Exploring Libyan Arab Personality: Unveiling 10 Factors Within the Big Five

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Abstract

In Arab World, the big five aspect scale (BFAS) with 10 factors domain currently lacks validating evidence. The BFAS structure was investigated in Libyan adult sample (N = 1163). The sample completed the BFAS, and the International Personality Item Pool (IPIP) to assess the BFAS validity. Results found that The BFAS Conscientiousness, Extraversion, Introversion Openness/Intellect are correlated positively with IPIP Conscientiousness, Extraversion, Introversion, Intellect, The BFAS Neuroticism was negatively correlated with IPIP emotional stability. Results found that the BFAS scales includes its 10 domains, has good internal consistency, and is strongly related to major personality dimensions assessed by the leading questionnaire. To conclude, the findings indicate that the Arabic BFAS is reliable, valid, and comparable to the original English version. This study provides valuable insights into an individual's personality and behavior, which can have implications for personal, professional, and clinical contexts.

Keywords: Personality; Big five; Factors domain; Factor Analysis; Arabic; Validation

Introduction

Personality assessment is evaluating an individual's unique character traits, attitudes, behaviors, and emotions to determine their psychological makeup (Goldberg, 1999; [1,2]. The goal of personality assessment is to provide insights into an individual's behavioural patterns, strengths, and weaknesses and to help identify areas for personal growth and development [2,3]. This personality assessment typically involves administering standardized tests and/or self-report measures that assess various aspects of personality, including traits dimensions, such as Introversion/Extraversion, Openness, Conscientiousness, Agreeableness, and Neuroticism (Cattell, 1943; [4], Eysenck, 1985; Digman, 1990; Goldberg, 1993; Hathaway, & McKinley, 1940; [5]. An increasing body of evidence suggests that many additional factors beyond those assessed dimensions in more traditional factor frameworks are required to account for significant individual variation [3,6,7], Ashton et al., 2004; Johnson, 1994).

Personality traits dimensions are also considered universal across cultures and have been found in studies across different languages and geographical regions [8,9]. These traits are not good or bad in themselves, but they can manifest in adaptive or maladaptive ways depending on the context (Marengo et al., 2021; [10]. These traits provide insight into a personu's character and how they might handle certain situations [11, 12].

Research on differences in personality traits among Arab populations is limited; nevertheless, some studies have been conducted [13,14]. According to a recent study, personality traits were prevalent among Arab teachers [15]. In a related manner, some studies suggest that there may be some similarities to the patterns of sex differences in personality traits found in Western populations [16-19]. On average, men tend to score slightly higher on traits such as Assertiveness, Dominance, Ambition (Extraversion) and Openness to experience and lower on traits related to caring and Compassion (Agreeableness). In contrast, women tend to score slightly higher on traits such as warmth, kindness, Compassion (Agreeableness) and Neuroticism and lower on traits related to Assertiveness, Dominance, and Ambition (Extraversion) (Abu Hussain & Abu Hussain, 2017; [20] Bunker et al., 2021; [21,22] Ye et al., 2018). However, a study showed that even on Extraversion

trait, women could report higher scores than men among other cultures [23].

In addition, research has found some cultural, societal, and habitual differences in the expression and manifestation of these traits [24,25] Gobrial & Radwan, 2017). For example, in Arab culture, collectivism and family-oriented values are highly emphasized, and people tend to score higher on Agreeableness, Extraversion and Conscientiousness, and lower on Openness and emotional stability, as they tend to prioritize their relationships with others and the needs of their family and community over their personal goals (Abu Hussain & Abu Hussain, 2017; [26-28]. Research has also found that Arab culture places a high value on emotional expressiveness, and people tend to score lower on Neuroticism, as they tend to be less prone to negative emotions [22,29, 30]. Other studies have indicated that financial hardship, poverty, and economic instability can significantly affect the Big Five traits Among Arabs [16,31]. However, these differences are socially and culturally constructed and can vary across time and cultures [8] Zell & Lesick, 2022).

Since the literature findings may not be generalizable to all Arab populations and may not reflect the diversity of cultures and experiences within the Arab world, additional cross-cultural studies are needed due to the challenges of comparing cultures and measuring personality traits. To our knowledge, no validated tests can be used to evaluate the additional factor models among Arabs. Therefore, there is a need for further Big five scale, particularly regarding its factorial structural analysis [14]. The current study aims to cross-culturally validate the big five aspect scale (BFAS) using factorial analysis with a 10-factor model in a sample of Libyan Arabs.

Methods

Overview of Study Design and Procedure

This study was performed in two steps: the first step was to develop an Arabic translation and cross-cultural adaptation of the Big Five aspect scale (BFAS). The second step was to test the psychometric properties of the Arabic version of the adapted questionnaire.

Translation and cross-cultural adaptation of the Big Five aspect questionnaire: Cross-cultural translation of a scale or a questionnaire from one language to another involves a careful and systematic approach [32]. This study started with a thorough analysis of the original questionnaire by the authors and a review of the target language's cultural context. This included exploring cultural differences between Arabic and English contexts that may affect the interpretation of the scale, such as the use of idioms or different ways of expressing the same concept. Once the cultural context is understood, the translation process starts.

The translation of the BFAS Questionnaire followed Beaton et al.'s [32] method of cross-cultural adaptation of questionnaires. The method begins with an initial forward translation of the original questionnaire into Arabic. Two professional translators independently translated the questionnaire from English to Arabic, followed by expert review and revision to ensure accuracy and cultural appropriateness. The experts' committee included a rehabilitation professional, a clinical psychologist, and a university professor specializing in Arabic language literature. Any discrepancies between the two translators were resolved by consensus.

The final step is back-translation and validation of the translated questionnaire by native speakers of the Arabic language to ensure accuracy and comprehension. This process ensures the cross-cultural validity of the questionnaire and is an essential step in the research process. The expert committee then reviewed the back translations, and the pre-final version of the questionnaire was produced.

Once the questionnaire adapted, it was tested on a small sample of individuals (n=30) with similar characteristics to the target population to evaluate its accuracy and clarity. The participants were allowed to give feedback on the questions and any issues they encountered when completing the questionnaire. Finally, the questionnaire is refined based on the testing phase results. This testing of the adapted questionnaire helped understand the attitudes and behaviours of people with different cultural backgrounds, as it helps ensure that it is appropriate for the target population. Beaton et al. [32] also suggest that the questionnaire should be piloted among a sample of the target population to check for any misunderstandings or misinterpretations of the questions. At the end of the pilot testing stage, the participants' feedback was analyzed and discussed, and the final version of the questionnaire was produced.

Testing the psychometric properties: This step was performed on 1163 individuals representing Libya's general public, employing a cross-sectional research design. To be eligible, the participants had to be able to read and understand the Arabic language and provide consent to participate in the study; they were at least 18 years old.

The study sample size was estimated based on the literature [33,34], which suggests that at least 100 participants are needed for appropriate psychometric analysis, such as construct validity and internal consistency. The literature seems inconclusive regarding the sample size estimation for validation studies as many researchers depend on the classical view, "the more, the better." However, we wanted to ensure that we get as extensive a range of responses as possible. That is, the recruited sample is as heterogeneous as possible to get various levels of responses on each item.

Ethical Approval

This study was approved by the Institutional Review Board (IRB) at the researcher's institution (Approval Certificate# E.M./1015-23). All participants were instructed to read the study information before proceeding to the questionnaire. They have the right to accept or reject participation in this study. The questions were also formulated so that participants could ignore to answer any question or quit the questionnaire if they wanted to.

Procedures

The final version of the adapted questionnaire was circulated through social media (e.g., Facebook, Twitter...etc.) and the official web pages of several community organizations, sports clubs, and Universities across the country. The questionnaire was made accessible over a period of three months, from September 20th to December 31st, 2022. The questionnaire consisted of three sections, as follows.

Demographics: The first section collected the participants' demographic information, such as place of residence, age, sex, marital status, education, occupation, and self-reported overall mental health.

The big five aspect scale BFAS: The original BFAS version is a self-report personality inventory developed by John and Srivastava [5]. It measures the Big Five dimensions of personality, also known as the Five-Factor Model (FFM), which includes the aspects of Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. DeYoung [7] specifically developed the BFAS, which assesses 10 facets. Scores of the statements on this scale ranges from one to five, with one being strongly disagree and five being strongly agree. The responses to the questions are then used to calculate scores for each of the five personality traits, including its domain.

The Arabic IPIP Big-Five factor markers: The IPIP personality questionnaire is a self-report measure of personality that is based on the International Personality Item Pool (IPIP), a large pool of items designed to assess the Five-Factor Model (FFM) of personality (Goldberg, 1999). It consists of 50 items that measure the five broad dimensions of personality: Extraversion (E), Agreeableness (A), Conscientiousness (C), Emotional Stability (ES) and Intellect (I). This study used the validated Arabic version of the IPIP questionnaire (Almaghbashy, 2017). The questionnaire comprises a series of statements that individuals can rate on a five-point scale ranging from strongly agree to strongly disagree. The answers are then used to determine and assess the individual's score for each of the BFAS dimensions.

Data Analysis

The data analysis was performed using the Jamovi Statistics software (Version 2.3.21). Continuous data were presented as a mean and standard deviation (SD). We also explored sex differences in the Big Five domains and subdomains using One-way non-parametric ANOVA (Kruskal-Wallis test). A statistical significance level was set at $p < 0.05$.

Reliability: The internal consistency of the Arabic version of the big five aspect scale was examined using Cronbach's α. In this study, Cronbach's α of 0.70 or more was considered an acceptable internal consistency [35].

Validity: The construct validity of the Arabic BFAS was assessed by using bivariate correlations between the BFAS subscale scores and the PIPI scores. The absolute value of the scale Correlation Coefficient between (0.45–0.96), is considered sufficient [35]. According to Clark and Watson [36], the average inter-item correlations should fall somewhere between 0.15 and 0.50. Anything below 0.15 would be too broad of a construct, while anything above 0.50 would indicate redundancy of items on the scale [36].

Factor Analysis: In this current study, in order to analyze the structure and item-factor loadings of BFAS factors in Libyan Arab samples, we conducted an exploratory factor analysis with oblique rotation based on parallel analysis. We chose to use an exploratory factor analysis (EFA) instead of a confirmatory factor analysis (CFA) with maximum likelihood technique because Likert-type items, such as those in the BFAS, can introduce inferential measurement issues [37]. Additionally, CFA with maximum likelihood can be problematic when examining complex personality structures, as it relies on restrictive assumptions and may not fit well [38, 39]. To evaluate the fit of the model, TLI > 0.90; an RMSEA with an upper boundary < 0.10; KMO- = 0.70, considered for an acceptable models' fit (Browne & Cudeck, 1992; [40]; Hu & Bentler, 1999; Kline, 2010. The correlation matrix for the items, Kaiser–Meyer–Olkin's measure of sampling adequacy (KMO acceptable level >0.50) [41] and Bartlett's test of sphericity [42] were calculated to verify the appropriateness of using factor models.

Result

Descriptive Statistics

Data were collected from 1163 participants representing over twenty major cities in Libya. The participants age ranged from 18 to 65 years (Mean ± Standard Deviation = 25.3 ± 8.44). The findings showed that the vast majority of the participants were 45 years old or younger (95.7%), with less than 1% of the population who represented older adults (i.e., 60+ years). Of the participants, 74.3% were females, and 25.7% were males. The majority of the participants were from Tripoli (55.8%), followed by Benghazi (15.4%), and other cities (28.8%). Regarding marital status, 19.3% of the participants were married, while 78.6% were single, and the remaining participants were either divorced or widowed. In terms of occupation, the majority of the participants were students (68.8.9%), followed by public sector employees (15.4%) and private sector employees (8.8%). The remaining participants

were either unemployed or had retired. Concerning self-reported mental health, the majority of the participants rated their mental health as good (38.4%) or very good (52.2%), while 8.2% rated it as fair, and only 1.2% rated it as poor.

Initial Item Selection

First, we analyzed the internal consistencies of the BFAS items, including its 10-domain and item-to-total correlations. Internal consistencies were quantified by Cronbach's α. These indices "set an upper limit to the reliability of tests constructed in terms of domain-sampling model." According to Compassion subdomain, the Item BFAS 32, as reversed, showed a negative correlation with -0.023, but when we left it as non-reversed, it showed a positive correlation with 0.23, and the α of the subdomain was increased from 0.66 to 0.73. Therefore, we advise to keep item BFAS 66 as non-reversed.

In terms of the Politeness subdomain, when we left item BFAS 87 as reversed, it showed a negative correlation with - 0.26. However, when we left it as non-reversed, it showed a positive correlation with 0.26, and the α of this subdomain was increased from 0.49 to 0.62. In regard to item BFAS 97, when entered as reversed, it showed a week negative correlation of -0.014. We tried to keep it non-reversed, but it also showed a weak correlation with 0.014. In addition, item BFAS 17 showed a low correlation of 0.10. By deleting both items, BFAS 17 and BFAS 97, the α of the subdomain increased to 0.65. So, we suggest deleting both items.

According to the Orderliness subdomain, when we kept item BFAS 78 as reversed, it showed a negative correlation with -0.072, and the α of the domain was 0.71. Still, when we kept it as non-reversed, it showed low positive correlation of 0.072, and the α of the subdomain slightly increased from 0.71 to 0.73. Interestingly, by dropping item BFAS 78, we observed that item BFAS 23 was increased from 0.19 to 0.22, and the α of the subdomain increased from 0.73 to 0.76. Therefore, we suggest deleting item BFAS 78.

Regarding Openness/Intellect domain, all items BFAS 60, BFAS 70, BFAS 80 and BFAS 90 showed very low positive correlations under 0.15 (i.e., 0.11, 0.015, 0.04 and 0.10, respectively) and the α of the domain was 0.51. By suspending these items the α was increased from 0.51 to 0.61, but when dropping the items BFAS 60, BFAS 80 and BFAS 90, it was observed that the correlation coefficient of item BFAS70 became 0.19, and the Cronbach's α of the corresponding scale slightly increased from 0.61 to 0.62. Thus, we suggest keeping only item BFAS 70. All in all, Items BFAS 17, BFAS 60, BFAS 78, BFAS 80, BFAS 90, BFAS 97 with their low correlations, lacking content validity evidence.

Final Item Selection

Before exploratory factor analysis factor analysis, Kaiser–Meyer–Olkin's test of sampling adequacy and Bartlett's test of sphericity were performed to examine the appropriateness of using factor analysis. The Kaiser-Meyer-Olkin index was (KMO = 0.91), indicating adequate sampling for factor analysis. Further, Bartlett's test of Sphericity showed significant correlations between variables (χ^2 = 38761, df = 4851, $p < 0.001$). To extract and correlate two factors from each of the Big Five domains, exploratory factor analysis factor analysis with direct oblimin rotation based on parallel analysis was used. Interestingly, the items chosen for the BFAS showed component loading of a ten-factor domain for each of the big five. The model had acceptable fit: χ2 (6215, n = 1163), p < 0.001; df = 3642; TLI = 0.90; RMSEA = 0.024. To reduce collinearity in the final scales, items were only included if their loading on the intended aspect factor was at least 0.30. The final items for each of the 10 factor domains are shown in Table 1. The columns in the Table 2 show the item-rest correlation included with its factor loading. Items were averaged (with appropriate reversals) to generate scale scores for each aspect, and these scores were averaged across the two domains to generate Big Five domain scores.

Table 1: EFA standardized factor loadings for the BFAS (n = 1163) in the nested Ten-factor model.

Scale	α	Factor Loading
Neuroticism		
Withdrawal		
Feel threatened easily	0.45	0.33
Rarely feel depressed (R)	0.36	-0.38
Worry about things	0.46	0.34
Am easily discouraged	0.59	0.48
Become overwhelmed by events	0.5	0.43
Am afraid of many things	0.51	0.4
Volatility		
Get angry easily	0.72	0.87
Rarely get irritated (R)	0.66	0.79
Get upset easily	0.66	0.58

Am not easily annoyed (R)	0.63	-0.55
Agreeableness		
Compassion		
Am not interested in other people's problems (R)	0.3	0.34
Feel others' emotions	0.54	-0.61
Sympathize with others' feelings	0.56	-0.61
Am indifferent to the feelings of others	0.57	0.72
Take no time for others (R)	0.37	0.43
Like to do things for others	0.39	-0.32
Politeness		
Take advantage of others (R)	0.47	0.37
Insult people	0.48	0.38
Seek conflict (R)	0.44	0.32
Conscientiousness		
Industriousness		
Carry out my plans	0.5	-0.38
Waste my time (R)	0.49	0.62
Find it difficult to get down to work (R)	0.47	0.55
Finish what I start	0.41	-0.31
Get things done quickly	0.4	-0.36
Postpone decisions	0.51	0.46
Orderliness		
Leave my belongings around	0.43	-0.41
Like order	0.63	0.6
Keep things tidy	0.57	0.58
Am not bothered by messy people (R)	0.46	-0.58
Want everything to be "just right."	0.36	0.35
Am not bothered by disorder (R)	0.54	-0.67
Extraversion		
Enthusiasm		
Make friends easily	0.5	-0.54
Am hard to get to know (R)	0.47	0.58
Keep others at a distance (R)	0.44	0.52
Reveal little about myself (R)	0.31	0.42
Warm up quickly to others	0.48	-0.51
Assertiveness		
Have a strong personality	0.63	0.55
Lack the talent for influencing people (R)	0.5	-0.48
Know how to captivate people	0.52	0.39
Wait for others to lead the way (R)	0.51	-0.55
See myself as a good leader	0.63	0.62
Can talk others into doing things	0.56	0.46
Am the first to act	0.46	0.33
Do not have an assertive personality (R)	0.48	-0.43
Openness/Intellect		
Intellect		

Am quick to understand things	0.55	0.61
Have difficulty understanding abstract ideas (R)	0.42	-0.49
Can handle a lot of information	0.56	0.55
Have a rich vocabulary	0.42	0.47
Think quickly	0.38	0.41
Learn things slowly	0.45	-0.57
Openness		
Enjoy the beauty of nature	0.38	0.35
Believe in the importance of art	0.47	0.46
Get deeply immersed in music	0.3	0.4
See beauty in things that others might not notice	0.44	0.36
Overall Cronbach's α	0.84	
(R) indicates items to be reverse scored		

Table 2: Scales reliability Statistics for the BFAS in Libyan Samples.

Factor	M	SD	α
Neuroticism	30.43	11.7	0.83
Withdrawal	17.93	7.04	0.74
Volatility	12.5	5.33	0.84
Agreeableness	32.18	11.2	0.75
Compassion	20.48	7.34	0.71
Politeness	11.7	4.29	0.66
Conscientiousness	37.99	13.64	0.78
Industriousness	16.7	6.57	0.72
Orderliness	21.29	7.88	0.75
Extraversion	37.92	13.68	0.77
Enthusiasm	12.93	5.38	0.68
Assertiveness	24.99	9.46	0.82
Openness/Intellect	33.12	11.54	0.71
Intellect	19.28	7.02	0.72
Openness	13.83	5.18	0.59

Table 3 also reveals correlation patterns among the BFAS within each domain, and the IPIP scales, offering further support for the similarity of measurement across instruments. High correlations (in bold) between the same Big Five domains across scales and IPIP provide further evidence that the BFAS measures the standard Big Five. These correlations ranged between –1 or +1 for the big five and the IPIP.

Discriminant Validity and Suppression

Given the relatively strong correlations between the two aspect factors in each domain, one critical question is: to what extent do the two aspects of each domain have discriminant validity? If the two aspects within each Big Five domain are indeed distinct traits, then their correlation patterns with other variables should not be overly similar (De Young et al.,2007). This study does not confirm this similarity (see Table 3). The differential associations

of Extraversion and Agreeableness aspect pairs provide one clear example: while Assertiveness is negatively correlated with Politeness, Enthusiasm is insignificant. Moreover, Looking at Agreeableness and Openness/Intellect, whereas Openness is positively correlated with Politeness, Intellect was insignificant with Politeness.

Since each domain of the BFAS aspects is positively correlated, determining discriminant validity can be more complex than simply looking for divergent patterns of zero-order correlations. Because the two aspects in each domain are positively correlated and presumably share some of the same sources, they should predict many variables similarly. Furthermore, if they do not predict the same variable similarly, they may act as suppressors on each other. When two positively correlated variables are related in opposite directions to a third variable, one or both of their associations with the third variable may be suppressed [43].

Table 3: Correlations between the IPIP and BFAS.

	IPIP E	IPIP A	IPIP C	IPIP ES	IPIP I	BFAS E	BFAS A	BFAS C	BFAS N	BFAS O/I	(Wd)	(Vl)	(Cp)	(Pt)	(Nd)	(Od)	(Et)	(At)	(It)
IPIP A	.34 ***	—																	
IPIP C	.15 ***	.27 ***	—																
IPIP ES	.19 ***	0.04	.29 ***	—															
IPIP I	.16 ***	.33 ***	.33 ***	-0.01	—														
BFAS E	.62 ***	.44 ***	.40 ***	.19 ***	.46 ***	—													
BFAS A	.13 ***	.65 ***	.16 ***	.06 *	.14 ***	.20 ***	—												
BFAS C	.13 ***	.27 ***	.83 ***	.31 ***	.36 ***	.45 ***	.16 ***	—											
BFAS N	-.19 ***	-0.032	-.32 ***	-.85 ***	-.10 ***	-.24 ***	0	-.35 ***	—										
BFAS O/I	.15 ***	.30 ***	.31 ***	.09 **	.68 ***	.45 ***	.20 ***	.37 ***	-.17 ***	—									
With-drawal (Wd)	-.21 ***	-0.02	-.32 ***	-.67 ***	-.12 ***	-.30 ***	.06 *	-.36 ***	.84 ***	-.19 ***	—								
Volatili-ty (Vl)	-.15 ***	-0.04	-.25 ***	-.81 ***	-.07 *	-.14 ***	-0.04	-.27 ***	.92 ***	-.12 ***	.57 ***	—							
Com-passion (Cp)	.27 ***	.74 ***	.18 ***	0.03	.27 ***	.41 ***	.80 ***	.20 ***	0	.30 ***	0.02	-0.02	—						
Polite-ness (Pt)	-.11 ***	.23 ***	.08 **	0.05	-0.04	-.11 ***	.70 ***	.07 *	0.02	0.01	.09 **	-0.02	.19 ***	—					
Indus-triousness (Nd)	.22 ***	.23 ***	.76 ***	.43 ***	.33 ***	.48 ***	.12 ***	.87 ***	-.49 ***	.36 ***	-.50 ***	-.40 ***	.18 ***	0	—				
Order-liness (Od)	0.08	.23 ***	.66 ***	.08 **	.29 ***	.28 ***	.15 ***	.83 ***	-.10 ***	.27 ***	-.11 ***	-.07*	.14 ***	.12 ***	.48 ***	—			
Enthu-siasm (Et)	.66 ***	.44 ***	.20 ***	.13 ***	.23 ***	.79 ***	.26 ***	.20 ***	-.09 **	.22 ***	-.11 ***	-.06 *	.41 ***	-0.02	.23 ***	.12 ***	—		
Asser-tiveness (At)	.35 ***	.31 ***	.44 ***	.19 ***	.51 ***	.82 ***	.08 **	.50 ***	-.28 ***	.52 ***	-.37 ***	-.16 ***	.28 ***	-.16 ***	.54 ***	.33 ***	.34 ***	—	
Intellect (It)	.24 ***	.30 ***	.37 ***	.19 ***	.65 ***	.53 ***	.15 ***	.43 ***	-.26 ***	.85 ***	-.28 ***	-.20 ***	.28 ***	-0.05	.47 ***	.27 ***	.26 ***	.60 ***	—
Open-ness (Os)	-0.06	.19 ***	.11 ***	-.07 *	.42 ***	.19 ***	.19 ***	.16 ***	0.01	.75 ***	0	0.03	.21 ***	.10 ***	.09 **	.19 ***	.11 ***	.22 ***	.33 ***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

IPIP = International Personality Item Pool; A = Agreeableness; C = Conscientiousness; ES = Emotional stability; E = Extraversion; I = Intellect

BFAS = Big Five Aspect Scales; N = Neuroticism; A = Agreeableness; C = Conscientiousness; E = Extraversion; O/I = Openness/Intellect; The first letter of an aspect is represented by subscript letters

Previous research has shown that the negative correlation between Conscientiousness and Neuroticism is one of the most robust cross-domain correlations among the Big Five [44]. Indeed, the results of this study revealed negative correlation between BFAS Conscientiousness and IPIP Neuroticism (see Table 2). Surprisingly, this correlation does not hold even for Industriousness and Orderliness, which were found to be negatively correlated with BFAS Neuroticism and positively correlated with IPIP emotional stability. Thus, the negative association between Industriousness, Orderliness and Neuroticism was not suppressing the positive association between Orderliness, Industriousness, and IPIP emotional stability.

Correlations between the 10 Aspects

Correlation patterns among aspect-level traits (see Table 3) are more varied than domain-level correlations, and stronger cross-domain correlations appear at the aspect level than at the Big Five level. BFAS Agreeableness, Extraversion, Introversion, and Openness are positively correlated with IPIP Agreeableness, Extraversion, Introversion, and Openness. Appealingly, BFAS Neuroticism was negatively correlated with IPIP emotional stability.

BFAS two aspects across two domains are at least as strong as correlations between two aspects within each of those two domains in several cases (DeYoung et al., 2007). This holds true for the relationships between Intellect and Industriousness, as well as Intellect and Assertiveness. In fact, Intellect, Industriousness, and Assertiveness are related scales from three different domains. Intellect is positively correlated with both Openness and Assertiveness, as well as with IPIP Intellect, and Industriousness has significant correlations with both Intellect and Assertiveness, as well as with IPIP Conscientiousness. Another cross-domain pair with strong correlations is Compassion and Enthusiasm and IPIP Extraversion and IPIP Agreeableness.

Sex Differences

Sex differences on the BFAS domains and subdomains were compared using One-way non-parametric ANOVA (Kruskal-Wallis test). The mean female score on the Neuroticism domain was significantly higher than that of males ($P<0.001$). For the BFAS subdomains, there was a statistical difference between males and females in Withdrawal, Volatility, Politeness, and Openness, with all p-values less than 0.005. No significant mean difference was found between males and females in other domains and subdomains. (See Table 4 and Figure 1).
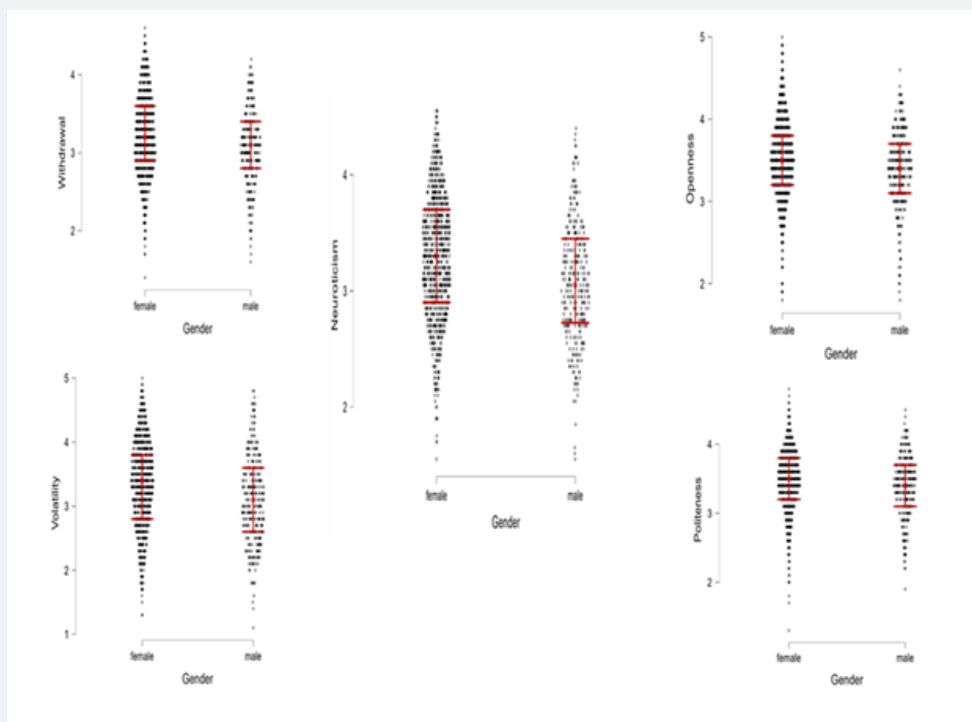

Figure 1: Sex differences on the BFAS domains and subdomains.

Discussion

Main Findings

In the Arabic version, the BFAS provides excellent representations of the two factors underlying the shared variance of the facets in each domain. Furthermore, averaging the two aspects in each domain yields accurate representations of the Big Five. Interestingly, the items chosen for the BFAS using exploratory Factor analysis with Oblimin Rotation based on Parallel analysis method showed a ten-factor domain for each of the big five, as previously demonstrated in research (DeYoung et al., 2007). Because of the significant demographic differences between the Libyan Arab

samples used to develop the Arabic BFAS, this instrument is likely to be valid in a wide range of Arabic-speaking populations. Furthermore, the IPIP-BFAS correlation results enabled us to provide additional support for validating BFAS instruments with excellent psychometric properties.

The BFAS is helpful for investigating the discriminant validity of the various aspects within each domain, particularly in cases of suppression, which occurs when a positive association between two variables obscures the association of one or both with a third variable. In contrast to previous research (DeYoung et al., 2007), our findings did not reveal any instances of suppression: BFAS Conscientiousness, including its subdomains of Orderliness and Industriousness, had a strong negative correlation with BFAS Neuroticism. Interestingly, BFAS Conscientiousness, including its subdomains, had a positive correlation with IPIP emotional stability. This finding may lead to the conclusion that forms of Conscientiousness, including its subdomains, may be adaptive as a positive trait in accordance with previous research [17, Abu Hussain.J & Abu Hussain.M, 2017; [45].

Aside from demonstrating the BFAS's reliability and validity, the aspect-level traits exhibit more striking patterns of cross-domain correlations than the Big Five. We see this as a potential advantage, as correlations among the aspects may reveal meaningful cross-domain connections that have received little attention in much of the Big Five literature [46-48]. For example, Enthusiasm and Compassion are strongly correlated, perhaps because both traits are associated with positive emotions and behaviors [49,50]. For instance, when someone is enthusiastic, they may be more likely to approach situations with a positive and open mindset, which can help to connect with others and understand their needs. This can lead to acts of compassion, as enthusiastic people may be more motivated to help others and positively impact their lives. Similarly, compassionate individuals may be more likely to approach situations with a caring and supportive attitude, which can help to build positive relationships and create a sense of enthusiasm and energy. This can lead to a cycle of positivity, where acts of compassion inspire enthusiasm, and enthusiasm leads to more acts of compassion [51,52].

Table 4: Sex differences.

Variables	Kruskal-Wallis H	df	Asymp. Sig.
Neuroticism	33.872	1	<0.001
Withdrawal	19.022	1	<0.001
Volatility	31.863	1	<0.001
Agreeableness	1.049	1	0.306
Compassion	0.116	1	0.733
Politeness	7.953	1	0.005
Conscientiousness	0.201	1	0.654
Industriousness	0.617	1	0.432
Orderliness	3.617	1	0.051
Extraversion	0.007	1	0.933
Assertiveness	0.82	1	0.365
Enthusiasm	0.577	1	0.447
Openness/Intellect	2.462	1	0.117
Intellect	0.001	1	0.972
Openness	13.183	1	<0.001

a. Kruskal Wallis Test

b. Grouping Variable: Gender

Interestingly, their complementary aspects, Assertiveness and Politeness, are negatively correlated. Separating the aspects of Extraversion and Agreeableness, while Assertiveness and Compassion were positively correlated, an explanation may better clear the negative correlation between Assertiveness and Politeness relay behind differences between males and females in some domains. Firstly, it was observed through ANOVA results that Politeness is more significant among females than males as demonstrated in (Table 4). A further explanation might be that many Arab cultures have a strong sense of social hierarchy and respect for authority, which may also influence the way people

express themselves and interact with others (Hamamy & Alwan, 2016; [53]. This may be perceived as a higher level of Politeness among females, especially in formal or hierarchical situations. For example, the Arabic Term "Al-Hayaa" which means being bashfulness, decency, modesty, or shyness among women leads to higher acceptance and attraction from society, especially versus men. Women may involve using kind and courteous language based on " Al-Hayaa," showing good manners, and being mindful of others' feelings [54-56]. Even though BFAS Compassion is not significant between males and females, males in Arab culture may express high level of compassion. Arab culture places a high value

on hospitality, respect, and politeness, and these values are often instilled in both men and women from a young age. In many Arab societies, showing hospitality and generosity towards guests and others is considered a virtue, and being polite and respectful is seen as a sign of good character. Moreover, Assertiveness, Intellect, and Industriousness were found to be highly correlated in this study. As a result, it was proposed that these traits are likely related to industrial performance, which could make them particularly useful in research on leadership or personnel selection [57] DeYoung et al., 2007).

Furthermore, we found sex differences in both Neuroticism subdomains (Withdrawal and Volatility). Females are more withdrawn and volatile than their male counterparts. As seen in major parts of Arabic literature, women tend to score higher than men in Neuroticism [16,21,22]. Cultural, and societal expectations and pressures may affect men and women differently in Arab societies, leading to differences in emotional expression and vulnerability to stress. For example, traditional sex roles in many Arab cultures may lead to women being socialized to be more emotionally expressive and sensitive to the needs of others, while men may be socialized to be more stoic and less emotional [58,59]. Another factor that may contribute to the difference in Neuroticism scores is the experience of discrimination and oppression that women face in many Arab societies. This can lead to chronic stress and anxiety, which may contribute to higher scores on measures of Neuroticism [60,61]. Another possible explanation of this finding may be influenced by socio-political situation in Libya. Since Libya passed through different circumstances such as economic instability, living conditions, access to resources, and exposure to violence [62], such factors may influence the development of these certain personality factors as suggested by previous research [63-66].

There is some evidence suggest that, on average, women tend to score slightly higher on measures of Openness than men (Weisberg et al., 2011). Interestingly, this study found that women obtained higher mean total scores than men for BFAS Openness contrary to previous study [16]. Our findings may be explained in part due the recent transition towards democracy in 2011 In Libya. Despite the challenges, Libyan women may take major steps towards democracy in recent years and continue to strive for a more democratic future. Previous studies confirm that the Openness to Experience trait is strongly linked to political and economic liberalism [25]. Furthermore, some theories suggest that women may be socialized to be more attuned to emotional and social cues, which could make them more open to new experiences and perspectives [67,68]. This could be due to the fact that women are more involved in multi-tasking duties which require executive functions [69].

Strength and Limitation

The BFAS assessment scale can be a powerful tool for personal and professional development, providing individuals with

self-awareness, goal-setting strategies, feedback, flexibility, and ongoing assessment. BFAS can help Arab individuals identify areas where they need to improve and set goals to achieve those improvements. This can lead to greater motivation and more focused efforts to reach those goals. Specifically, the BFAS can help Arab researchers gain a better understanding of their individual strengths, weaknesses, values, and goals through BFAS domains [70-73].

Based on the finding of a common theme or concept between items compared to the original study, the loading of items on a factor represents the strength of the relationship between each item and the underlying factor. Most items that measure similar concepts or share a common theme were likely to load on the same factor. For example, deleted items BFAS46, BFAS66, related to volatility subdomain, were loaded on a single factor with withdrawal subdomain items while both representing overall Neuroticism factor. The same as the deleted item BFAS33 related to industriousness subdomain was loaded on a single factor with orderliness subdomain items while both representing overall Conscientiousness factor.

Such common concept between items might be due to the sample we used may differ from the sample used in the original study in terms of demographic characteristics, culture, or other factors that could affect the factor structure. It might be also due to the Measurement issues, for example, the items in this study may differ from the items in the original study in terms of wording or response options, which could affect the factor structure. In addition, it might be due Analysis methods. For example, we observed that when we used a different factor extraction method (e.g., principal component analysis) it was loaded 10 factor structure as shown in the original study but with lower results of KMO and Bartlett's tests. On the other hand, when we used (e.g., exploratory factor analysis) maximum likelihood estimation, it was loaded 10 factor structure, with better results of KMO and Bartlett's tests and better model fit.

Since we did have removed items compared to the original study, we suggest using item response theory which may explain why the number of items we identified is different. Also, BFAS might be improved upon psychometrically by developing additional new items specifically targeting the 10 aspect factors. Since this research employed an online survey methodology, this method has limitations. One limitation of online surveys is that they rely on self-reported data and may be subject to bias and dishonesty. People may answer questions in the way they think they should, rather than how they really feel, or they may give answers just to finish the survey quickly. Additionally, as online surveys can only be sent to those with internet access, there is a chance of sampling bias as those without access are excluded.

Conclusion

This study set out to cross-culturally adapt the Arabic version of the BFAS and to examine its psychometric properties using fac-

tor analysis method. The findings indicate that the Arabic BFAS is reliable, valid, and comparable to the original English version. These are novel findings and have significant theoretical and practical implications for understanding how Arabic-speaking individuals may behave in different situations. Interestingly, the BFAS 10 factors domains can be used to identify specific areas of strength and weakness in an individual's personality, which can inform targeted interventions to help individuals overcome challenges and achieve their goals. This study provides valuable insights into an individual's personality and behavior, which can have implications for personal, professional, and clinical contexts.

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