PSYCHOMETRIC PROPERTIES OF THE BANGLA VERSION OF THE BIG FIVE PERSONALITY INVENTORY-10

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ABSTRACT

Shorter assessing instrument for measuring psychological construct is on the rise in recent years. Personality measuring instruments are not an exception to this. The present study aimed to assess the psychometric properties of the Bangla version of the Big Five Personality Inventory–10 (BFI-10). This instrument was translated into Bangla and back-translated into English by following the International Test Commission's guidelines. After the pretest, the translated version of this scale was administered on a sample of 372 students. Psychometric properties were estimated through both classical test theory and item response theory. Findings revealed that the Bangla version of this scale had sufficient inter-item correlations, inter-factor correlations, test-retest reliability, non-DIF contrast, and Rasch model fit. This translated scale would be applicable to assess the personality of the Bangladeshi people and fulfill the demand fora short version of the personality assessment scale in the Bangladesh context.

Keywords: Big Five Personality, Psychometrics, Rasch Analysis, Reliability, Validity.

INTRODUCTION

Personality is the unique behavioral and mental processes that characterize an individual and his interaction with the surrounding environment (Crider *et al.,* 1983). It can be defined as enduring interpersonal, experiential, emotional, motivational, and attitudinal styles that explain one's behavior in different situations. It is a stable psychological feature that is related to a broad range of attitudes and behaviors (Correa *et al.,* 2010). There are several approaches to the development of the personality. The trait approach is one of these. Traits can be defined as consistent characteristics and behaviors of a person which they show in different situations (Feldman 2015). Trait theories of personality describe the personality in terms of necessary basic traits. Gordon Allport was the proponent of the trait approach of the personality. Thurstone (1934) identified five factors

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that anticipated in the contemporary Big Five personality traits model. The Big Five personality traits approach is the most widely used personality approaches for research purposes in recent years. Cattell (1943) used factor analysis to identify central traits that represent personality and identified 16 source traits as the basic personality factors (Cattell 1965). Some researchers (Tupes and Christal 1992; Norman 1963; Digman and Takemoto-Chock 1981; Goldberg 1981) applied the Cattell's techniques and identified five factors. Tupes and Christal (1992) labeled these five factors as surgency (assertive talkativeness), agreeableness, dependability, emotional stability, and culture. Norman (1963) labeled the same as Tupes and Christal (1992) except the 3rd factor as conscientiousness. Above mentioned researchers identified the Big Five Model using the lexical hypothesis to investigate trait-descriptive terms. Using personality questionnaires, McCrae and Costa (1987) identified five factors structure also. They labeled five factors as neuroticism, extraversion, agreeableness, conscientiousness, and openness. They identified six underlying facets of each factor.

There are several measures for assessing the big five personality traits. The Big Five Inventory (BFI: John *et al.,* 1991) is one of them. This inventory comprised of 44 items that was the shortest measure for assessing big five traits during that time. However, time has changed. In present days, researchers are more interested in shorter versions of the psychometric instruments. Single item Narcissism scale (Konrath *et al.,* 2014), single-item self-esteem scale (Robins *et al.,* 2001) etc. are the example of shorter version scale. These scales have good psychometric properties. From the demand of using the shorter assessment instrument, Rammstedt and John (2007) developed a ten items scale for assessing big five traits from the BFI (John et al., 1991). In this scale, two items were used to assess each trait. This short scale has sufficient psychometric properties for applying in assessing intended personality traits. There was a scarcity of such a short scale for assessing personality traits of the Bangladeshi people. So, the present study was aimed to adapt the short version of the Big Five Inventory in Bangladeshi culture. This scale would help the relevant users (i.e., psychologists, researchers etc.) to assess the personality traits of Bangladeshi people within a few minutes. This study's main objective was to assess the psychometric properties of the short version of the BFI in Bangladeshi culture.

MATERIALS AND METHODS

Participants
In the present study, a sample of 372 students from the University of Chittagong,
Bangladesh, were selected through convenience sampling technique. Participants'
mean age was 20.85 years with standard deviation of 2.11 years. Among
participants, 200 were male and 172 were female, 133 brought up in the village
and 239 brought up in city, and 289 brought up in nuclear family and 86 from
extended family.

Measure
The Big Five Personality Inventory-10 (BFPI-10: Rammstedt and John, 2007)
comprise ten items (2 items in each factor). The five factors are – extraversion,
agreeableness, conscientiousness, neuroticism, openness. Among items, item 1
and 6 measure extraversion, item 2 and 7 measure agreeableness, item 3 and 8
measure conscientiousness, item 4 and 9 measure neuroticism, and item 5 and 10
measure openness. Item 1, 3, 4, 5, and 7 are negative items. Participants expressed
their opinions using a 5-point Likert-type scale ranging from 1 (Strongly
Disagree) to 5 (Strongly Agree). Test-retest reliabilities of the inventory were
ranged from .68-.83. This instrument was highly correlated with the NEO
Personality Inventory-Revised (NEO-PI-R; Costa and McCrae, 1992) ranged
from .51-.70 (Rammstedt and John 2007).

The Big Five Personality Inventory-10 (BFPI-10) was translated into Bangla
language by two bilingual experts. Then, translations were adjusted into one.
Again, two other experts examined this translation. They checked the conceptual
equivalence of words or phrases, but not a word for word translation. They
recommended some modifications. According to these recommendations, the
translated version of the BFPI-10 was adjusted again after some changes. Then,
two experts back-translated the translated measure into the original language.
Their translations were synthesized into one and checked by two other experts.
They compared the content of the original version and the back-translated version.
All of them rated that items of the two versions had the same content. Next phase,
the measure was administered on a sample of 30 students. Observations ensured
that the BFI-10 Bangla was understandable to participants. It had no ambiguity or
double meaning.

Procedure

The final study was carried out to estimate the reliability and validity of the BFPI-10 Bangla version. At the beginning of the study questionnaire administration, participants were requested to read the written instructions carefully. They were informed about the objectives and significance of the study. They were assured about the confidentiality of their responses. They were asked to filling the personal information form and read the questionnaire and express their opinion for each item by putting 'tick' ($\sqrt{}$) on the appropriate response boxes that were the best expression of their opinions.

Statistical Analysis

Descriptive statistics (e.g., mean, standard deviation, skewness, and kurtosis), Pearson product-moment correlation coefficient (inter-item correlations, convergent validity, test-retest reliability) were performed in SPSS. Differential item functioning (DIF) contrast was assessed between males and females. The Rating Scale Model of the Rasch analysis was used to estimate the item validity. Item validity was tested through weighted fit statistics (infit) mean square (MnSq) and outlier sensitive fit statistic (outfit) mean square.

RESULTS AND DISCUSSION

Table 1 shows descriptive statistics of all items and 5 traits of the inventory. Skewness and kurtosis values of items suggest the normality of the data. Kim (2013) suggested that skewness value more than 2 and kurtosis value less than 7 suggest non-normality of the data. So we can proceed to further analysis.

TABLE 1 : DESCRIPTIVE STATISTICS OF BANGLA BFPI-10

	Mean	Std. Deviation	Minimum	Maximum	Skewness	Kurtosis
Item 1	3.67	1.34	1.00	5.00	-.489	-1.18
Item 2	4.21	.82	1.00	5.00	-1.11	1.60
Item 3	3.38	1.34	1.00	5.00	-.17	-1.29
Item 4	2.39	1.10	1.00	5.00	.65	-.14
Item 5	3.71	1.09	1.00	5.00	-.48	-.65
Item 6	3.96	1.20	1.00	5.00	-.96	-.21
Item 7	4.30	.90	1.00	5.00	-1.13	.57
Item 8	3.72	.98	1.00	5.00	-.73	.36
Item 9	2.78	1.33	1.00	5.00	.07	-1.22
Item 10	4.05	.99	1.00	5.00	-1.06	.81
Extraversion	7.63	2.25	2.00	10.00	-.72	-.66
Agreeableness	8.51	1.41	2.00	10.00	-1.18	1.70
Conscientiousness	7.10	1.96	2.00	10.00	-.26	-.70
Neuroticism	5.17	2.04	2.00	10.00	.18	-.78
Openness	7.76	1.75	2.00	10.00	-.59	-.10

Reliability

Internal consistency reliability: As a rule of thumb, at least 3 items are required to estimate the *Cronbach's Alpha* reliability. Pallant (2016) suggested to assess inter-item correlation when items are fewer than 10. So, consistency reliabilities of the inventory were assessed through inter-item correlation.

Table 2 shows that inter-item correlations of each personality trait of the BFPI-10 Bangla version were ranged between .342 ((p<.001) and .562 (p<.001). These scores suggested that the BFPI-10 had sufficient inter-item correlations. Briggs and Cheek (1986) recommended optimal range of *mean* inter-item correlation is .2-.4. He opined that score lower than .1 unlikely to represent the adequate complexity of the items. He also opined that scores higher than .5 suggested that the scale's items are overly redundant and assessed construct is too specific. Inter-item correlation of the extraversion was above .5, but this does no not pose the multicollinearity problem. Therefore, this value could be acceptable.

TABLE 2 : INTER-ITEM CORRELATIONS AND TEST-RETEST RELIABILITIES OF THE BFPI-10 BANGLA

Traits	Inter-item correlation	Test-retest reliability
Extraversion	.562*** [.489, .628]	.830*** [.699, 907]
Agreeableness	.342*** [.249, .429]	.688*** [.480, .823]
Conscientiousness	.415*** [.327, .495]	.724*** [.533, .845]
Neuroticism	.411*** [.323, .492]	.714*** [.517, .839]
Openness	.408*** [.320, .490]	.720*** [.526, .842]

***p<.001; values in the parentheses are 95% confidence interval

Test-retest reliability: For estimating the test-retest reliability, data were collected from 30 students from the University of Chittagong with an interval of 1 month. Table 3 shows that test-retest reliabilities of BFPI-10 Bangla are ranged from .688 to .830. The minimum value for acceptable test-retest reliability is .7. Except for the agreeableness, all subscales had exceeded this value. However, the reliability value of agreeableness also very close to .7. Furr (2011) opined that there is no clear cut-off points those separating poor and good reliabilities, but values between .70-.80 are viewed as sufficient. From this point, the Bangla BFPI-10 had acceptable test-retest reliabilities.

Validity

Content Validity: Content validity is the systematic examination of the test content to determine whether it covers a representative sample of the behavior domain to be measured. The essential remarks of the expert panels assured the content validity of the Bangla BFPI-10.

Convergent Validity: Table 3 shows that all traits measured by the Bangla BFPI-10 significantly correlated with each other (ranged from -.212 to .419).

TABLE 3 : CORRELATION COEFFICIENTS AMONG TRAITS OF THE BFPI-10BANGLA

Traits	Extraversion	Agreeableness	Conscientiousness	Neuroticism
Agreeableness	.283***			
	[.187, .374]			
Conscientiousness	.229***	.295***		
	[.131, .323]	[.199, .385]		
Neuroticism	-.257***	-.249***	-.413***	
	[-.349, -.159]	[-.342, -.151]	[-.494, -.325]	
Openness	.212***	.363***	.419***	-.369***
	[.113, .307]	[.271, .448]	[.332, .500]	[-.454, .278]

***$p<.001$, values in the parentheses are 95% *confidence interval*

Differential Item Functioning (DIF)

Mentel χ^2 (ranged from .001 to 2.16), *Standardized Liu-Agresti Cumulative Common Log-Odds Ratio*s (ranged from -1.471 to 1.478), and *Standardized Cox's Noncentrality Parameter*s (ranged from -1.47 to 1.47) values in Table 4 suggests absence of DIF between male and female. The recommended value of the Mantel-Haenszel χ^2 is <3.84 (Penfield, 2013). *Standardized Liu-Agresti Cummulative Common Log-Odds Ratio*and *Standardized Cox's Noncentrality Parameter*values outside the – range of – 2 to + 2 suggest the presence of DIF (Penfield, 2013). Moreover, positive values of these statistics suggest DIF in favor of the reference group and negative values to the focal group. A non-DIF item suggested that different groups, having same latent trait or ability, have an equal probability of giving a response to that item. A DIF contrast suggested that groups have a different probability of endorsing that item.

TABLE 4 : DIFFERENTIAL ITEM FUNCTIONING STATISTICS OF THE BFPI-10 BANGLA ACROSS GENDER

Items	Mantel χ^2	L-A LOR	LOR SE	LOR Z	COX's B	COX SE	COX Z
Extroversion							
Item 1	.001	-.008	.263	-.03	-.006	.187	-.032
Item 6	.001	.008	.254	.031	.006	.187	.032
Agreeableness							
Item 2	.308	.14	.259	.541	.121	.217	.557
Item 7	.308	-.14	.25	-.56	-.121	.217	-.557
Conscientiousness							
Item 3	.459	-.164	.235	-.698	-.124	.184	-.676
Item 8	.459	.164	.242	.678	.124	.184	.676
Neuroticism							
Item 4	2.16	.331	.224	1.478	.245	.167	1.47
Item 9	2.16	-.331	.225	-1.471	-.245	.167	-1.47
Openness							
Item 5	.089	.07	.231	.303	.057	.192	.297
Item 10	.089	-.07	.242	-.289	-.057	.192	-.297

Reference group = Male, Focal group = Female;
L-A LOR = *Liu-Agresti cummulative common log-odds ratio*, LOR SE = *Standard error of the Lui-Agresti Cumulative Common Log-Odds Ratio*, LOR Z = *Standardized Liu-Agresti Cummulative Common Log-Odds Ratio*, COX's B = *Cox's Noncentrality Parameter Estimator*, COX SE = *Standard Error of Cox's Noncentrality Parameter Estimator*, COX Z = *Standardized Cox's Noncentrality Parameter*

Rasch Analysis
Table 5 also shows the fit statistics of the Rasch analysis. All items infit MnSqs are ranged from .90 (item 3) to 1.02 (item 7) and outfit MnSqs are ranged from .88 (item 1) to 1.03 (Item 8). Item separation indices ranged from 2.35 (Agreeableness subscale) to 6.53 (extroversion subscale). Item reliabilities are ranged from .74 (Agreeableness subscale) to .97 (neuroticism and openenss subscale).There are several rules of thumb for deciding about the acceptable range of MnSq and outfit MnSq. Linacre (2012) suggested accepted values of MnSq and outfit MnSq ranges from .5 to 1.5. The accepted value of item separation is >2 and item reliability is >.7. These statistics of the BFPI-10 Bangla were in the accepted level.

TABLE 5 : RASCH MODEL FIT STATISTICS OF BFPI-10 BANGLA

Subscale	Items	Infit MnSq	Outfit MnSq	Item Separation	Item Reliability
Extroversion	Item 1	.91	.88	6.53	.96
	Item 6	1.01	.97		
Agreeableness	Item 2	.98	.97	2.35	.74
	Item 7	1.02	1.01		
Conscientiousness	Item 3	.90	.93	5.05	.96
	Item 8	.97	1.03		
Neuroticism	Item 4	.99	1.02	5.59	.97
	Item 9	.93	.93		
Openness	Item 5	.93	.91	5.78	.97
	Item 10	1.06	1.05		

The present study suggested that the Bangla Big Five Personality Inventory – 10 as a psychometrically sound instrument. It had sufficient reliability and validity to apply in the Bangladesh context for assessing the personality of the Bangladeshi people. However, this study has some limitations. The sample of the present study was not representative. Respondents were university students and aged 18-26 years old. They didn't represent the whole population of Bangladesh. So, users of the BFPI-10 Bangla should be careful in applying this instrument to sample outside this age range. The correlations of this inventory with other Bangla personality measurement scales were not estimated. This scale's discriminant validity was not assessed also. A large-scale study should be undertaken that would include the sample from all age groups of Bangladeshi people to determine the rest of the psychometric properties. This inventory would be applicable to assess the personality traits of young people aged 18-26 years old, especially students at the university level. This inventory would be useful to researchers, teachers and other relevant persons who were interested in personality measurement.

REFERENCES

BRIGGS, S. R., AND CHEEK, J. M. 1986. The Role of Factor-Analysis in the Development and Evaluation of Personality-Scales. *Journal of Personality*, **54(1):** 106-148.

CATTELL, R. B. 1943. The description of personality: basic traits resolved into clusters. *The Journal of Abnormal and Social Psychology,* **38(4)**: 476-506.

CATTELL, R. B. 1965. *The scientific analysis of personality*. Baltimore: Penguin Books.

CORREA, T., HINSLEY, A. W. AND ZUNIGA, H. 2010. Who Interacts on Web?: The intersection of user's personality and social media use. *Computers in Human Behavior,* **26(2)**: 247-253.

COSTA, P. T., AND MCCRAE, R. R. 1992. *NEO-PI-R Professional manual*. Psychological Assessment Resources. Odessa, FL.

CRIDER, A. B., GOETHALS, G. R., KAVANAUGH, R. D. AND SOLOMON, P. R. 1983. *Psychology*. Scott, Foresman and Company.Gienview, Illinois.

DIGMAN, J.M. AND TAKEMOTO-CHOCK, N.K. 1981. Factors in the natural language of personality: Re-analysis, comparison, and interpretation of six major studies. *Multivariate Behavioral Research,* **16(2)**: 149-170.

FELDAN, R. S. 2015. *Understanding Psychology* (12th edition). McGraw-Hill Education. New York, NY.

FURR, R. M. 2011. *Scale Construction and Psychometrics for Social and Personality Psychology*. Sage Publication Ltd. Thousand Oaks, California.

GOLDBERG, L. 1981. Language and Individual Differences: The Search for Universals in Personality Lexicons. In L. Wheeler (Ed.), *Review of Personality and Social Psychology* (pp. 141-165). Sage Publication. Beverly Hills, CA.

JOHN, O. P., DONAHUE, E. M., AND KENTLE, R. L. 1991. *The Big Five Inventory-Versions 4a and 54*. Berkeley, CA: University of California, Berkeley, Institute of Personality and Social Research.

KIM, H.-Y. 2013). Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. *Restorative Dentistry and Endodontics, 38*(**1**): 52-54.

KONRATH, S., MEIER, B. P., AND BUSHMAN, B. J. 2014. Developemnt and Validation of the Single Item Narcissism Scale (SINS). *PLOS,***9(8):**103469.

LINACRE, J. M. (2012). *A User's Guide to WINSTEPS and Ministep Rasch Model Computer Programs: Program Manual. 3.75*. author

MCCRAE, R. R., AND COSTA, P. T. 1987. Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology,* **52(1)**: 81-90.

NORMAN, W. T. 1963. Toward an adequate taxonomy of personality attributes: Replicated factor structure in peer nomination personality ratings. *The Journal of Abnormal and Social Psychology,* **66(6)**: 574-583.

Pallant, J. 2016. *SPSS Survival Manual: A Step by Step Guide to Data Analysis using IBM SPSS*. McGraw Hill Education. Maidenhead.

PENFIELD, R. D. 2013. DIFAS 5.0. Differential Item Functioning Analysis System. Users's Manual. Retrieved from https://soe.uncg.edu/wp-content/uploads/2015/12/DIFASManual_V5.pdf

RAMMSTEDT, B., AND JOHN, O. P. 2007. Measuring Personality in one Minute or less: A 10-Item Short Version of the Big-Five Inventory in English and German. *Journal of Research in Personality,* **41(1)**: 203-212.

ROBINS, R. W., HENDIN, H.M. AND TRZESNIEWSKI, K.H. 2001. Measuring global self-esteem: Construct validation of a single-item measure and the Rosenberg self-esteem scale. *Personality and Social Psychology Bulletin,* **27**: 151–161.

THURSTONE, L. L. 1934. The vectors of mind. *Psychological Review,* **41(1)**: 1-32.

TUPES, E. C., AND CHRISTAL, R. E. 1992. Recurrent personality factors based on trait ratings. *Journal of Personality,* **60(2)**: 225-251.