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Translation and Validation of a Bahasa Malaysia (Malay) Version of the Functionality Appreciation Scale

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**Abstract**

The Functionality Appreciation Scale (FAS; Alleva, Tylka, & Kroon Van Diest, 2017) is a 7-item measure of an individual’s appreciation of their body for what it can do and is capable of doing. To date, its psychometric properties have not been examined beyond the parent study and outside English-speaking samples. To rectify this, we examined the psychometric properties of a Bahasa Malaysia (Malay) translation of the FAS. An online sample of 815 Malaysia citizens completed a Malay translation of the FAS, along with validated measures of body appreciation, weight discrepancy, drive for muscularity, perceived pressure from and internalisation of appearance ideals, self-esteem, and trait mindfulness. Exploratory factor analyses supported a 1-dimensional factor structure of FAS scores, which was upheld using confirmatory factor analysis. FAS scores were also invariant across sex and there was no significant sex difference in scores. Construct validity was generally supported through significant associations with the additional measures included in the study. Incremental validity was also established insofar as functionality appreciation predicted self-esteem over-and-above the variance accounted for by other body image measures. The availability of the Malay FAS will be of use to scholars in Malaysia, but establishing cross-linguistic invariance will be an important next step.

**Keywords:** Functionality appreciation; Positive body image; Factor structure; Psychometrics; Malaysia

**1. Introduction**

 *Body functionality* refers to everything that one’s body can do or is capable of doing, and includes physical capacities, internal processes, bodily senses and perceptions, creative efforts, interpersonal communication, and self-care (Alleva, Martijn, van Breukelen, Jansen, & Karos, 2015). Body functionality can be affected by a range of issues (e.g., physical injury) and, for this reason, body image scholars sometimes focus on an individual’s appreciation for the functionality and capabilities of their bodies (Franzoi, 1995). This is now referred to as *functionality appreciation* (Alleva, Tylka, & Kroon van Diest, 2017), which more precisely refers to an individual’s “appreciation of, respect for, and honouring of their body for what it can do and is capable of doing” (Tylka, 2018, p. 15). The focus on functionality appreciation is important because it provides a more comprehensive account of the construct of positive body image, going beyond a focus on aesthetic qualities to focus on cognitions and feelings about one’s corporeal capabilities (Alleva et al., 2015).

 To measure the construct of functionality appreciation, Alleva and colleagues (2017) developed the 7-item Functionality Appreciation Scale (FAS). Scores on the FAS have been shown, through exploratory and confirmatory factor analysis with U.S. adults, to have a 1-dimensional factor structure (Alleva et al., 2017). Adequate internal consistency (Cronbach α = .86-.91) and 3-week test-retest reliability was also evidenced. FAS scores were also reported to be fully invariant across sex and between-group comparisons indicated no significant differences between women and men (*d*s = 0.05-0.28). Construct validity was established through significant associations with scores on measures of body image (e.g., body appreciation, body surveillance), psychological well-being (e.g., self-esteem, life satisfaction, depressive symptomatology), and positive self-care (e.g., self-compassion). In addition, FAS scores predicted indices of psychological well-being over-and-above scores on other body image measures, providing evidence of incremental validity. Given its psychometric qualities, it is unsurprising that the FAS is increasingly used by scholars seeking to provide broader coverage of the positive body image construct (e.g., Soulliard, Kauffman, Fitterman-Harris, Perry, & Ross, 2019; Todd, Aspell, Barron, & Swami, 2019) and included in interventionist studies (e.g., Alleva et al., 2018).

 To date, however, use of the FAS have been limited to populations from North America and Western Europe, and it is unclear to what extent the instrument’s psychometric properties will be upheld in other populations. To rectify this oversight, the present study sought to examine the factor structure of FAS scores in a sample of Malaysian Malay adults. Beyond merely examining the psychometric properties of the FAS in a new, non-English-speaking population, availability of a Malay translation of the FAS would also facilitate the development of body image research in a relatively neglected national context (Swami & Barron, 2017). As a preliminary hypothesis, we expected that scores on a Bahasa Malaysia (Malay) translation of the FAS would demonstrate a 1-dimensional factor structure in both exploratory and confirmatory factor analyses, which would be invariant across sex. Based on the findings of Alleva and colleagues (2017), we also hypothesised that there would be no sex difference between women and men in functionality appreciation scores.

Beyond examining its factor structure, we also conducted a preliminary assessment of the construct validity of FAS scores through assessments of associations with indices of body image (body appreciation, drive for muscularity in men, and weight discrepancy in women), perceived pressure from and internalisation of appearance ideals, self-esteem, and trait mindfulness. Evidence of construct validity would be established through positive associations with body appreciation, self-esteem, and trait mindfulness, and negative associations with drive for muscularity, weight discrepancy, and internalisation of appearance ideals. This expectation was broadly based on the findings of Alleva and colleagues (2017) and the broader literature on correlates of positive body image (for reviews, see Tylka, 2018, 2019). Finally, we also conducted a preliminary test of incremental validity by assessing whether functionality appreciation would predict self-esteem above-and-beyond the variance of the other body image measures included in the study. This is important as it would help provide additional evidence of incremental validity and would also help establish the extent to which functionality appreciation scores are conceptually distinct from other body image measures, particularly the construct of body appreciation.

**2. Method**

**2.1. Participants**

 The participants of this study were 815 Malaysian citizens (women *n* = 403, men *n* = 412). All participants were of Malay ancestry, representing the majority ethnic group in Malaysia, and all Malays are considered Muslim based on Malaysian constitutional law. Participants ranged in age from 18 to 69 years (*M* = 33.89, *SD* = 8.80) and in self-reported body mass index (BMI) from 13.26 to 49.86 kg/m2 (*M* = 24.82, *SD* = 5.48). In terms of educational qualifications, 32.1% had completed secondary schooling, 39.4% had an undergraduate degree, 18.7% had a postgraduate degree, and the remainder had some other qualification. Of the total sample, 34.6% were single, 62.7% were married, 2.3% were divorced, and 0.4% had some other marital status.

**2.2. Measures**

 **2.2.1. Functionality appreciation**. Participants completed a Bahasa Malaysia (Malay) translation of the 7-item FAS (Alleva et al., 2017), with items rated on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*). The FAS was translated into Malay using Beaton, Bombardier, Guillemin, and Ferraz’s (2000) five-stage procedure, which has been recommended for test adaptation of body image instruments (Swami & Barron, 2019). This procedure involved independent forward-translation of the FAS by two bilinguals, production of a synthesised forward-translation, back-translation by two new bilinguals working independently, and committee evaluation of the forward- and back-translations. No major translational issues were identified, so in a fifth step, a pre-final version was tested for understanding (1 = *do not understand at all*, 5 = *understand completely*) in a community sample of 42 Malaysian Malays (women = 54.8%). The mean responses per item were assessed (overall *M* = 4.29, *SD* = 0.57, range = 4.17-4.52) and were suggestive of a high degree of understanding of the translated items. As such, the committee approved the final version of the Malay FAS without any further revisions. The items of the final translation are reported in Table 1 alongside the items in English and scoring information is considered in the Results.

 **2.2.2. Body appreciation**. Participants were asked to complete the Body Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015; Malay translation: Swami et al., 2019). The BAS-2 is a 10-item scale that assesses acceptance of one’s body, respect and care for one’s body, and protection of one’s body from unrealistic beauty standards (sample item: “I respect my body”). All items were rated on a 5-point scale, ranging from 1 (*never*) to 5 (*always*), and an overall score was computed as the mean of all items. Higher scores on this scale reflect greater body appreciation. Scores on the Malay version of the BAS-2 have been shown to have a 1-dimensional factor structure, adequate internal consistency, and good construct and incremental validity (Swami et al., 2019). In the present study, ω for BAS-2 scores was .92 (95% CI = .91, .93).

**2.2.3. Weight discrepancy.** Women were asked to complete the Photographic Figure Rating Scale (PFRS; Swami, Salem, Furnham, & Tovée, 2008; Malay translation: Swami, Tovée, & Harris, 2013), a figural rating scale that presents 10 photographic images of women ranging from emaciated to obese. Participants were asked to select the figure that most closely matched their own body and the figure that they would most like to possess on a 10-point scale, ranging from 1 (*figure with the smallest body size*) to 10 (*figure with largest body size*). Actual-ideal weight discrepancy was computed as the difference between absolute current and ideal ratings. Higher scores, therefore, reflect greater weight discrepancy. Previous work has shown that the PFRS has adequate patterns of construct validity (Swami et al., 2012), including in Malaysian women (Swami et al., 2013). Men did not complete the PFRS because no male version of the PFRS is available.

**2.2.4. Drive for muscularity.** Men were asked to complete the Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000; Malay translation: Swami, Barron, Lau, & Jaafar, 2016), a 15-item scale that measures an individual’s desire to have a more muscular body (sample item: “I wish that I were more muscular”). All items were rated on a 6-point scale (1 = *always*, 6 = *never*), and scores were reverse-coded so that higher scores reflect greater drive for muscularity. Like the parent English version, scores on the Malay translation of the DMS have been found to reduce to two highly-correlated factors (Swami et al., 2016), both of which load on to a higher-order drive for muscularity dimension (present study subscale *r* = .70). For this reason, we computed an overall DMS score as the mean of all items. Scores on the Malay version of the DMS evidence adequate internal consistency and good convergent validity in Malaysian men (Swami et al., 2016), but its psychometric properties have not been examined in Malaysian women. In the present study, ω for the overall DMS scores in men was .94 (95% CI = .93, .95).

 **2.2.5. Appearance ideals.** All participants were asked to complete the Sociocultural Attitudes Toward Appearance Questionnaire-3 (SATAQ-3; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004; Malay translation: Swami, 2009). This is a 30-item scale measuring the multidimensional impact of sociocultural influences on body image, with items rated on a 5-point scale (1 = *definitely disagree*, 5 = *definitely agree*). Although scores on the English version of the scale reduce to four factors, Swami (2009) found that scores on the Malay version consisted of three dimensions tapping perceived pressure and general internalisation of appearance ideals (14 items), the extent to which different sources of information are considered important in terms of appearance ideals (9 items), and internalisation of an athletic ideal (5 items). In the present study, participants were only asked to complete the 14-item Pressure and Internalisation-General subscale of the Malay SATAQ-3 and subscale scores were computed as the mean of all 14 items. Scores on the Malay version of the SATAQ-3 evidence adequate internal consistency coefficients and convergent validity (Swami, 2009). In the present study, ω was .86 (95% CI = .83, .89) for Pressure and Internalisation-General.

**2.2.6. Self-esteem.** To measure self-esteem, we used the 10-item Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965; Malay translation: Swami, 2011), which measures participants’ overall sense of self-worth (sample item: “I feel that I have a number of good qualities”). Items were rated on a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). In its English version, five items are reverse-coded prior to analysis, but in the Malay form, one of these reverse-coded items (#8) loads negatively. Therefore, following Swami’s (2011) recommendation, this item was included here in its non-reversed format. A total RSES score was, therefore, computed following reverse-coding of four items, with higher scores reflecting higher self-esteem. Scores on the Malay version of the RSES have a 1-dimensional factor structure, adequate internal consistency, good test-retest reliability after 5 weeks, and good patterns of convergent and discriminant validity (Swami, 2011). In the present study, ω was .74 (95% CI = .72, .76).

**2.2.7. Mindfulness.** Trait mindfulness was assessed using the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003; Malay translation: Phang, Mukhtar, Ibrahim, & Mohd. Sidik, 2015). This is a 15-item trait measure of the tendency to be attentive to, and aware of, present moment experiences in everyday activities (sample item: “I find it difficult to stay focused on what’s happening in the present”). All items were rated on a 6-point scale (1 = *almost always*, 6 = *almost never*) and scores were reverse-coded so that higher-scores reflect greater trait mindfulness. The Malay version of the MAAS has been shown to have a 1-dimensional factor structure, with adequate internal consistency, and good patterns of convergent validity (Phang et al., 2015). In the present study, ω for MAAS scores was .93 (95% CI = .92, .94).

 **2.2.8. Demographics**: Participants were asked to provide their demographic details consisting of sex, age, highest educational attainment, marital status, height, and weight. Height and weight data were used to compute self-reported BMI as kg/m2, which is highly correlated with actual measurements in Malaysian samples (Kee et al., 2017).

**2.3. Procedures**

Prior to beginning the project, ethics approval was obtained from the divisional ethics committee at the first author’s primary institution (approval code: EHPGR-13). All data were collected in March-April 2019 via a QualtricsTM (www.qualtrics.com) research panel, which is an online survey platform available to researchers to facilitate participant recruitment and online data collection. Inclusion criteria for the study included being of adult age (≥ 18 years), a citizen of Malaysia, of Malay ancestry, and fluent in Malay. The project was advertised as a study on “attitudes toward the body” and included an estimated duration (15 minutes). After providing digital informed consent, participants were asked to complete the measures described above, as well as a Malay translation of the Multidimensional Assessment of Interoceptive Awareness (MAIA; Mehling et al., 2012). The translation and validation of a Malay version of the MAIA is reported in a separate paper (Todd et al., 2019), which also includes the RSES and MAAS; it was not included here as we wished to only include validated measures to determine the construct validity of FAS scores. The order of presentation of the scales was counterbalanced for each participant. IP addresses were checked to ensure that no participant completed the survey more than once. In exchange for completing the survey, participants were paid AUD 2.00. All participants received debriefing information at the end of the survey.

**2.4. Analytic Strategy**

Missing data, which accounted for less than 1.0% of the total dataset, were replaced using the multiple imputation technique (Rubin, 2004). The factor structure of the Malay FAS was examined using a two-step process that involved exploratory factor analysis (EFA) in the first step and confirmatory factor analysis (CFA) in the second (see Swami & Barron, 2019). To ensure adequate sample sizes for both steps, the total sample was split using a computer-generated random seed, resulting in one split-half for EFA (women *n* = 187, men *n* = 190) and a second split-half for CFA (women *n* = 216, men *n* = 222). With data from the first split-half, we conducted principal-axis EFAs separately for women and men in IBM SPSS Statistics v. 24. Sample sizes met Worthington and Whittaker’s (2006) item-communality requirements, as well as assumptions for EFA based on item distributions, average item correlations, and item-total correlations (Clark & Watson, 1995).

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (which should ideally be ≥ .80; Kaiser, 1974) and Bartlett’s test of sphericity (which should be significant) were computed to determine whether our data were factorable. Following Alleva and colleagues (2017), we used a Varimax rotation for the EFA and the number of factors to be extracted was based on the eigenvalue > 1.0 criterion. Item retention was based on Comrey and Lee’s (1992) recommendation that items with “fair” loadings (i.e., ≥ .33) should be retained. The degree of factor similarity across women and men was assessed using Tucker’s (1951) congruence coefficient, with values between .85 and .94 corresponding to fair similarity across groups and values ≥ .95 suggesting that factor structures can be considered equal across groups (Lorenzo-Seva & ten Berge, 2006).

With data from the second split-half, we conducted CFA using the lavaan (Rosseel, 2012), semTools (Jorgensen, Pornprasertmanit, Schoerman, & Rosseel, 2018), and MVN packages (Korkmaz, Goksuluk, & Zararsiz, 2014) with *R* (*R* Development Core Team, 2014). Proactive Monte Carlo simulations (Marcoulides & Chin, 2013) indicated that a sample size of 186 would be sufficient for this analysis, which was surpassed in our study. Our aim was to test the 1-dimensional model proposed by Alleva and colleagues (2017) and, if discrepant, the model suggested by our EFA results. Assessment of the present data for normality indicated that they were neither univariate (Sharipo-Wilks *p* < .001) nor multivariate normal (Mardia’s skewness = 1294.76, *p* < .001, Mardia’s kurtosis = 54.93, *p* < .001), so parameter estimates were obtained using the robust maximum likelihood method with the Satorra-Bentler correction (Satorra & Bentler, 2001). To assess goodness-of-fit, we used the normed model chi-square (χ²/df; values < 3.0 considered indicative of good fit; Hu & Bentler, 1999), the Steiger-Lind root mean square error of approximation (RMSEA) and its 90% CI (values close to .06 considered to be indicative of good fit and up to .08 indicative of adequate fit; Steiger, 2007), the standardised root mean square residual (SRMR; values < .09 indicative of good fit; Hu & Bentler, 1999), the comparative fit index (CFI; values close to or > .95 indicative of adequate fit; Hu & Bentler, 1999), the Tucker-Lewis index (TLI; values close to or > .95 indicative of good fit; Hu & Bentler, 1999), and Bollen’s Incremental Fit Index (BL89; values close to or > .95 indicative of good fit; Hu & Bentler, 1999).

In the second split-half, we also used multi-group CFA (Chen, 2007) to assess measurement invariance at the configural, metric, and scalar levels between women and men. Configural invariance implies that the latent FAS variable(s) and the pattern of loadings of the latent variables on indicators are similar across groups (i.e., the unconstrained latent model should fit the data well in all groups). Metric invariance implies that the magnitude of the loadings is similar across groups and is tested by comparing two nested models consisting of a baseline model and an invariance model. Because the Δ*χ*² statistic is overly stringent criterion invariance (Meade, Johnson, & Braddy, 2008), we used ΔCFI < .01 as an indicator of metric invariance (Cheung & Rensvold, 2002). Finally, scalar invariance implies that both the item loadings and item intercepts are similar across groups and is examined using the same nested-model comparison strategy as with metric invariance (Chen, 2007). For scalar invariance, Chen (2007) suggested that invariance is supported when ΔCFI < .01 *and* ΔRMSEA < .015 *or* ΔSRMR < .030, although other scholars suggest that ΔCFI < .01 is sufficient (Cheung & Rensvold, 2002).

To assess internal consistency, we computed ω and its associated 95% CI, with values greater than .70 reflecting adequate internal reliability (Dunn, Baguley, & Brunsden, 2014). In the CFA portion of the dataset, evidence of convergent validity was assessed using the Fornell-Larcker criterion (Fornell & Larcker, 1981), with average variance extracted (AVE) values of ≥ .50 considered adequate (Malhotra & Dash, 2011). Sex differences in FAS scores would only be investigated using an independent-samples *t*-test should scalar or partial scalar invariance be established. To assess convergent validity, we used the total sample and examined bivariate correlations between FAS scores and scores on the additional measures included in the survey. Finally, incremental validity was assessed by conducting a hierarchical regression to determine whether functionality appreciation significantly predicted self-esteem over-and-above the variance accounted for by body appreciation, weight discrepancy, and drive for muscularity.

**3. Results**

**3.1. Exploratory Factor Analysis**

In the female subsample from the first split-half, Bartlett’s test of sphericity returned a significant result, χ2(21) = 636.94, *p* < .001, and KMO = .90. This suggested that the FAS items had adequate common variance for factor analysis. Principal axis EFA indicated that only a single factor (λ = 4.21), which explained 60.1% of common variance, should be extracted. Factor loadings, reported in Table 1, indicated that all seven items should be extracted. In the male subsample, the FAS items were also factorable, with Bartlett’s test of sphericity returning a significant result, χ2(21) = 901.43, *p* < .001, and KMO = .92. The results of the EFA again suggested only a single factor should be extracted (λ = 4.81). This factor explained 68.7% of the common variance and all items could be extracted (see Table 1). Tucker’s congruence coefficient was .96, suggesting that the factor structures were equal in women and men. Based on these results, we computed mean FAS scores using all 7 items, which had adequate internal consistency in women (ω = .89, 95% CI = .86, .91) and in men (ω = .92, 95% CI = .90, .94).

**3.2. Confirmatory Factor Analysis and Sex Invariance**

 In the second split-half subsample (*n* = 438), we examined the fit of the 1-factor model of FAS scores developed by Alleva and colleagues (2017) and supported by the EFAs. Fit indices were adequate: SBχ²(14) = 26.808, SBχ²normed = 1.92, robust RMSEA = .046 (90% CI = .027, .064), SRMR = .025, robust CFI = .985, robust TLI = .978, BL89 = .978. The standardised estimates of factor loadings ranged from .66 to .81. The convergent validity for this model was acceptable, as AVE was greater than .50 (AVE = .60). Internal consistency coefficients for FAS scores were adequate for women (ω = .91, 95% CI = .89, .93) and men (ω = .92, 95% CI = .90, .93) in this split-half subsample. Next, we tested for measurement across sex for the full subsample. As reported in Table 2, indices indicated that configural, metric, and scalar invariance were all supported. An independent-samples *t*-test showed that there was no sex difference in FAS scores in this split-half (women *M* = 4.44, *SD* = 0.61; men *M* = 4.38, *SD* = 0.68), *t*(436) = 0.88, *p* = .380, *d* = 0.08.

**3.3. Construct Validity**

 To assess the convergent validity of FAS scores, we examined bivariate correlations with all other measures included in the present study separately for women and men using the total sample. As can be seen in Table 3, in women, functionality appreciation was significantly and positively correlated with body appreciation, self-esteem, and trait mindfulness, and negatively correlated with pressure from and internalisation of appearance ideals and actual-ideal weight discrepancy. In men, functionality appreciation was significantly and positively associated with body appreciation and self-esteem. The associations between functionality appreciation and pressure from and internalisation of appearance ideals and drive for muscularity, respectively, did not reach significance. Table 3 also presents associations between functionality appreciation scores, BMI, and age for descriptive purposes. As can be seen, the only significant association was a weak, positive association between functionality appreciation and age in men.

 Finally, to test for incremental validity, we conducted hierarchical regressions (separately for women and men) in which self-esteem was the criterion variable. For women, body appreciation, pressure from and internalisation of appearance ideals, and weight discrepancy were entered as predictors in a first step and functionality appreciation was included in a second step. The same regression was repeated for men, but with weight discrepancy replaced by drive for muscularity. In women, the first step of the regression was significant, *F*(3, 399) = 75.93, *p* < .001, Adj. *R*2 = .35. The second step of the regression was also significant, *F*(4, 398) = 61.42, *p* < .001, Adj. *R*2 = .38, Δ*R*2 = .03, *p* = .001. Functionality appreciation was a significant predictor of self-esteem (B = .13, *SE* = .04, β = .16, *t* = 3.43, *p* = .001) in the second step, as were body appreciation (B = .27, *SE* = .04, β = .36, *t* = 7.30, *p* < .001) and pressure from and internalisation of appearance ideals (B = -.15, *SE* = .03, β = -.24, *t* = -5.83, *p* < .001). In men, the first step of the regression was significant, *F*(4, 408) = 74.53, *p* < .001, Adj. *R*2 = .35, as was the second step, *F*(4, 407) = 62.45, *p* < .001, Adj. *R*2 = .37, Δ*R*2 = .02, *p* < .001. In the second step of the regression, functionality appreciation emerged as a significant predictor of self-esteem (B = .12, *SE* = .03, β = .18, *t* = 4.16, *p* < .001), as did body appreciation (B = .30, *SE* = .03, β = .47, *t* = 10.71, *p* < .001) and pressure from and internalisation of appearance ideals (B = -.15, *SE* = .02, β = -.29, *t* = -7.31, *p* < .001).

**4. Discussion**

The FAS, developed to measure one’s appreciation of what the body can do and is capable to doing, has been shown to have good psychometric properties in English-speaking samples (Alleva et al., 2017). However, its psychometric properties have not previously been tested in non-English-speaking samples, which we sought to rectify in the present study. In broad outline, our findings with Malaysian Malay adults suggest that Malay FAS scores can be considered to be psychometrically robust. In terms of the dimensionality of FAS scores, for example, we were able to confirm a 1-dimensional factor structure identical to that proposed in the parent study. Indeed, factor loadings were very high, suggesting that this factor structure is robust. Moreover, the 1-factor structure of FAS scores was equal across women and men in the EFA and sex invariant in our multi-group CFA analysis. Overall, these results support Alleva and colleagues’ assertion that functionality appreciation is a 1-dimensional construct.

 Our analyses also indicated that FAS scores evidenced adequate internal consistency, as indexed by ω. Our results also generally support the construct validity of Malay FAS scores, insofar as scores were significantly correlated with scores of body appreciation, self-esteem, and trait mindfulness. Importantly, functionality appreciation and body appreciation were only moderately correlated in women and men, suggestive that these are indeed distinct constructs. In addition, FAS scores were also significantly and negatively correlated with actual-ideal weight discrepancy, and perceived pressure from and internalisation of appearance ideals in women, which supports the measure’s construct validity. In broad outline, these findings are consistent with the conclusion of Alleva and colleagues (2017) that functionality appreciation is a unique construct that is associated with healthier body image and psychological well-being. This is important because it is suggestive of possible interventionist routes that leverage functionality appreciation, perhaps alongside other facets of positive body image, to assist individuals to achieve better emotional well-being and achieve a flourishing state of being (e.g., Alleva et al., 2015; see also Swami, Weis, Barron, & Furnham, 2018).

Conversely, the associations between functionality appreciation and, respectively drive for muscularity and perceived pressure from and internalisation of appearance ideals did not reach significance in men. One possibility here is that functionality appreciation in men is relatively divorced from the body’s aesthetics. For example, Rosenman and Kaplan (2014) have discussed how traditional or hegemonic masculine ideologies require a male body that is fully functional, so as to assert dominance over oneself and one’s environment, but that this pragmatic and instrumental view of the body (i.e., the body as a machine) cultivates an insensitivity to bodily sensations. From this point-of-view, it is possible that men who strive toward hegemonic masculinity appreciate their bodies as functional machines, but that such appreciation is distinct from broader cognitions about what the body looks like (see also Franzoi, 1995; Robertson, 2006; Watson, 2000). Of course, it is also worth noting that the associations between body appreciation and drive for muscularity and perceived pressure from and internalisation of appearance ideals, respectively, were likewise weak and nonsigniciant in the present study.

Also consistent with the findings of Alleva and colleagues (2017), functionality appreciation was only weakly correlated with age and BMI, and associations did not reach significance in most cases. Finally, and also in line with the findings of Alleva and colleagues (2017), we found no sex difference in FAS scores. In terms of the scores specifically, it was notable that mean FAS scores were relatively high in both women (*M* = 4.43) and men (*M* = 4.38) – indeed, they were much higher that the scale mid-point and are suggestive of a ceiling effect. Although Alleva and colleagues (2017) reported similarly high means in U.S. samples (*M*s = 3.98-4.18), it is worth considering to what extent such high scores are artefactual. For example, because the FAS items were designed to be generally applicable (Alleva et al., 2017, p. 42), it may be that it is difficult for individuals to disagree with the FAS statements. One way of potentially solving this issue would be to alter the response scale for the FAS from a 5-point scale to a 7- or 9-point scale, which is considered a useful way of minimising ceiling effects in satisfaction instruments (Crow et al., 2002). If researchers desire to change the response scale, it is important to contact the FAS authors (Alleva et al., 2017) for permission.

 A number of limitations of the present study should be considered. First, our sampling was limited to Malaysian Malays. Although Malays are the majority ethnic group in Malaysia, it will be important to determine to what extent the psychometric properties of the Malay FAS are upheld in other Malaysian ethnic groups. A second limitation of the present study was the fact that we did not examine test-retest reliability, which should be rectified in future work. In addition, our assessment of the construct validity of FAS scores should be considered preliminary. Here, we were limited by the dearth of psychometrically-valid tools available for use in Malay-speaking populations. Finally, it should be noted that the approach adopted in the present study was to validate a measure that was originally developed with English-speaking participants. In this sense, it is possible that the FAS does not capture elements of functionality appreciation that are specific to the local context. Adopting an emic approach (Brislin, Lonner, & Thorndike, 1973) – in which item content relevant to a particular group or groups is developed and considered in conjunction with existing FAS items – may be useful in the future.

Such an approach would require a thorough understanding of the ways in which issues related to body functionality, and appreciation of body functionality, are affected by the sociocultural factors (e.g., cultural and religious beliefs, traditions, customs) within a social identity group (Nettleton, 2013). Several examples may help to illustrate this point. First, qualitative research with Bamiléké adults in Cameroon has found body functionality in this group to be highly related to body aesthetics, such that someone attractive is also someone who is physically functional and able to fulfil societal roles and expectations (Cohen, Boetsch, Palstra, & Pasquet, 2013). Similar findings have been reported in rural Brazil, where a sense of good body functionality was derived through being of use to one’s family and the wider community (e.g., working in agriculture or fishing; do Nascimento, de Oliveira, Cardoso, dos Santos, da Silva Pinto, & Magalhães, 2016). Finally, functional perceptions of the body among Oraon adolescents in India appear to be heavily tied to work performativity (e.g., being able to work without fail, being able to earn an income) or social roles (e.g., being able to comply with gender role norms, such as being a good mother; Raj & Nayak, 2018).

For these social identity groups, then, the item-content of the FAS may be too general to allow for an in-depth understanding of the nature and meaning of functionality appreciation in context. Of course, this is not to say that the FAS is not a useful measurement tool for such communities; rather, because of its generalist content, it may be less adept at uncovering the nuances of lived experiences *vis-à-vis* functionality appreciation or may not fully capture the meaning of the construct in different social groups. From a practical point-of-view, developing additional item content that is relevant to specific social identity groups may help to determine the extent to which there are aspects of functionality appreciation that are not (fully) captured by the FAS in existing item-content. Of course, such an emic approach will need to be balanced with the fact that additional item content may also reduce the generalisability of FAS item-content: while new items may provide a fuller understanding of concepts relevant to one culture or group, those items may not be relevant to other or all cultural groups.

 Despite these limiting issues, the present work provides evidence that Malay FAS scores are 1-dimensional, internally consistent, and have adequate construct validity in Malaysian Malay adults. As such, the FAS may prove to be very useful for examining specific research questions that are of importance in the Malaysian context. For example, some scholars have noted that aging is an important concern in Malaysia, but that the nation is ill-prepared for the transition to becoming an aging society (Ming, Hau, & Wai, 2016). Understanding issues such as mobility and quality of life in an aging society will undoubtedly be aided by the availability of the Malay FAS. Likewise, national surveys have indicated a transition toward less physically-active lifestyles and less healthy eating behaviours in Malaysia (Institute of Public Health, 2008). Developing a fuller understanding of functionality appreciation in the context of a nation underdoing a lifestyle and nutrition transition may help to address these issues, particularly if it facilitates interventionist work aimed at promoting healthier lifestyles in tandem with more positive body image.

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Table 1. *Items of the Functionality Appreciation Scale in English and Bahasa Malaysia (in Italics) and Factor Loadings Derived from the Exploratory Factor Analyses with Women and Men*

|  |  |  |
| --- | --- | --- |
| Item | Women | Men |
| (1) I appreciate my body for what it is capable of doing / *Saya menghargai badan saya untuk apa yang ia mampu lakukan.* | .74 | .82 |
| (2) I am grateful for the health of my body, even if it isn’t always as healthy as I would like it to be / *Saya bersyukur dengan kesihatan badan saya, walaupun ia tidak selalu sihat seperti yang saya inginkan.* | .67 | .73 |
| (3) I appreciate that my body allows me to communicate and interact with others / *Saya menghargai badan saya membolehkan saya berkomunikasi dan berinteraksi dengan orang lain.* | .82 | .84 |
| (4) I acknowledge and appreciate when my body feels good and/or relaxed / *Saya akui dan hargai apabila badan saya berasa baik dan/atau relaks.* | .82 | .83 |
| (5) I am grateful that my body enables me to engage in activities that I enjoy or find important / *Saya bersyukur badan saya membolehkan saya terlibat dalam aktiviti yang saya sukai atau aktiviti yang saya rasa penting*. | .86 | .87 |
| (6) I feel that my body does so much for me / *Saya rasa badan saya melakukan banyak perkara untuk saya* | .70 | .83 |
| (7) I respect my body for the functions it performs / *Saya menghormati badan saya untuk fungsi yang ia lakukan.* | .80 | .88 |

*Note.* Women *n* = 187. Men *n* = 190.

Table 2. *Measurement Invariance Across Sex in the Second Split-Half Subsample.*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | SBχ² | *df* | Robust CFI | Robust RMSEA | SRMR | Model Comparison | ΔSB*χ*² | ΔRobust CFI | ΔRobust RMSEA | ΔSRMR | Δ*df* | *p* | PGFI |
| Configural | 40.91 | 28 | .985 | .065 | .029 |  |  |  |  |  |  |  | .399 |
| Metric | 45.60 | 34 | .987 | .055 | .038 | Configural *vs*. metric | 4.69 | .002 | .010 | .009 | 6 | .751 | .484 |
| Scalar | 54.25 | 40 | .986 | .054 | .042 | Metric *vs*. scalar | 8.65 | .001 | .001 | .004 | 6 | .163 | .569 |

*Note*. SB = Satorra-Bentler; CFI = Comparative fit index; RMSEA = Steiger-Lind root mean square error of approximation; SRMR = standardised root mean square residual; PGFI = Parsimony goodness of fit index.

Table 3. *Bivariate Correlations Between Functionality Appreciation, Scores on Other Measures Included in the Study, Body Mass Index, and Age in Women (Top Diagonal) and Men (Bottom Diagonal)*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| (1) Functionality appreciation |  | .52\*\* | -.25\*\* | - | -.13\* | .40\*\* | .16\* | -.06 | -.06 |
| (2) Body appreciation | .43\*\* |  | -.43\*\* | - | -.25\*\* | .54\*\* | .28\*\* | -.21\*\* | .06 |
| (3) Actual-ideal weight discrepancy |  | - |  | - | .29\*\* | -.35\*\* | -.24\*\* | .56\*\* | .06 |
| (4) Drive for muscularity | .03 | .02 | - |  | - | - | - | - | - |
| (5) Pressure and general internalisation | -.05 | .12\* | - | -.03 |  | -.38\*\* | -.38\*\* | .04 | -.20\*\* |
| (6) Self-esteem | .39\*\* | .51\*\* | - | -.03 | -.24\*\* |  | .43\*\* | -.09 | .19\*\* |
| (7) Trait mindfulness | .09 | .24\*\* | - | .41\*\* | .12\* | .10\* |  | -.04 | .12\* |
| (8) Body mass index | .08 | -.03 | - | .03 | -.04 | .11\* | -.03 |  | .08 |
| (9) Age | .14\* | .08 | - | .22\*\* | -.06 | ..09 | .15\* | .22\*\* |  |
| Women | *M* | 4.43 | 4.17 | 2.19 | - | 2.99 | 3.07 | 3.84 | 24.49 | 33.55 |
|  | *SD* | 0.61 | 0.67 | 1.56 | - | 0.83 | 0.50 | 0.97 | 5.39 | 8.88 |
| Men | *M* | 4.38 | 4.08 | - | 4.00 | 3.09 | 3.01 | 3.99 | 25.13 | 34.24 |
|  | *SD* | 0.71 | 0.76 | - | 1.14 | 0.95 | 0.48 | 1.04 | 5.56 | 8.72 |

*Note.* \**p* < .05, \*\**p* < .001.