Psychometric Evaluation of the Bangla-translated Five Facet Mindfulness Questionnaire through Classical Test Theory and Item Response Theory

Mushfiqul Anwar Siraji[1], Munia Rahman Chandni[2], Bishal Saha[3], & Shamsul Haque[1]

[1] Department of Psychology, Jeffrey Cheah School of Medicine and Health Sciences, Monash University Malaysia

[2] Independent Scholar

[3] Department of Psychology, University of Chittagong

Author Note

Add complete departmental affiliations for each author here. Each new line herein must be indented, like this line.

Enter author note here.

The authors made the following contributions. Mushfiqul Anwar Siraji: Conceptualization, Data Curation, Formal Analysis, Project Management, Data Visualization, Writing - Original Draft Preparation, Writing - Review & Editing; Munia Rahman Chandni: Conceptualization, Data Curation, Writing - Original Draft Preparation, Writing - Review & Editing; Bishal Saha: Conceptualization, Data Curation; Shamsul Haque: Conceptualization, Writing - Original Draft Preparation, Writing - Review & Editing, Supervision.

Correspondence concerning this article should be addressed to Shamsul Haque, Monash University Malaysia, Jalan Lagoon Selatan, 47500 Bandar Sunway, Selangor Darul Ehsan, Malaysia.. E-mail: shamsul@monash.edu

Abstract

Mindfulness-related skills have been widely incorporated into physiological and psychological health-related interventions. The 39-item Five Facet Mindfulness Questionnaire (FFMQ) encompasses a multi-faceted construct of mindfulness and provides an in-depth understanding of mindfulness. However, past research evidenced that the latent structure of FFMQ differs highly. Hence, we attempted to translate FFMQ into Bangla and investigated the reliability, structural and concurrent validity of Bangla-FFMQ. We collected data from a large community sample of Bangladeshi adults (N=532). We assessed content validity using item-level (I-CVI) and scale-level (S-CVI) content validity indexes. We used item-response theory-based item analysis to identify items with problematic item fit, item discrimination and item difficulty. Confirmatory factor analysis (CFA) was utilized to investigate the structural validity. Associations of the scale with other measures of mindfulness, emotional intelligence, depression, and two aspects of the Big Five Personality Inventory: openness and neuroticism, were investigated to establish concurrent validity. Bangla-FFMQ had acceptable content validity (I-CVI>.83, S-CVI=.93). Item response theory-based item analysis identified ten items as problematic, thus discarded. CFA on the 29-item Bangla-FFMQ yielded an acceptable fit for two models: the five-factor correlational model (CFI= 0.94; TLI= 0.94) and the one-factor higher-order model (CFI= 0.93; TLI= 0.93). The 29-item scale had satisfactory internal consistency (Mcdonald's Omega = .80). The five facets were differentially associated with the other measures indicating the scale's satisfactory concurrent validity. Our findings provide the first evidence of the structural and concurrent validity of the Bangla-FFMQ and indicated its usability in measuring mindfulness among Bangladeshi community adults.

Keywords: c("Mindfulness", "Structural Validity", "Concurrent Validity", "Reliability")

Word count: X

Psychometric Evaluation of the Bangla-translated Five Facet Mindfulness Questionnaire through Classical Test Theory and Item Response Theory

Introduction

Mindfulness indicates a state with complete attention towards the present moment experience with a nonjudgmental attitude (1,2). In recent years, mindfulness has been successfully incorporated with different physiological and psychological health-related interventions (3,4). Mindfulness-based interventions, including mindfulness-based stress reduction (4,5), mindfulness-based cognitive therapy (6) and dialectical behaviour therapy (7,8) have reported a reduction in symptoms across a wide range of disorders. These interventions consider mindfulness as a set of skills that can be installed in one′s behaviour and mastered through practice over time to increase health and well being. Over the years, several self-reported instruments have emerged to capture the essence of mindfulness. However, across these instruments, the operational definition of "mindfulness" varies, and most importantly, the question regarding the underlying latent structure of mindfulness remains open.

Most of the self-reported instruments to measure mindfulness are rooted in the two-component model (9) or two-style model of mindfulness. The two-component model (9) defines mindfulness by a. self-regulated attention towards the present moment and b. orientation to experience. The two-style model (10) defines mindfulness by a. focused attention to a chosen object and b. open (nonreactive) monitoring of the present moment experience. These two models can be thought of as two sides of the same coin that guided the developmental process of several popular instruments, including: Mindfulness Attention Awareness Scale (MASS;(2)), Freiburg Mindfulness Inventory (FMI;(11)), The Kentucky Inventory of Mindfulness Skills (KIMS;(12)), The Cognitive and Affective Mindfulness Scale (CAMS;(13)) and Southampton Mindfulness Questionnaire (SMQ; (14)). MASS, FMI, CAMS, and SMQ follow a single factor structure, whereas KIMS follow a

multidimensional structure. In an attempt to answer the question of dimensionality and develop a common definition of mindfulness, (15) conducted an exploratory factor analysis with 613 respondent′s data on all the aforementioned questionnaires. This led to the development of the "Five-facet Mindfulness Questionnaire" where the essence of mindfulness was captured in five distinct facets. The first facet, "Observe" captures people′s ability to notice their own emotions, thoughts and other environmental sensation. The "Describe" facet captures the ability to describe one′s thoughts and emotions in words. " Acting with awareness" (actwar) investigate people′s ability to attend to the present moment awareness. The fourth facet, "Not judging the inner experiences" (Nonjudge) captures the ability not to judge one′s internal thoughts and emotions. The last facet, "not reacting to the inner experience" (Nonreact), deals with people′s ability to attend to one′s thoughts and emotions without rumination or fixation ((12,16)).

(15) proposed two different models as the latent structure, First is the most popular one, a correlated five facet model where each facet would yield a subscore for itself. The second proposed model was a higher order model where 4 facets (describe, actwar, nonjudge, and nonreact) were elements of a general factor: mindfulness. However, the necessity of proper psychometric calibration of FFMQ for the target population is also evident in the work of (15). In their work, it was evident that the latent structure of mindfulness was different among meditating and student samples. Among the meditating sample (n =190), the higher order model with all five facets exhibited the best fit, whereas in the student sample (n = 268), a hierarchical model with 4 facets was accepted. Several studies have since replicated these two proposed models (higher order:(17,18); correlated five-facet: (19,20) added more proof that the latent structure of FFMQ may vary depending on the target population. Subsequently, several countries including including Germany (20), Italy (21), Japan (22), Chinese (23), Brazil (24), and Australia (16,25) have validated The FFMQ. However, FFMQ has not yet been validated among Bangladeshi sample to date.

Additionally, most validation work focused on classical test theory (CTT)-based analyses(factor analyses and construct validity). However, classical test theory does not incorporate individual item properties, i.e. item difficulty and item discrimination and relies on the total score obtained in an instrument. Item response theory (IRT) complements the conventional CTT-based analysis by gathering information on item discrimination and difficulty(26). Unlike the CTT, IRT relates the probability of success of each item with the estimated latent trait using a logistic function called Item Characteristic Curve (ICC) (27). Item difficulty corresponds to the latent trait level at which the probability of endorsing a particular response option is 50%. Item discrimination indicates how well a particular item can differentiate between participants across the given latent trait continuum. Along with these parameters, IRT also provides item-information and test-information curves that demonstrate how much information a particular item and test carry across the latent trait continuum. This information can use used to increase the precision of an instrument. However, very few studies have attempted to increase the precision of FFMQ using IRT based analysis(25,28).

Thus, in this study, we had three main objectives: first, we evaluated the Bangla-FFMQ (BFFMQ) using IRT based analysis to increase the scale precision of Bangla-FFMQ (BFFMQ). Second, we investigated the structural properties of BFFMQ on a large community sample (n=532). Third, we collected construct validity evidence of BFFMQ

Methods

Ethical Consideration

All procedures performed in studies involving human participants were in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the

125 authors.

126 Data and code availability

127 All code and data underlying this article is available on a public GitHub repository
128 (https://github.com/masiraji/FiveFacetMindfulness).

129 Participants

130 A large group of 532 participants from Bangladesh participated in this study . 11
131 participants were excluded due to incomplete data. Participants were recruited following
132 convenience sampling technique. For conducting a confirmatory factor analysis For
133 estimating the sample size for the confirmatory factor analysis we followed the N:q rule
134 (29–32) where 10 participants per parameters is required to earn trustworthiness of the
135 result. Our sample size exceeds the requirement. Out of 532 participants, 390 were female
136 ranging in age from 18 to 51 years (29.65±5). 142 were male with an age range between 21
137 to 60 years (31.8±5.38). The average years of education for the females were 15.26±2.13
138 and for the males were 16.8±0.45. 403 (76%) participants were married. The mean score of
139 perceived social stance measured by a 10-point ladder was 6.67±2.08 among females and
140 6.55±2.12 among males.

141 Responses from a subset of our sample, n = 254 were used to investigate the
142 construct validity evidence. Among them, 185 were female ranging in age from 18 to 51
143 years (28.82±4.66). 69 were male with an age range between 27 to 60 years
144 (33.55±5.63).The average years of education for the females were 15.25±2.11 and for the
145 males were 16.78±0.42. 193 (76%) participants were married. The mean score of perceived
146 social stance measured by a 10-point ladder was 6.62±2.09

Material

Five Facets Mindfulness Questionnaire (FFMQ). FFMQ is a 39-item questionnaire that measures an individual's mindfulness across five dimensions: observe, describe, nonjudging of inner experience (nonjudge), acting with awareness (actwar) and nonreactivityto inner experience (nonreact) (15). Items were scored on a 5-point Likert-type scale ranging from 1 (never or very rarely true) to 5 (very often or always true). Each facet score were computed by summing the scores on the individual items. A higher score would indicate a higher disposition of mindfulness.

Bangla Five Facets Mindfulness Questionnaire (BFFMQ)

We followed International Test Commission (ITC) guidelines (33) to translate and adapt FFMQ. Two bilingual researchers (PhD in Psychology) natives in Bangla translated the original version (English) to Bangla. Two translated versions were then judged and synthesized by the authors. Subsequently, two bilingual researchers (PhD in psychology) back translated the Bangla scale into English with no knowledge of the original work. The authors synthesized the two back-translations and compared it with the original scale and made necessary amendments. ### Mindfulness Attention Awareness Scale (MAAS) MAAS is a 15-item instrument with a 6-point Likert type response scale (almost always to almost never) measuring the tendency to be attentive and remain aware of present-moment experience (2). It provides a single total score (total score range: 1-90) where a high score would indicate a higher disposition of mindfulness. We used the Bangla MAAS (34). In our subset of the sample (n = 254) the reliability coefficient was $\omega_t = .89$

Emotional Intelligence (EI). The Emotional Intelligence Scale is a 34-item self-report scale with a 5-point Likert type response scale (Strongly agree to strongly disagree) (35). We translated all 34 items (English) to Bangla language using the standard forward and backward translation method. A total score can be computed by summing up

all item scores (total score range : 34-170) where Aahigher total score indicates a higher level of emotional intelligence. Internal consistency coefficient for the total scale in our subset of the sample (n = 254) was, $\omega_t = .89$

Depression Scale. Depression scale is a 30-item questionnaire with a 5-point Likert type response scale (Not at all true to always true) (36) that measure depression. A total score can be computed by summing up all item scores (total score range: 30-150). A higher total score indicates a higher level of depression. Internal consistency coefficient in our subset of the sample (n = 254) was $\omega_t = .94$

Bangla Big Five Inventory (BBFI). We measured neuroticism and openness to experience by two subscales of BBFI (37–39).The neuroticism subscale measures the extent to which an individual is an affectively unstable, anxious and worried (40). It has eight items (3 reversed items). The openness subscale has ten items (2 reversed items) and measures an individual′s susceptibility to aesthetics, ideas, values, and flexibility (41). Each item was scored on a five-point Likert scale. Internal consistency coefficient McDonald's ω_t for extroversion, neuroticism and openness to experience obtained in our subset of the sample (n = 254) were ‘ .75 and .73 respectively.

Data collection

A cross-sectional fully anonymous online survey was conducted. Participants were invited via email and social media (i.e., LinkedIn, Twitter, Facebook) along with explanatory statements and upon their expressed interest, survey link was sent to them. Once the participants voluntarily agreed to participate, their consent was recorded digitally. Completing the online survey took approx. 20 to 25 minutes and was not compensated.

Analytic strategies

We used R version 4.2.1 (2022-06-23)(42) for our analysis. We started our psychometric analysis by assessing the content validity of BFFMQ. We confirmed the unidimensionality of each five facets of BFFMQ in our sample (n = 532) by a Categorical Confirmatory Factor Analysis (CFA) using a "Weighted Last Square with mean and variance" (WSMV) estimator using "lavaan" package(43). To assess the model fit we followed the popular suggestions of (44): Comparative fit index (CFI) and the Tucker Lewis index (TLI): good fit $\geq$.95, acceptable fit$\geq$.90); the root mean square error of approximation (RMSEA): good fit $<$ .06, acceptable fit $<$.08; and the standardized root mean square (SRMR) good fit$<$.08, acceptable fit $<$.10. Once, we confirm the unidimensionality of each facet, we fitted "graded response" based IRT models with for each facet using "mirt" package (45). In IRT we employed marginal maximum likelihood estimation method with MHRM algorithm. We gathered information on item difficulty, discrimination, item information and test information. We assessed the local fit of the items using S-χ^2 and RMSEA statistics. Person-fit was assessed using Z_h statistics. Based on the IRT parameters we identified and discarded low quality items. With the retained items we fitted two different latent structure models: a. correlated model with 5 factors, b. Higher order model with 1 general factor and 5 secondary factors. Lastly, we gathered evidence of convergent validity of the five facets by calculating correlation coefficients with other related constructs.

#Results

Content validity: expert panel review

12 mental health professionals independently assessed the content validity of Bangla FFMQ (39 items) using a using a 4-point Likert type scale (1: not at all relevant, 2: slightly relevant, 3: quite Relevant, 4: Highly Relevant). We estimated the item-level

content validity (I-CVI) and scale-level content validity index (S-CVI) to assess the relvance of the items. All items I-CVI scores higher than 0.83 indicating good content validity (46,47). The S-CVI was .96, estimated using the average method and indicated satisfactory content validity (46,47).

Descriptive Statistics

Table1 reports univariate descriptive statistics for the 39 items of BBFQ. Our data violated the normality assumption tested by the Shapiro-Wilk test of normality (48). The corrected item-total correlations for each facets ranged between: observe: .44 - .67; describe: .50 - .66; actwar: .23 - .68; nonjudge: .25 - .56 and nonreact: .41 - .57.

Unidimensionality of each facet

We have checked the assumption of unidimensionality of each facets of BFFMQ through categorical CFA and assessed the fit model fit using CFI, TLI, RMSEA and SRMR values and χ^2 statistic. Table @**??**tab:Unitab) summarizes the model fit of each facets. All fitted model exhibited a significant χ^2 statistic. However, χ^2 statistic is well known for its sensitivity towards sample size (49). As such more emphasize were given towards other fit indices. Other fit indices indicated good fit to "observe" and "actwar" facet. Acceptable fit was observed for "nonreact" facet. Describe facet attained good fit after allowing three pairs of items to covary their error variance in the model(items: 12-22; 12-16; 16-22). Similarly, "nonjudge" facet achieved best fit after allowing error variance of item 14 and 17 to covary in the model.The internal consistency reliability coeffcients Mcdonald′s ω_t ranged between 0.67 to 0.89. These findings allowed us to assume unidimentionality of each facet of the BFFMQ

Item Response Theory

We fitted each facet to the IRT framework using "graded response" model (50). In IRT we gather evidence on item difficulty and discrimination, item-fit, person-fit, and item and scale information. At first we assessed item-fit using RMSEA values obtained associated with S-χ^2 statistic. We discarded items that indicated a bad fit (RMSEA >.06) to the model and refitted the revised models. Table@**??**tab:tab-itemfit) summarizes the item-fit indices for each five facets. Item 2 in describe facet and item14 in nonjudge facet appeared as misfit to the model thus discarded. In the refitted model of describe facet two more items (item 12 & 16) (Supplementary Table——) appeared as misfit thus discarded.

```
## <ScaleContinuousPosition>
##  Range:
##  Limits:    0 --    1
```

Table 4 summarizes the item discrimination and discrimination parameters of retained items with their item fit indices. (51) suggested the optimum range of item discrimination,a is $.5 \leq a \leq 2$. All items except item:38 and 39 were within this suggested limits.

Item information curve (IIC) indicate the amount of information an item carry along the latent trait continuum (supplimentary Figure———). Upon inspection we identified 4 items (22, 38, 39, 3) with relatively flat curve ($I(\theta)<.20$). Option Characteristics Curves (OCC) showed the probability of endorsing each response choice (y-axis) as a function of underlying latent trait(x-axis). The OCCs (Figure 1) showed all items except items 38,22, 39, 3, and 17 had appropriately monotonically ordered response options.

Subsequently, we discarded five items for being outside the suggested item discrimination guidelines, inappropriate monotonocity and/or relatively flat information curve (item 22, 38, 39, 3,17) and refitted the revised models. For the revised models, we

categorize the item discrimination (a) presented in table 5 using the following criteria of (51), none = 0; very low =0.01 to 0.34; low = 0.35 to 0.64; moderate = 0.65 to 1.34 ; high = 1.35 to 1.69; very high >1.70. Among the 30items, 12 items had moderate discrimination, 11 had high discrimination and 7 items had very high discrimination. For all items, each of the response options are likely to be selected for some level of underlying level of mindfulness.

Person fit indicates the validity and meaningfulness of the fitted model at the participants latent trait level (52). We estimated the person fit statistics using standardized fit index Zh statistics (53). Fig2 indicates that Zh is larger than -2 for most participants, suggesting a good person-fit of the fitted IRT models.

Test information curves with standard error for the revised models (Fig **??**) indicated that each facet had a good range of coverage across the underlying measured traits with least amount or errors ranging between -2 to 2 θ range (Fig **??**). Conditional reliability plots (Fig @ref(fig: conrel-fig)) also indicated the scales were most reliably estimating scores between -2 to 2 θ range. The marginal reliability estimates of the five facets were observe= 0.82, describe = 0.76, actware = 0.85, nonjudge = 0.64, nonreact = 0.72. Thus we conferred the fitted models covers a wide range of underlying mindfulness facets and the precision is highest for the estimated scores across θ range -2 to 2.

#Validity analysis

We gathered convergent and divergent validity evidence of BFFMQ on a subset of our sample (n= 254). We gathered convergent validity evidence based on correlational analysis. Table6 summarized the inter correlation of the five mindfulness facets as well as correlation coefficients of these facets with emotional intelligence (35), depression (36), MAAS (2,34), and three measures of personality: openness, extroversion and neuroticism (37–39). Table6 indicated inter-correlations of the five facets were in general modest and significant (only three pairs: observe with actware, describe with nonjudge, and nonreact with actware were

non-significant). Nonjudge was significantly negatively correlated with observe (r = -0.33, $p < .01$). Nonreact was significantly negatively correlated with awareness (r = -0.26, $p < .01$). By judging the underlying construct and item contents of BFFMQ we expected positive correleation among facets of BFFQ and emotional intelligence, MASS and openness since these constructs incorporate the elements of mindfulness (15). And with neuroticism and depression negative correlations were expected as neuroticism to some extent reflect the absence of mindfulness (15). Table6 indicated that our directional findings of the correlations were almost consistent with our prediction. Emotional intelligence was significantly positively correlated with four facets (negatively correlated with nonjudgement, r =-0.02 p>.05). MASS was positively correlated with all five facets of mindfulness. Depression and neuroticism were negatively correlated with all the five facets.

Discussion

References

1. Kabat-Zinn J. Wherever you go, there you are: Mindfulness meditation in everyday life. Hachette Books; 2009.
2. Brown KW, Ryan RM. The Benefits of Being Present: Mindfulness and Its Role in Psychological Well-Being. J Pers Soc Psychol. 2003;84(4):822–48.
3. Hofmann SG, Sawyer AT, Witt AA, Oh D. The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. Journal of Consulting and Clinical Psychology. 2010;78(2):169.
4. Kabat-Zinn J. Mindfulness-based stress reduction (MBSR). Constructivism in the Human Sciences. 2003;8(2):73.
5. Kabat-Zinn J. An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: Theoretical considerations and preliminary results. General hospital psychiatry. 1982;4(1):33–47.
6. MacKenzie MB, Abbott KA, Kocovski NL. Mindfulness-based cognitive therapy in patients with depression: Current perspectives. Neuropsychiatric disease and treatment. 2018;
7. Linehan M. Skills training manual for treating borderline personality disorder. Vol. 29. Guilford press New York; 1993.
8. Linehan MM. Cognitive-behavioral treatment of borderline personality disorder. Guilford Publications; 2018.
9. Bishop SR, Lau M, Shapiro S, Carlson L, Anderson ND, Carmody J, et al. Mindfulness: A proposed operational definition. Clinical psychology: Science and practice. 2004;11(3):230.
10. Lutz A, Slagter HA, Dunne JD, Davidson RJ. Attention regulation and monitoring in meditation. Trends in Cognitive Sciences. 2008;12(4):163–9.

11. Buchheld N, Grossman P, Walach H. Measuring mindfulness in insight meditation (vipassana) and meditation-based psychotherapy: The development of the freiburg mindfulness inventory (FMI). Journal for meditation and meditation research. 2001;1(1):11–34.

12. Baer RA, Smith GT, Allen KB. Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. Assessment. 2004;11(3):191–206.

13. Feldman G, Hayes A, Kumar S, Greeson J, Laurenceau J-P. Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R). Journal of psychopathology and Behavioral Assessment. 2007;29(3):177–90.

14. Chadwick P, Hember M, Symes J, Peters E, Kuipers E, Dagnan D. Responding mindfully to unpleasant thoughts and images: Reliability and validity of the southampton mindfulness questionnaire (SMQ). British Journal of Clinical Psychology. 2008;47(4):451–5.

15. Baer RA, Smith GT, Hopkins J, Krietemeyer J, Toney L. Using Self-Report Assessment Methods to Explore Facets of Mindfulness. Assessment. 2006;13(1):27–45.

16. Taylor NZ, Millear PMR. Validity of the Five Facet Mindfulness Questionnaire in an Australian, meditating, demographically diverse sample. Personality and Individual Differences. 2016;90:73–7.

17. Curtiss J, Klemanski DH. Factor analysis of the five facet mindfulness questionnaire in a heterogeneous clinical sample. Journal of Psychopathology and Behavioral Assessment. 2014;36(4):683–94.

18. Gu J, Strauss C, Crane C, Barnhofer T, Karl A, Cavanagh K, et al. Examining the factor structure of the 39-item and 15-item versions of the five facet mindfulness questionnaire before and after mindfulness-based cognitive therapy for people with recurrent depression. Psychological assessment. 2016;28(7):791.

19. Bohlmeijer E, Ten Klooster PM, Fledderus M, Veehof M, Baer R. Psychometric properties of the five facet mindfulness questionnaire in depressed adults and development of a short form. Assessment. 2011;18(3):308–20.

20. Tran US, Glück TM, Nader IW. Investigating the Five Facet Mindfulness Questionnaire (FFMQ): Construction of a short form and evidence of a two-factor higher order structure of mindfulness. Journal of Clinical Psychology. 2013;69(9):951–65.

21. Giovannini C, Giromini L, Bonalume L, Tagini A, Lang M, Amadei G. The Italian five facet mindfulness questionnaire: A contribution to its validity and reliability. Journal of psychopathology and Behavioral Assessment. 2014;36(3):415–23.

22. Sugiura Y, Sato A, Ito Y, Murakami H. Development and validation of the Japanese version of the Five Facet Mindfulness Questionnaire. Mindfulness. 2012;3(2):85–94.

23. Deng Y-Q, Liu X-H, Rodriguez MA, Xia C-Y. The five facet mindfulness questionnaire: Psychometric properties of the Chinese version. Mindfulness. 2011;2(2):123–8.

24. de Barros VV, Kozasa EH, de Souza ICW, Ronzani TM. Validity evidence of the brazilian version of the Mindful Attention Awareness Scale (MAAS). Psicologia: Reflexão e Crítica. 2015;28:87–95.

25. Medvedev ON, Siegert RJ, Kersten P, Krägeloh CU. Improving the precision of the five facet mindfulness questionnaire using a rasch approach. Mindfulness. 2017;8(4):995–1008.

26. Lord FM. Applications of item response theory to practical testing problems. Routledge; 2012.

27. Calderón C, Beyle C, Véliz-García O, Bekios-Calfa J. Psychometric properties of addenbrooke's cognitive examination III (ACE-III): An item response theory approach. PloS one. 2021;16(5):e0251137.

28. Shallcross AJ, Lu NY, Hays RD. Evaluation of the psychometric properties of the five facet of mindfulness questionnaire. Journal of psychopathology and behavioral assessment. 2020;1–10.

29. Jackson DL. Revisiting sample size and number of parameter estimates: Some support for the n:q hypothesis. Structural equation modeling. 2003;10(1):128–41.

30. Worthington RL, Whittaker TA. Scale development research: A content analysis and recommendations for best practices. The Counseling psychologist. 2006;34(6):806–38.

31. Bentler PM, Chou C-P. Practical issues in structural modeling. Sociological methods & research. 1987;16(1):78–117.

32. Kline RB. Principles and practice of structural equation modeling. The Guilford Press; 2015.

33. Bartram D, Berberoglu G, Grægoire J, Hambleton R, Muniz J, van de Vijver F. ITC Guidelines for Translating and Adapting Tests (Second Edition). International journal of testing [Internet]. 2018;18(2):101–34. Available from: https://www.tandfonline.com/doi/full/10.1080/15305058.2017.1398166

34. Islam MA, Siddique S. Validation of the Bangla Mindful Attention Awareness Scale. Asian J Psychiatr. 2016;24:10–6.

35. Hyde A, Pethe S, Dhar U. Psychological Test: Manual for Emotional Intelligence Scale. 2002.

36. Uddin MZ, Rahman MM. Development of A Scale of Depression for Use in Bangladesh. Bangladesh Psychological Studies. 2005;15:25–44.

37. Muhammad N, Akter S, Uddin E. Adaptation of big five personality test for use in bangladesh. Department of Psychology, Jagannath University, Bangladesh; 2011.

379 38. John OP, Naumann LP, Soto CJ. Paradigm shift to the integrative big five trait taxonomy: History, measurement, and conceptual issues. In: Handbook of personality: Theory and research, 3rd ed. New York, NY, US: The Guilford Press; 2008. p. 114–
380 58.

381 39. John OP, Donahue EM, Kentle RL. The big five inventory–versions 4a and 5b. Berkeley, CA: University of California,Berkeley, Institute of Personality; Social Research;
382 1991.

383 40. Horner KL. Locus of control, neuroticism, and stressors: Combined influences on reported physical illness. Personality and Individual Differences [Internet]. 1996;21(2):195–204. Available from: https://www.sciencedirect.com/science/article/
384 pii/0191886996000670

385 41. Costa PT, McCrae RR. Normal personality assessment in clinical practice: The NEO
386 Personality Inventory. Psychological assessment. 1992;4(1):5.

387 42. R Core Team. R: A language and environment for statistical computing [Internet]. Vienna, Austria: R Foundation for Statistical Computing; 2021. Available from:
388 https://www.R-project.org/

389 43. Rosseel Y. lavaan: An R package for structural equation modeling. Journal of Statistical Software [Internet]. 2012;48(2):1–36. Available from: https://www.jstatsoft.
390 org/v48/i02/

391 44. Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling: A Multidisciplinary Journal [Internet]. 1999;6(1):1–55. Available from: https:
392 //doi.org/10.1080/10705519909540118

393 45. Chalmers RP. mirt: A multidimensional item response theory package for the R
394 environment. Journal of Statistical Software. 2012;48(6):1–29.

46. Polit D, Beck C, Owen S. Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. Research in nursing & health. 2007 Aug;30:459–67.

47. Lynn MR. Determination and quantification of content validity. Nurs Res. 1986;35(6):382–5.

48. Shapiro SS, Wilk MB. An analysis of variance test for normality (complete samples). Biometrika. 1965;52(3-4):591–611.

49. Brown TA. Confirmatory factor analysis for applied research. 2nd ed. New York, NY, US: The Guilford Press; 2015.

50. Samejima F. Estimation of latent ability using a response pattern of graded scores. Psychometrika monograph supplement. 1969;

51. Baker FB. The basics of item response theory using r. 1st ed. 2017. Springer; 2017.

52. Desjardins C, Bulut O. Handbook of educational measurement and psychometrics using r. 2018.

53. Drasgow F, Levine MV, Williams EA. Appropriateness measurement with polychotomous item response models and standardized indices. British Journal of Mathematical and Statistical Psychology. 1985;38(1):67–86.

54. Wilke CO. Cowplot: Streamlined plot theme and plot annotations for 'ggplot2' [Internet]. 2020. Available from: https://CRAN.R-project.org/package=cowplot

55. Iannone R. DiagrammeR: Graph/network visualization [Internet]. 2020. Available from: https://CRAN.R-project.org/package=DiagrammeR

56. Iannone R. DiagrammeRsvg: Export DiagrammeR graphviz graphs as SVG [Internet]. 2016. Available from: https://CRAN.R-project.org/package=DiagrammeRsvg

57. Ryu C. Dlookr: Tools for data diagnosis, exploration, transformation [Internet]. 2021. Available from: https://CRAN.R-project.org/package=dlookr

58. Wickham H, François R, Henry L, Müller K. Dplyr: A grammar of data manipulation [Internet]. 2021. Available from: https://CRAN.R-project.org/package=dplyr

59. Wickham H. Forcats: Tools for working with categorical variables (factors) [Internet]. 2021. Available from: https://CRAN.R-project.org/package=forcats

60. Wickham H. ggplot2: Elegant graphics for data analysis [Internet]. Springer-Verlag New York; 2016. Available from: https://ggplot2.tidyverse.org

61. Iannone R, Cheng J, Schloerke B. Gt: Easily create presentation-ready display tables [Internet]. 2021. Available from: https://CRAN.R-project.org/package=gt

62. Sjoberg DD, Whiting K, Curry M, Lavery JA, Larmarange J. Reproducible summary tables with the gtsummary package. The R Journal [Internet]. 2021;13:570–80. Available from: https://doi.org/10.32614/RJ-2021-053

63. Zhu H. kableExtra: Construct complex table with 'kable' and pipe syntax [Internet]. 2021. Available from: https://CRAN.R-project.org/package=kableExtra

64. Johnson P, Kite B, Redmon C. Kutils: Project management tools [Internet]. 2020. Available from: https://CRAN.R-project.org/package=kutils

65. Sarkar D. Lattice: Multivariate data visualization with r [Internet]. New York: Springer; 2008. Available from: http://lmdvr.r-forge.r-project.org

66. Bryer J, Speerschneider K. Likert: Analysis and visualization likert items [Internet]. 2016. Available from: https://CRAN.R-project.org/package=likert

67. Ooms J. Magick: Advanced graphics and image-processing in r [Internet]. 2021. Available from: https://CRAN.R-project.org/package=magick

68. Buchanan EM, Gillenwaters A, Scofield JE, Valentine KD. MOTE: Measure of the Effect: Package to assist in effect size calculations and their confidence intervals [Internet]. 2019. Available from: http://github.com/doomlab/MOTE

69. Korkmaz S, Goksuluk D, Zararsiz G. MVN: An r package for assessing multivariate normality. The R Journal [Internet]. 2014;6(2):151–62. Available from: https://journal.r-project.org/archive/2014-2/korkmaz-goksuluk-zararsiz.pdf

70. Revelle W. Psych: Procedures for psychological, psychometric, and personality research [Internet]. Evanston, Illinois: Northwestern University; 2021. Available from: https://CRAN.R-project.org/package=psych

71. Barnier J, Briatte F, Larmarange J. Questionr: Functions to make surveys processing easier [Internet]. 2021. Available from: https://CRAN.R-project.org/package=questionr

72. Wickham H, Hester J. Readr: Read rectangular text data [Internet]. 2021. Available from: https://CRAN.R-project.org/package=readr

73. Wickham H, Bryan J. Readxl: Read excel files [Internet]. 2019. Available from: https://CRAN.R-project.org/package=readxl

74. Ooms J. Rsvg: Render SVG images into PDF, PNG, PostScript, or bitmap arrays [Internet]. 2021. Available from: https://CRAN.R-project.org/package=rsvg

75. Epskamp S. semPlot: Path diagrams and visual analysis of various SEM packages output [Internet]. 2019. Available from: https://CRAN.R-project.org/package=semPlot

76. Johnson P, Kite B. semTable: Structural equation modeling tables [Internet]. 2020. Available from: https://CRAN.R-project.org/package=semTable

77. Jorgensen TD, Pornprasertmanit S, Schoemann AM, Rosseel Y. `semTools`: Useful tools for structural equation modeling [Internet]. 2021. Available from: https://CRAN.R-project.org/package=semTools

78. Pornprasertmanit S, Miller P, Schoemann A, Jorgensen TD. Simsem: SIMulated structural equation modeling [Internet]. 2021. Available from: https://CRAN.R-project.org/package=simsem

79. Müller K, Wickham H. Tibble: Simple data frames [Internet]. 2021. Available from: https://CRAN.R-project.org/package=tibble

80. Wickham H. Tidyr: Tidy messy data [Internet]. 2021. Available from: https://CRAN.R-project.org/package=tidyr

81. Wickham H, Averick M, Bryan J, Chang W, McGowan LDA, François R, et al. Welcome to the tidyverse. Journal of Open Source Software. 2019;4(43):1686.

82. Kowarik A, Templ M. Imputation with the R package VIM. Journal of Statistical Software. 2016;74(7):1–16.

83. Dahl DB, Scott D, Roosen C, Magnusson A, Swinton J. Xtable: Export tables to LaTeX or HTML [Internet]. 2019. Available from: https://CRAN.R-project.org/package=xtable

84. Zeileis A, Fisher JC, Hornik K, Ihaka R, McWhite CD, Murrell P, et al. colorspace: A toolbox for manipulating and assessing colors and palettes. Journal of Statistical Software. 2020;96(1):1–49.

85. Zeileis A, Hornik K, Murrell P. Escaping RGBland: Selecting colors for statistical graphics. Computational Statistics & Data Analysis. 2009;53(9):3259–70.

86. Stauffer R, Mayr GJ, Dabernig M, Zeileis A. Somewhere over the rainbow: How to make effective use of colors in meteorological visualizations. Bulletin of the American Meteorological Society. 2009;96(2):203–16.

87. Navarro-Gonzalez D, Lorenzo-Seva U. EFA.MRFA: Dimensionality assessment using minimum rank factor analysis [Internet]. 2021. Available from: https://CRAN.R-project.org/package=EFA.MRFA

88. Kassambara A. Ggcorrplot: Visualization of a correlation matrix using 'ggplot2' [Internet]. 2019. Available from: https://CRAN.R-project.org/package=ggcorrplot

89. Venables WN, Ripley BD. Modern applied statistics with s [Internet]. Fourth. New York: Springer; 2002. Available from: https://www.stats.ox.ac.uk/pub/MASS4/

90. Aust F, Barth M. papaja: Create APA manuscripts with R Markdown [Internet]. 2020. Available from: https://github.com/crsh/papaja

91. Dinno A. Paran: Horn's test of principal components/factors [Internet]. 2018. Available from: https://CRAN.R-project.org/package=paran

92. Henry L, Wickham H. Purrr: Functional programming tools [Internet]. 2020. Available from: https://CRAN.R-project.org/package=purrr

93. Epskamp S, Cramer AOJ, Waldorp LJ, Schmittmann VD, Borsboom D. qgraph: Network visualizations of relationships in psychometric data. Journal of Statistical Software. 2012;48(4):1–18.

94. Chang W, Cheng J, Allaire J, Sievert C, Schloerke B, Xie Y, et al. Shiny: Web application framework for r [Internet]. 2021. Available from: https://CRAN.R-project.org/package=shiny

95. Wickham H. Stringr: Simple, consistent wrappers for common string operations [Internet]. 2019. Available from: https://CRAN.R-project.org/package=stringr

96. Zeileis A, Croissant Y. Extended model formulas in R: Multiple parts and multiple responses. Journal of Statistical Software. 2010;34(1):1–13.

97. Harrell Jr FE. Hmisc: Harrell miscellaneous [Internet]. 2021. Available from: https://CRAN.R-project.org/package=Hmisc

98. Choi SW, Laura E. Gibbons with contributions from, Crane PK. Lordif: Logistic ordinal regression differential item functioning using IRT [Internet]. 2016. Available from: https://CRAN.R-project.org/package=lordif

99. Harrell Jr FE. Rms: Regression modeling strategies [Internet]. 2021. Available from: https://CRAN.R-project.org/package=rms

100. Koenker R. SparseM: Sparse linear algebra [Internet]. 2021. Available from: https://CRAN.R-project.org/package=SparseM

101. Terry M. Therneau, Patricia M. Grambsch. Modeling survival data: Extending the Cox model. New York: Springer; 2000.

102. Siraji MA. Tabledown: A companion pack for the book "basic & advanced psychometrics in r" [Internet]. 2021. Available from: https://github.com/masiraji/tabledown

103. Chalmers RP, Adkins MC. Writing effective and reliable Monte Carlo simulations with the SimDesign package. The Quantitative Methods for Psychology. 2020;16(4):248–80.

104. Michalke M. koRpus: Text analysis with emphasis on POS tagging, readability, and lexical diversity [Internet]. 2021. Available from: https://reaktanz.de/?c=hacking&s=koRpus

105. Michalke M. koRpus.lang.en: Language support for 'koRpus' package: english [Internet]. 2020. Available from: https://reaktanz.de/?c=hacking&s=koRpus

106. Michalke M. Sylly: Hyphenation and syllable counting for text analysis [Internet]. 2020. Available from: https://reaktanz.de/?c=hacking&s=sylly

107. Wickham H. Reshaping data with the reshape package. Journal of Statistical Software [Internet]. 2007;21(12). Available from: http://www.jstatsoft.org/v21/i12/paper

108. Barth M. tinylabels: Lightweight variable labels [Internet]. 2022. Available from: https://cran.r-project.org/package=tinylabels

Table 1

Descriptive Statistics

Items	Mean	SD	Skew	Kurtosis	Normality	Corrected.item.total.correlation
item1	3.51	1.20	-0.45	-0.64	0.89*	0.44
item6	3.20	1.34	-0.20	-1.10	0.90*	0.58
item11	3.18	1.19	-0.22	-0.84	0.91*	0.61
item15	3.34	1.26	-0.31	-0.89	0.90*	0.53
item20	3.75	1.19	-0.75	-0.32	0.86*	0.56
item26	4.14	0.89	-1.12	1.43	0.80*	0.59
item31	3.58	1.08	-0.54	-0.22	0.89*	0.56
item36	3.69	1.00	-0.65	0.12	0.88*	0.67
item2	3.40	1.12	-0.17	-0.59	0.89*	0.66
item7	3.45	1.16	-0.41	-0.59	0.90*	0.64
Ritem12	3.13	1.28	0.11	-1.10	0.89*	0.55
Ritem16	3.01	1.20	0.16	-0.90	0.91*	0.63
Ritem22	3.25	1.24	-0.11	-1.06	0.90*	0.56
item27	3.13	1.30	-0.20	-1.05	0.90*	0.55
item32	3.58	1.06	-0.47	-0.29	0.89*	0.60
item37	3.34	1.17	-0.32	-0.83	0.90*	0.50
Ritem5	2.58	1.16	0.47	-0.50	0.90*	0.60
Ritem8	3.41	1.25	-0.11	-1.18	0.88*	0.65
Ritem13	2.93	1.24	0.08	-1.00	0.91*	0.68
Ritem18	3.24	1.14	-0.08	-0.88	0.91*	0.59
Ritem23	3.36	1.16	-0.14	-0.95	0.90*	0.65
Ritem28	3.35	1.19	-0.18	-0.84	0.91*	0.66
Ritem34	3.50	1.21	-0.21	-1.08	0.88*	0.66
Ritem38	2.59	1.16	0.55	-0.45	0.89*	0.23
Ritem3	2.22	1.17	0.78	-0.23	0.85*	0.33
Ritem10	2.81	1.11	0.37	-0.54	0.90*	0.47
Ritem14	2.77	1.28	0.34	-0.95	0.90*	0.40

Table 2

Unidimensionality of each Mindfulness facet

	Chi-square	df	p	CFI	TIL	RMSEA	RMSEA-Upper	RMSEA-
Observe	71.65	20.00	0.00	0.98	0.98	0.07	0.05	0.09
Describe	416.34	20.00	0.00	0.91	0.88	0.19	0.18	0.21
Describe (Modified)	36.55	17.00	0.00	1.00	0.99	0.05	0.03	0.07
Actwar	85.18	20.00	0.00	0.98	0.98	0.08	0.06	0.10
Nonjudge	173.89	20.00	0.00	0.86	0.80	0.12	0.10	0.14
Nonjudge(Modified)	28.86	8.00	0.00	0.98	0.95	0.07	0.04	0.10
Nonreact	55.31	14.00	0.00	0.96	0.94	0.07	0.05	0.10

Table 3

Item fit Statistics

Items	S-X2	df	p	RMSEA
item1	95.75	65.00	0.03	0.01
item6	114.68	60.00	0.04	0.00
item11	146.39	55.00	0.06	0.00
item15	135.62	59.00	0.05	0.00
item20	115.41	57.00	0.04	0.00
item26	91.58	41.00	0.05	0.00
item31	75.78	53.00	0.03	0.02
item36	89.56	41.00	0.05	0.00
item2	165.69	52.00	0.06	0.00
item7	142.75	53.00	0.06	0.00
Ritem12	119.65	63.00	0.04	0.00
Ritem16	125.36	60.00	0.05	0.00
Ritem22	106.63	65.00	0.03	0.00
item27	116.73	61.00	0.04	0.00
item32	99.25	51.00	0.04	0.00
item37	120.31	63.00	0.04	0.00
Ritem5	117.53	56.00	0.05	0.00
Ritem8	150.42	55.00	0.06	0.00
Ritem13	108.42	55.00	0.04	0.00
Ritem18	91.73	58.00	0.03	0.00
Ritem23	96.69	51.00	0.04	0.00
Ritem28	129.65	52.00	0.05	0.00
Ritem34	79.43	49.00	0.03	0.00
Ritem38	162.79	76.00	0.05	0.00
Ritem5	117.53	56.00	0.05	0.00
Ritem8	150.42	55.00	0.06	0.00
Ritem13	108.42	55.00	0.04	0.00

Table 4

IRT Description

	a	b1	b2	b3	b4	S-X2	df	RMSEA	p
item1	0.90	-3.09	-1.85	-0.12	1.41	95.75	65.00	0.03	0.01
item6	1.39	-1.62	-0.77	0.26	1.25	114.68	60.00	0.04	0.00
item11	1.47	-1.95	-0.81	0.24	1.66	146.39	55.00	0.06	0.00
item15	1.29	-2.10	-1.06	0.09	1.25	135.62	59.00	0.05	0.00
item20	1.45	-2.38	-1.54	-0.53	0.65	115.41	57.00	0.04	0.00
item26	1.66	-3.25	-2.47	-1.24	0.39	91.58	41.00	0.05	0.00
item31	1.43	-2.66	-1.63	-0.26	1.23	75.78	53.00	0.03	0.02
item36	1.89	-2.58	-1.62	-0.44	1.07	89.56	41.00	0.05	0.00
item7	1.94	-1.98	-1.16	-0.04	1.10	75.91	29.00	0.06	0.00
Ritem22	0.64	-4.05	-1.39	0.32	2.31	97.17	40.00	0.05	0.00
item27	1.52	-1.58	-0.72	0.23	1.48	32.76	34.00	0.00	0.53
item32	1.94	-2.35	-1.39	-0.17	1.10	69.01	28.00	0.05	0.00
item37	1.33	-2.43	-1.03	-0.03	1.57	76.21	35.00	0.05	0.00
Ritem5	1.40	-1.44	0.03	1.31	2.24	117.53	56.00	0.05	0.00
Ritem8	1.70	-2.37	-0.81	0.15	0.85	150.42	55.00	0.06	0.00
Ritem13	1.73	-1.50	-0.38	0.53	1.61	108.42	55.00	0.04	0.00
Ritem18	1.44	-2.52	-0.88	0.27	1.57	91.73	58.00	0.03	0.00
Ritem23	1.71	-2.36	-0.91	0.07	1.17	96.69	51.00	0.04	0.00
Ritem28	1.93	-1.99	-0.91	0.16	1.05	129.65	52.00	0.05	0.00
Ritem34	1.82	-2.43	-1.01	-0.02	0.77	79.43	49.00	0.03	0.00
Ritem38	0.40	-4.28	0.31	3.41	5.95	162.79	76.00	0.05	0.00
Ritem3	0.73	-1.07	0.99	2.59	4.11	55.27	49.00	0.02	0.25
Ritem10	1.06	-2.44	-0.29	1.29	2.47	51.56	43.00	0.02	0.17
Ritem17	1.04	0.54	1.41	3.39	4.39	77.08	36.00	0.05	0.00
Ritem25	1.03	-2.06	-0.22	1.49	2.94	75.81	45.00	0.04	0.00
Ritem30	1.28	-1.42	0.09	1.22	2.23	97.86	45.00	0.05	0.00
Ritem35	0.98	-2.91	-0.94	1.47	3.65	75.15	46.00	0.03	0.00

Table 5

IRT Description

	a	b1	b2	b3	b4	S-X2	df	RMSEA	p
item1	0.90	-3.09	-1.85	-0.12	1.41	95.75	65.00	0.03	0.01
item6	1.39	-1.62	-0.77	0.26	1.25	114.68	60.00	0.04	0.00
item11	1.47	-1.95	-0.81	0.24	1.66	146.39	55.00	0.06	0.00
item15	1.29	-2.10	-1.06	0.09	1.25	135.62	59.00	0.05	0.00
item20	1.45	-2.38	-1.54	-0.53	0.65	115.41	57.00	0.04	0.00
item26	1.66	-3.25	-2.47	-1.24	0.39	91.58	41.00	0.05	0.00
item31	1.43	-2.66	-1.63	-0.26	1.23	75.78	53.00	0.03	0.02
item36	1.89	-2.58	-1.62	-0.44	1.07	89.56	41.00	0.05	0.00
item7	2.02	-1.95	-1.13	-0.04	1.07	72.99	21.00	0.07	0.00
item27	1.52	-1.58	-0.72	0.23	1.48	35.62	24.00	0.03	0.06
item32	1.90	-2.39	-1.41	-0.17	1.11	43.02	19.00	0.05	0.00
item37	1.31	-2.46	-1.04	-0.03	1.58	41.45	23.00	0.04	0.01
Ritem5	1.39	-1.44	0.03	1.31	2.24	126.97	52.00	0.05	0.00
Ritem8	1.68	-2.38	-0.82	0.15	0.85	100.83	50.00	0.04	0.00
Ritem13	1.73	-1.51	-0.38	0.53	1.61	96.48	52.00	0.04	0.00
Ritem18	1.42	-2.54	-0.89	0.27	1.59	109.87	51.00	0.05	0.00
Ritem23	1.72	-2.36	-0.91	0.07	1.17	100.58	49.00	0.04	0.00
Ritem28	1.96	-1.97	-0.90	0.15	1.04	109.86	49.00	0.05	0.00
Ritem34	1.84	-2.41	-1.01	-0.03	0.77	89.21	46.00	0.04	0.00
Ritem10	1.26	-2.17	-0.26	1.16	2.20	37.47	24.00	0.03	0.04
Ritem25	1.46	-1.66	-0.19	1.17	2.32	64.47	22.00	0.06	0.00
Ritem30	1.32	-1.40	0.05	1.17	2.18	39.09	24.00	0.03	0.03
Ritem35	0.84	-2.27	-0.10	1.59	2.95	43.70	27.00	0.03	0.02
item4	0.82	-3.30	-1.97	0.14	2.28	109.15	52.00	0.05	0.00
item9	0.97	-2.92	-1.42	0.07	2.04	85.58	52.00	0.03	0.00
item19	1.10	-3.30	-2.16	-0.67	1.33	94.79	46.00	0.04	0.00
item21	1.18	-2.36	-1.16	0.05	1.82	106.25	48.00	0.05	0.00

Table 6

Correlation matrix of the main variables

	1	2	3	4	5	6	7	8	9
1 Observe									
2 Describe	.54**								
3 Awarenness	.06	.20**							
4 Nonjudge	-.33**	-.11+	.39**						
5 Nonreact	.53**	.49**	.10	-.26**					
6 EI	.36**	.45**	.45**	-.02	.39**				
7 Depression	-.05	-.13*	-.48**	-.15*	-.10	-.38**			
8 MASS	.16**	.26**	.63**	.24**	.17**	.46**	-.51**		
9 Openness	.20**	.13*	.01	-.12*	.18**	.24**	-.10	.08	
10 Neuroticism	-.18**	-.29**	-.55**	-.20**	-.36**	-.50**	.52**	-.53**	-.16*

Note. **p < .001

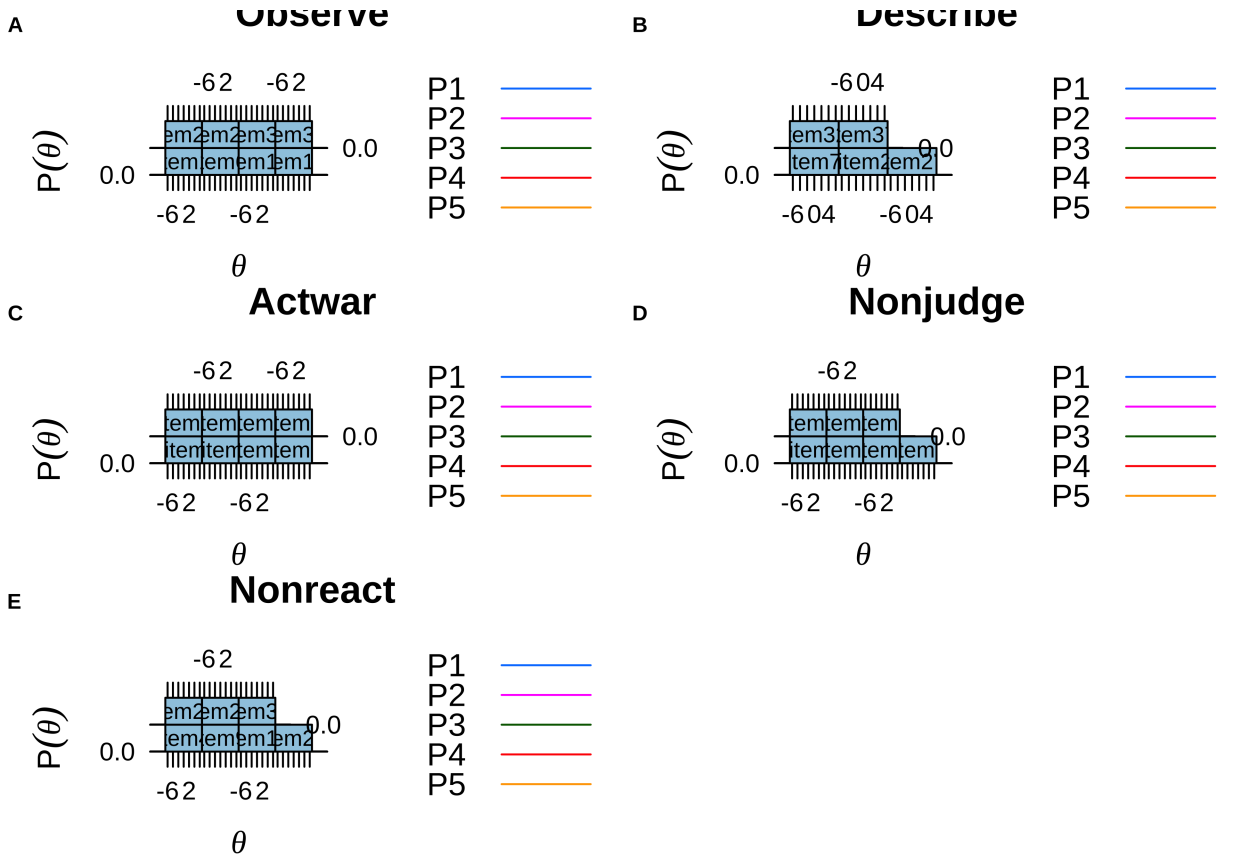

Figure 1. Option Charecteristics curve (A) Observe, (B) Describe, (C)Act with awareness, (D)Nonjudgement, (E) Nonreact

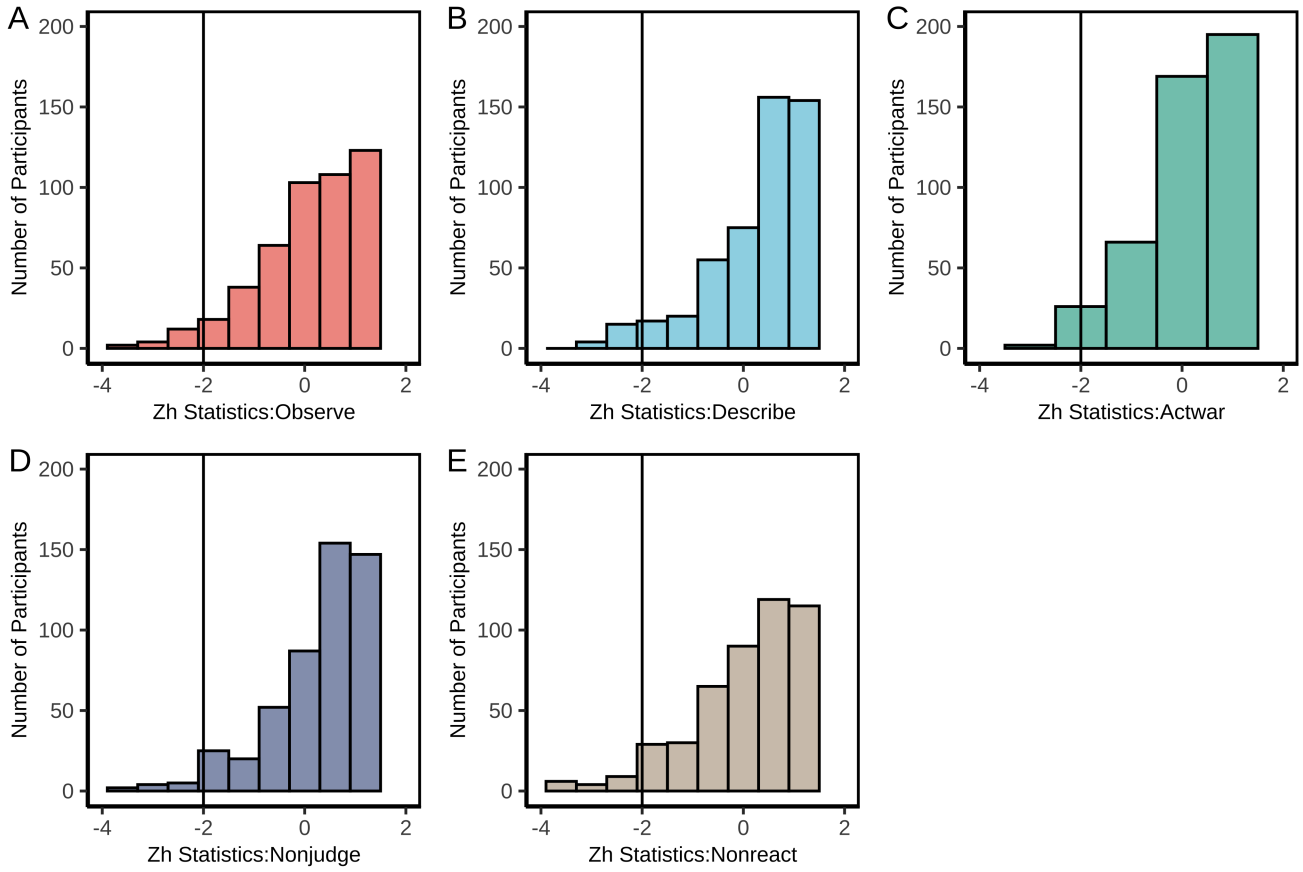

Figure 2. Person Fit of the Five fitted Models (A) Observe, (B) Describe, (C)Act with awareness, (D)Nonjudgement, (E) Nonreact

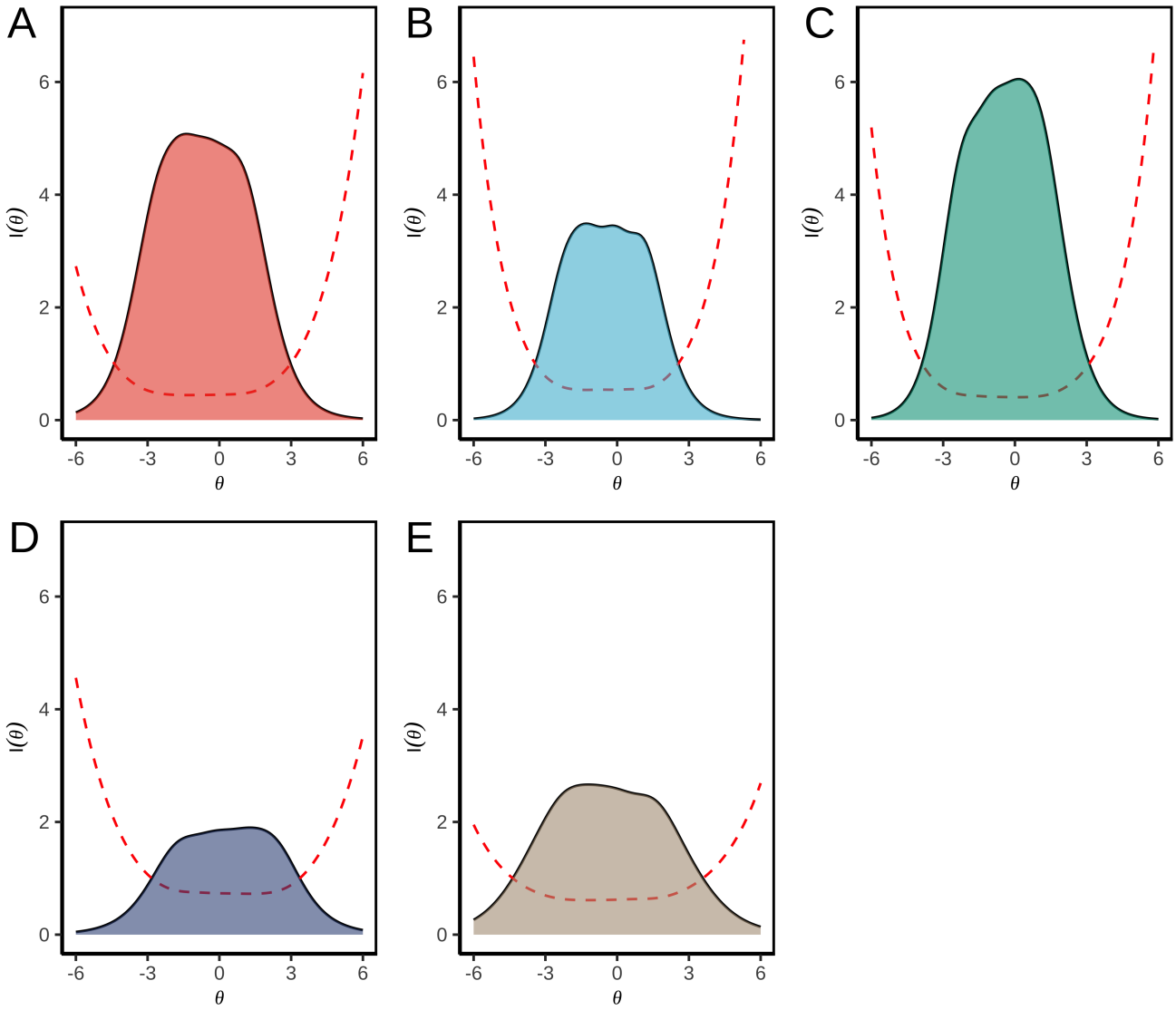

Figure 3. Test information curves (a) observe (b) describe (c) actware (d) nonjudge (e) nonreact

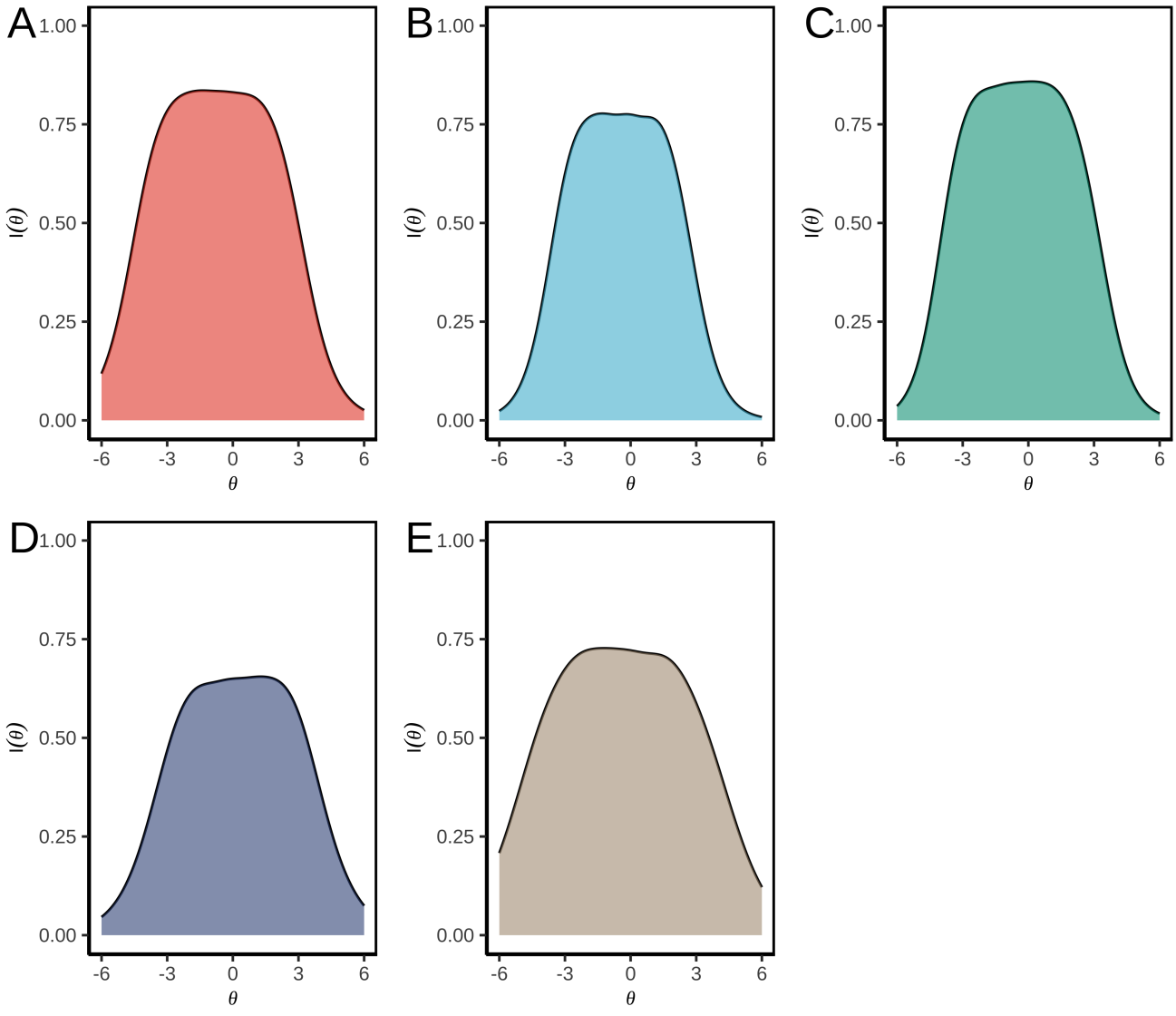

Figure 4. Conditional Reliability plots: (A) Observe, (B) Describe, (C)Act with awareness

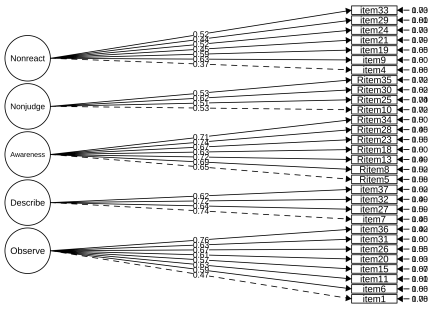
Nonreact
Nonjudge
Awareness
Describe
Observe
item33
item29
item24
item21
item19
item9
item4
Ritem35
Ritem30
Ritem25
Ritem10
Ritem34
Ritem28
Ritem23
Ritem18
Ritem13
Ritem8
Ritem5
item37
item32
item27
item7
item36
item31
item26
item20
item15
item11
item6
item1

Figure 5. (A)