



Factor Structure and Reliability of Big Five Inventory: A Study on Indian Tribal Population

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Abstract

The Current study aimed to investigate the structural organization of the Big Five Personality Inventory developed by John & Srivastava. The study comprises of 140 tribal students belonging to various tribal communities and groups making a composition of Adi, Galo, Nyshii, and Apatani to be found mostly in the University's premises. The primary data has been collected by administering a Big Five Personality Inventory. The reliability and factor structure of the inventory were measured. Among the total of 44 items, the total five major factors were extracted, representing only three main items in each factor with high factor loading, these five factors collectively accounted for 66.88% of total variance in personality traits on the sample of tribal students. The correlation matrix table revealed that extraversion exhibited strong inter correlations with agreeableness, conscientiousness, and neuroticism.

Keywords: Big Five Inventory, Personality Traits, Tribal Population.

Introduction

The term "tribe" can be considered as one of the indigenous forms of societal organization, consisting of people who have witnessed the authenticity of the traditional lifestyle. The term "tribe" provides a universally accepted definition which is not a simple task because various scholars emphasize different aspects of tribal communities and their ancestral lifestyles. The term "tribe" emerged in light of the Latin word "tribus," which implies to a race or a regional group of people. Tribes consist of those individuals who have a common ancestry and belong to a local community. According to the World Book Encyclopedia, a tribe is defined as "a group of people living in a specific area, speaking the same language, obeying a leader or elder, and sharing a common way of life." The Imperial Gazetteer of India describes tribe in terms of "a collection of families bearing a common name, speaking a common language, residing in or claiming a common territory, although they may not originally be indigenous." According to Majumdar, "a tribe is a group of families or a gathering of families with a common name, whose members share a common territory, speak the same

language, observe certain restrictions regarding marriage, occupation, or profession, and have developed a recognized system of communication and a sense of shared responsibilities" (1).

In order to understand the unique features and characteristics of the students belonging from various tribal communities it is important to acknowledge their personality which certainly having a important influence not only as influential but also as determining their overall success and prosperity in life. Interest in understanding personality has existed since the dawn of civilization. In this context, the environment in which children are raised, including their family, society, and culture, becomes significantly important. Regardless of the cultural or societal context, children and adolescents face various kinds of pressures, both personal and social. The term "personality" has its roots in the Latin word "persona," which originally meant a mask. Interestingly, in the theatre of the ancient Latin-speaking world, masks weren't used to conceal a character's identity but were instead a

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convention employed to represent or symbolize that character. Personality can also encompass the consistent patterns of thoughts, feelings, and behaviours exhibited by an individual over time. These patterns strongly influence their expectations, self-perceptions, values, attitudes, and how they respond to people, challenges, and stress. Likewise, the term "personality" signifies the set of predictable behavioural responses that make an individual recognizable to others (2).

Personality is frequently described in relation to traits. Traits are the distinct behavioural attributes that are both typical and unique to an individual. These traits represent consistent patterns in an individual's behaviour across various situations. An individual's personality can be thought of as an arrangement or combination of these traits. Study provides further insight into traits by defining them as "inherent fundamental tendencies that, when considered within a cultural framework, lead to the development of habits, attitudes, skills, beliefs, and other characteristic adaptations" (3). In this study the personality traits of the students will be assessed by using the Big Five factor model. The Big Five Inventory has five parts that each define a person's personality characteristics. Following is a list of the behavioural traits that each component represents: there may be some Individual difference in the extraversion in terms of social, aggressiveness, and energy level aspects. Further, there may be some kind of variation on the agreeableness trait in terms of deference, empathy, and acceptance of others. The person who are high on pleasant may exhibit emotional care, having favourable to other. On the other side people who are having disagreeable exhibit low level of consideration for others but in a socially adequate conduct. On the conscientiousness factors related to productivity, responsibility the variation may be observed. Similarly, in another factor of personality that is neuroticism which can be seen in terms of strength and more frequency of unpleasant feelings. Next factors i.e Openness to Experience may observe in terms of imaginative warmth, rational curiosity and creative ability (4). From earlier studies it was observed from the findings that adolescents' mental health can be improved by employing personality assessments

correctly and activating the Barnum effect (5). The Big Five personality traits were substantially linked with domains of grit and Meta cognition (6). Findings stated that students with stable personality traits are well-adjusted than students with neurotic personality traits (7). The tribal students, who are extroverts by nature, are more outgoing and often adapt better than their introverted classmates. Prior research has demonstrated that personality changes (as well as other psychological qualities) have an impact on how people react in dangerous situations. Personality traits are additionally thought of as individual factors that affect hazard identification (8). In earlier research it was found that there was no significant variation on the dimension of personality with respect to the tribal and non-tribal populations (9). According to another study it was revealed that tribal post graduate students are found to be happier, less neurotic and less open to experience than non-tribal post graduate students (10). It was also found out in a study that pupils who exhibit the motivational feature of seeking pleasure had the characteristics of agreeableness and openness to experiences (11). On the other hand, the extraversion, agreeableness, and openness to experience personality traits are shared by students who exhibit the trait of self-satisfaction. Other researcher found that personality traits can be associated with the cognitive control (12).

Problem Statement

The reason behind of the current study was to serve various purposes which were not considerably found in earlier studies as per the review of literature provided. This study holds a unique feature by conducting its research on the premises of Rajiv Gandhi University, Arunachal Pradesh. Secondly, it will help in focussing on the tribal populations who have their own norms, values and behaviours culturally. In this way it will allow for a more culturally sensitive approach to understanding personality. Thirdly, it can help identify specific personality factors that may influence health-related behaviours and mental health outcomes. Moreover, it will try to understand the psychometric investigation in support of the personality traits on the basis of factor analysis which will give a deeper

insight on the factors which holds responsible assessing the personality of the tribal students (13).

Objectives

- To explore the structural organization of big five personality inventory among tribal students.

Hypothesis

- Structural analysis of big five personality inventory is likely to replicate the five-factor model of personality.

Methodology

The current study followed non-experimental research specifically the correlational research design. Since it is non-experimental study, therefore the simple random sampling techniques were used to fulfil the objective of the study of the study. Sample was selected only from the premises of Rajiv Gandhi University, Arunachal Pradesh. Data was collected with the help of structured The Big Five Inventory (BFI) questionnaire.

Sample

The universe of the study comprises of 140 tribal students belonging from various tribal communities and groups making a composition of Adi, Galo, Nyshii and Apattani to be found mostly in the premises of Rajiv Gandhi University, Arunachal Pradesh. The age ranges of the universe of the sample were 21- 24 years comprising of both male and female. Simple random sampling techniques were used to fulfil the objective of the study of the study.

Inclusion Criteria

- Participants taken in the study were tribals in nature belonging to any tribal community of Arunachal Pradesh.
- Participants were selected from postgraduate courses only.

Exclusion Criteria

- Participants belonging from other states were not selected for the study.

Tools

The Big Five Inventory (BFI)

The Big five inventories consisted of forty-four questions that measure personality traits. Srivastava has mentioned the reliability coefficient range from

0.75 to 0.80, and the sub scales of the inventory reported with a three mounts test-retest reliability appropriately (0.80 to 0.90). On the current data, the BFI confirmed internal consistency for the mentioned four subscales (for the extraversion it was reported Cronbach's $\alpha = 0.799$, for Agreeableness it was observed Cronbach's $\alpha = 0.751$, on the other factors i.e. Conscientiousness the Cronbach's α reported was 0.794, and for the neuroticism factor it was 0.828), next factors Openness to experience reported a low level of Cronbach's alpha (Cronbach's $\alpha = 0.672$).

Data Collection Method

By keeping in view of the objective of the study the data was collected from the participants by using standardized and structured tools which are meant for assessing personality traits. The current study was conducted by applying psychological methods using psychological tools. Personality assessment tools includes 44 items that require the person to give her appropriate answer on each of the item on a 5-point likert scale ranged start from "strongly disagree" to "strongly agree".

Statistics

After the data collection the filled data was analysis by using the SPSS software. It was the aim of the paper to estimate the reliability coefficient of the personality measure. The method of reliability, i.e. the internal consistencies was examined by estimating Cronbach's Alpha. The present research employed Factor Analysis and Correlation analysis to find out the answer to research questions.

Results and Discussion

The purpose of the present study was to explore the factor structure of the Big Five Inventory on the tribal population at Rajiv Gandhi University, Arunachal Pradesh, hence the table no. 1 and Figure-1 graphically represents the descriptive statistics like mean, SD, skewness and kurtosis of all the measured variables were computed to understand the level and the distribution of scores. The Extraversion score ranged start from one (minimum) to three (maximum), mean 1.99, Standard deviation .587, Variance .345, Skewness .002, Kurtosis -.042. Agreeableness ranges from a minimum 2 to maximum 4, Mean 2.91, Standard

Deviation .529, Variance .280, Skewness -.093, Kurtosis .530. Conscientiousness scores ranged minimum 1 to maximum 4, Mean 2.32, Standard Deviation .579, Variance .335, Skewness .734, Kurtosis .527, This implies that the value of Skewness is positive, then the distribution is skewed to the right and the tails are heavier on the right.

Neuroticism score ranged start from minimum 1 to maximum 3, Mean 2.11, Standard Deviation .559, Variance .312, Skewness -.037, Kurtosis .142. Openness ranges from a minimum 2 to maximum 4, Mean 2.98, Standard Deviation .472, Variance .223, Skewness -.070, Kurtosis 1.609.

Table 1: Descriptive Statistics

	Min	Max	Mean	Std. Deviation	Variance	Skewness	Kurtosis
Extraversion	1	3	1.99	.587	.345	.002	-.042
Agreeableness	2	4	2.91	.529	.280	-.093	.530
Conscientiousness	1	4	2.32	.579	.335	.734	.527
Neuroticism	1	3	2.11	.559	.312	.037	.142
Openness	2	4	2.98	.472	.223	-.070	1.609

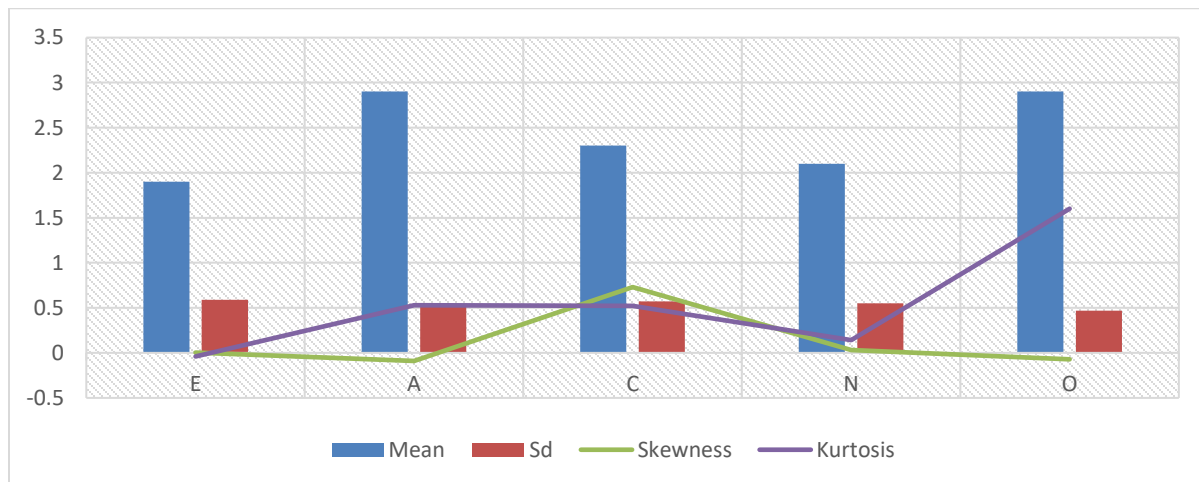


Figure 1: Indicating Mean, SD, Skewness and Kurtosis

Table 2 represents the reliability coefficient of the BFI on the tribal population. The most used technique for evaluating the personality inventory reliability is Cronbach alpha. The Cronbach Alpha value ranges from 0 to 1, a sufficient importance value more than 0.6 is necessary for the scale to be

considered reliable (14). Current study, the reliability statistics estimated for forty-four items is 0.59 (approx. 0.6) as shown in Table 2. This implies satisfactory reliability showing that the items are appropriate for analysis of personality factors.

Table 2: Reliability of BFI on tribal student

S. No	Number of Items	Cronbach's Alpha Based on Standardized Items	Cronbach's Alpha
1	44	0.610	0.595

The above-mentioned Table 3 reflecting the KMO measure of sampling adequacy. The Kaiser-Meyer-

Oklin (KMO) measure is another technique for assessing whether data are suitable for factor

analysis. The KMO Statistics ranges from 0 to 1 (15), values above 0.5 are considered acceptable, between 0.5 and 0.7 are considered moderate, between 0.7

and 0.8 are considered good, and between 0.8 and 0.9 are considered superior (16).

Table 3: Factorial Validity of KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.632
Bartlett's Test of Sphericity	Approx. Chi-Square	1900.018
	Df	946
	Sig.	.000

The above statistical test was used to confirm its applicability according to Bartlett's test of sphericity (17). KMO for 44 items of Big Five Personality

Inventory has observed a value of 0.632. This score suggested that the sample used for factor analysis was statistically moderate.

Table 4: Loading of scale items on factors by Rotated Factor Matrix

BFI items and Component	Component				
	1	2	3	4	5
Factor 1- Extraversion					
Is talkative	.820				
Is sometimes shy, inhibited	.729				
Is outgoing, sociable	.698				
Generates a lot of enthusiasm	.676				
Tends to be quiet	.671				
Has an assertive personality	.660				
Is full of energy	.614				
Is reserved	.479				
Factor 2- Agreeableness					
Has a forgiving nature		.763			
Is considerate and kind to almost everyone		.744			
Is helpful and unselfish with others		.712			
Is generally trusting		.667			
Likes to cooperate with others		.661			
Starts quarrels with others		.656			
Can be cold and aloof		.645			
Tends to find fault with others		.642			
Is sometimes rude to others		.578			
Factor 3- Conscientiousness					
Is a reliable worker			.727		
Makes plans and follows through with them			.727		
Does things efficiently			.707		
Tends to be lazy			.701		
Perseveres until the task is finished			.696		
Tends to be disorganized			.682		
Is easily distracted			.665		
Does a thorough job			.663		

Can be somewhat careless	.646	
Factor 4- Neuroticism		
Can be moody		.718
Worries a lot		.712
Gets nervous easily		.685
Is emotionally stable, not easily upset		.674
Is depressed, blue		.657
Is relaxed, handles stress well		.603
Remains calm in tense situations		.597
Can be tense		.473
Factor 5 – Openness		
Can be somewhat careless		.762
Is sophisticated in art, music, or literature		.744
Has few artistic interests		.737
Is inventive		.677
Is curious about many different things		.668
Has an active imagination		.665
Values artistic, aesthetic experiences		.660
Prefers work that is routine		.610
Is original, comes up with new ideas		.594
Is ingenious, a deep thinker		.567

The above Table 3 explains that the data was suitable to run the factor analysis and hence it revealed about the suitability of relevant data. Data related to the big factor inventory further employed the principal component method of factor analysis; the above table no 4 which revealed five major factors.

Furthermore, the solution was also obtained by applying set number of factors. Accordingly, 8 test items came under Factor 1 (extraversion), nine items come under Factor 2 (agreeableness), 9 items for Factor 3 (conscientiousness), 8 items for Factor 4 (neuroticism), and 10 items for Factor 5 (openness).

Table 5: The extracted factors together with their Eigen values, percentage of variance and cumulative

Factor along with item Numbers	Eigen value	Variance Percentage of Eigen value	Cumulative Variance Percentage
E item no. 1	5.594	12.714	12.714
A item no. 2	3.627	8.243	20.957
C item no. 3	2.408	5.474	26.431
N item no. 4	2.145	4.874	31.305
O item no. 5	2.018	4.587	35.892
E item no. 6	1.767	4.016	39.908
A item no. 7	1.666	3.786	43.694
C item no. 8	1.561	3.549	47.243
N item no. 9	1.484	3.374	50.616
O item no. 10	1.332	3.027	53.644

E item no. 11	1.259	2.861	56.505
A item no. 12	1.211	2.752	59.257
C item no. 13	1.161	2.638	61.894
N item no. 14	1.136	2.581	64.476
O item no. 15	1.061	2.412	66.888

Extraction Method: Principal Component Analysis.
Factors: E= Extraversion, A= Agreeableness, C= Conscientiousness, N= Neuroticism, O= Openness

According to the Kaiser criteria, the finding of this current sample extracted total five major factors, each major factor comprising three items, all of which had Eigen values exceeding one. The Eigen value representing cumulative square to estimate the factor loadings for each one factor and signify the amount of variance contributed by the specific factor. It's contributed in terms of a particular Eigen value about the observed factor, with higher values indicating a greater share of the variance accounted by the factor. In our study, results of table no. 5 identified and ordered these five factors with their respective Eigen values, with a focus on maximum variance. Factor loading, which denotes the correlation between each variable and its associated factor, the range, may vary between -1 and +1. The variance explained by all corresponding factors to the square of factor loading and is referred to as the Eigen value. Notably, the initial Eigen value is always the largest and exceeds one, while subsequent factors have lower Eigen values. The ideal factor structure for each one of the variable exhibits' high lodes on factor (greater than 0.5) on one specific factor and a low factor loading (below 0.2) on all other factors. Moreover, high factor loads indicating desirable formal validity appear to capture latent traits or characteristics effectively (18). The first

factor, encompassing items 1, 6, and 11, holds the utmost significance when evaluating the personality traits of tribal students at Rajiv Gandhi University in Arunachal Pradesh. This factor independently contributes to 19.57% of the overall influence within the factor structure used for personality assessment. Moving to the second factor, which incorporates items 2, 7, and 12, it is responsible for elucidating 14.77% of the variations observed in agreeableness traits among the University's tribal students. The third factor, involving items 3, 8, and 13, accounts for 11.64% of the changes seen in the Conscientiousness trait of these students' personalities. The fourth factor, comprising items 4, 9, and 14, explains 10.82% of the fluctuations in the Neuroticism trait within the same population. Lastly, the fifth factor, involving items 5, 10, and 15, contributes to 10.01% of the changes witnessed in the Openness trait of personality for tribal students at Rajiv Gandhi University in Arunachal Pradesh.

These findings (mention in Table 5) collectively indicate that the five factors identified in this dataset have the remarkable ability to predict a total of 66.88% variance of the observed changes in personality traits among the University's tribal students.

Table 6: Correlation Matrix

	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
Extraversion	1	.204*	.246**	-.171*	.129
Agreeableness		1	.278**	-.236**	.194*
Conscientiousness			1	-.352**	.157
Neuroticism				1	-.046
Openness					1

Note: *. Indicating significant on zero point zero five levels (2-tailed).
Note: **. Indicating significant on zero point zero one level (2-tailed).

In the above Table 6, the correlation is shown between the personality factors of the Big Five

inventory. Extraversion is positively correlated with Agreeableness (.204) and Conscientiousness (.246)

at the 0.05 and 0.01 levels of significance, respectively. Extraversion is also negatively correlated with Neuroticism (-.171) at the 0.05 level of significance. From the table, it can also be observed that Agreeableness is positively correlated with Conscientiousness (.278) and Openness (.194) at the 0.01 and 0.05 levels of significance, respectively. Whereas Agreeableness is negatively correlated with Neuroticism (-.236) at the 0.01 level of significance. Conscientiousness observed inverse correlation with Neuroticism (-.352) at the 0.01 levels.

Conclusion

According to the finding of the study, it may be concluded that the reliability statistics for the 44 items in the Big Five Inventory were 0.59, which can be approximated to 0.6, indicating satisfactory reliability (Cronbach Alpha). Among these 44 items, the study's Kaiser-Meyer-Olkin (KMO) value was 0.632, signifying a moderate level of significance for the sample used in the factor analysis. Additionally, according to Bartlett's test analysis it was found a chi-square value of 1900.01, data representing statistically significant for employing the analysis for factor analysing. Out of the 44 items, only 15 were extracted with eigen values higher than the threshold, thereby confirming that all five factors (extraversion, agreeableness, conscientiousness, neuroticism, and openness) from the Big Five Inventory were explored to assess the personality traits of tribal students at Rajiv Gandhi University, Arunachal Pradesh. This fulfils the hypothesis that structural analysis of big five personality inventory is likely to replicate the five-factor model of personality. Notably, extraversion contributed the most to the overall inventory of personality traits, explaining a higher percentage of variance. Among the total of 44 items, the initial 15 items, representing three items from each of the five factors, collectively accounted for 66.88% of the variance in assessing personality traits among the university's tribal students. This finding contradicts the earlier study which suggested that the five-factor measures were not suitable for Indian students when using NEO and BFI 10 inventories with an Indian adult sample which emphasizes that

validating measures on adults does not automatically ensure their reliability and validity for adolescents (13). Furthermore, the correlation matrix table revealed that extraversion exhibited strong inter correlations with agreeableness, conscientiousness, and neuroticism.

Limitations

The findings of the current study will be better generalized to Tribal students related to the Rajiv Gandhi University, Arunachal Pradesh. Hence it can be generalized only to the mentioned population.

Abbreviation

Big Five Inventory (BFI).

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Author Contributions

Dr. Sandeep has been one of the experts who has made valuable contribution in overall planning, writing and formulation of paper by using higher order statistical analysis and interpretation.

Conflict of Interest

The authors declare that there is no conflict of interest.

Ethics Approval

Informed consents were taken from the participant before the data collection.

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