297.11)=-2.64$, $p=.01$] as women showed more agreeableness than men. Negative Emotionality scores were also found to be significantly different for men ($M=37.18$, $SD=7.62$) and women [$M=40.44$, $SD=8.54$; $t(290.94)=-3.42$, $p=.001$] as women scored higher than men. There was also a significant difference for Open Mindedness scores of men ($M=41.60$, $SD=5.78$) and women [$M=43.75$, $SD=5.69$; $t(298)=-3.22$, $p=.001$] as women scored higher than men. For Agreeableness ($d=0.4$), a small effect size was reported. For Open-Mindedness ($d=0.7$) and Negative Emotionality ($d=0.6$), medium effect sizes were reported.

Discussion

The present study looked at the variance of personality traits across academic majors and gender. Holland's (1985) theory of person-environment fit argues that students tend to major in fields

which their personality is congruent with. Based on this theory, Psychology students were found to be more agreeable, open and neurotic than Economics and Law students (Vedel, Thomsen, & Larsen, 2015).

On Conscientiousness, Psychology students scored the highest and Conscientiousness has been reported to predict a high GPA in Psychology students (Poropat, 2014; Vedel, Thomsen, & Larsen, 2015). Business and Law students scored the highest on the dark triad traits, as they were found to score lowest on Agreeableness (Vedel & Thomsen, 2017).

Costa and McCrae (1992) characterized Agreeableness as possessing the quality of being good and kind towards others (Schultz & Schultz, 2009). Based on the theory of agreeableness of Costa and McCrae (1992), a plausible explanation for why Social Science majors scored higher on Agreeableness than business majors is because their major and career field requires them to be kind and understanding towards others and offer empathy, hence, these traits aid them in both their academic and career field, thus, supporting the person-environment fit theory of Porter & Umbach (2006).

Jungian paradigm focuses on the concept of Extraversion and defined extraverts as possessing the qualities of being lively, outgoing and seeking out the external world and external connections. Eysenck (1992), further characterized extraverts as possessing a carefree attitude and being assertive (Schultz & Schultz, 2009). Business majors were found to be more extraverted than Social Science majors.

A plausible explanation for this can be provided through Holland's (1985) theory of person-environment fit, as it could be argued that Business majors are more extraverted and outgoing, because these social skills are in congruence with their academic environment and later on, provide them success in their career (Porter & Umbach, 2006).

It can be questioned then as to why Business majors are more extraverted than Social Science majors when both disciplines require social skills. It can be explained through the dark triad traits theory as Business majors were found to be less Agreeable and scored higher on the dark triad traits than Social Science majors, it can be argued that Business majors use their social skills to get ahead in the business field and manipulate others whereas Social Science majors use their Agreeableness and social skills to help others. Social Science majors also scored higher on Open Mindedness than Business majors, hence,

their open mindedness helps them to understand different perspectives and to empathize (Vedel & Thomsen, 2017).

The question remains whether these personality traits are pre-existing or due to social learning? According to Bandura (1977), it could be that extraverts learned to be extraverted by modelling their teachers and Psychology students learned to be agreeable by observing their teachers being empathetic towards others. Hence, social learning might be involved (Schultz & Schultz, 2009).

The personality traits have also been reported to vary across gender as on Negative Emotionality and Agreeableness, women scored higher than men and previous studies support these findings (Kajonius & Johnson; Vedel, Thomsen & Larsen, 2015; Vedel, 2016; Vedel & Thomsen, 2017).

Women have been found to be higher on Negative Emotionality, Agreeableness and Open Mindedness than men. This can be explained through social role theory (Eagly & Wood, 2016), as in Pakistan, both genders are expected to follow traditional roles and hence, women are expected to be the nurturers, hence, they are more Agreeable to fulfill that role and sometimes fulfilling that role, they face stressful circumstances, which leads to higher Negative Emotionality and higher Open Mindedness in order to adapt to the new circumstances.

Implications

- Further research needs to be conducted on whether BFI traits are pre-determined or acquired through social learning.
- Highlights the importance of personality testing in educational settings
- Highlights the importance of academic and career counseling
- This research also highlights the importance of personality traits in predicting academic performance
- Cultural differences across personality and gender are also highlighted

Conclusion

The research found group differences in personality traits across academic major and gender. This research can be used as a foundation to conduct further research in Pakistan in this area.

However, further research needs to be conducted in Pakistan to see if the findings can be replicated. Different cross-sections like socioeconomic status and ethnicity need to be explored in order to see whether they predict differences in personality traits across academic major and gender.

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