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Psychometric Properties of a Romanian Translation of the
Functionality Appreciation Scale (FAS)

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Abstract

The Functionality Appreciation Scale (FAS; Alleva et al., 2017) is a 7-item measure of an individual's appreciation of their body for what it can do and is capable of doing. The instrument is increasingly used in interventionist studies, but its psychometric properties have been infrequently investigated outside Anglophone populations. Here, we examined psychometric properties of a novel Romanian translation of the FAS. An online sample of 959 Romanian adults completed the Romanian FAS and validated measures of positive body image (body appreciation), negative body image (weight discrepancy in women and drive for muscularity in men), eating disorder symptomatology, and psychological well-being (self-esteem and gratitude). Exploratory factor analyses led to the extraction of a 1-dimensional model of FAS scores, which we confirmed using confirmatory factor analysis. FAS scores were invariant across sex, but the sex difference in latent FAS scores did not reach significance ($d = 0.15$). FAS scores had adequate internal consistency and 4-week test-retest reliability, and further analyses provided evidence of the convergent, construct, and incremental validity. These results provide support for the psychometric properties of the Romanian FAS and present evidence of the importance of functionality appreciation in relation to healthier body image and psychological well-being.

Keywords: Functionality appreciation; Positive body image; Factor structure; Psychometrics; Romania; Body functionality

1. Introduction

Body functionality is an aspect of body image that refers to everything the body can do or is capable of doing, including physical capacities, internal processes, bodily senses and perceptions, creative endeavours, communication with others, and self-care (for reviews, see Alleva & Martijn, 2019; Alleva & Tylka, 2021). In this view, body functionality is not limited to physical capacities (Bailey et al., 2015), though it can be affected by a range of issues, such as physical injury and disability (Vinoski Thomas et al., 2019). For this reason, body image scholars sometimes adopt a broader focus on *functionality appreciation*, which Alleva and colleagues (2017, p. 29) defined as “appreciating, respecting, and honouring the body for what it is capable of doing, extending beyond mere awareness of body functionality”. Functionality appreciation has been theorised as a core facet of positive body image (Alleva & Martijn, 2019; Swami, Furnham et al., 2020; Webb et al., 2015) and the construct has been the target of interventions aimed at generating more positive feelings toward the body (e.g., Alleva et al., 2015, 2018a, 2018b), precisely because it provides a focus beyond one’s feelings and cognitions about body aesthetics.

To measure functionality appreciation, Alleva and colleagues (2017) developed the 7-item Functionality Appreciation Scale (FAS). In samples of adults from the community in the United States, these authors reported that FAS scores had a 1-dimensional factor using both exploratory and confirmatory factor analysis. In addition, Alleva et al. (2017) demonstrated that FAS scores were internally consistent (Cronbach’s $\alpha = .86$ to $.91$), were invariant across sex, showed test-retest reliability up to three weeks, and had adequate construct validity 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). FAS scores also predicted indices of psychological well-being over-and-above scores on other body image

measures, providing evidence of incremental validity. These patterns of results have since been replicated in an online, international sample of adults (Linardon et al., 2020) and among lesbian, gay, bisexual, and queer individuals in the United States (Soulliard & Vander Wal, 2020).

In contrast, the psychometric properties of the FAS have been rarely examined outside Anglophone samples. He and colleagues (2020) prepared a Chinese translation of the FAS, but did not examine its psychometric properties prior to use in an elderly sample of adults. In contrast, Swami, Todd and colleagues (2019) assessed the psychometric properties of a Bahasa Malaysia (Malay) translation of the FAS in a sample of Malaysian adults. Their results supported the 1-dimensional factor structure and internal consistency of FAS scores, as well as the invariance of scores across sex. In addition, Swami and colleagues also provided evidence of construct validity through significant associations with measures of body image (e.g., body appreciation, weight discrepancy), psychological well-being (e.g., self-esteem), and other key constructs (e.g., trait mindfulness). Incremental validity was also established insofar as functionality appreciation uniquely predicted self-esteem over-and-above the variance accounted for by other body image measures. In a subsequent study, Todd and Swami (2020) demonstrated that FAS scores were partially scalar invariant across adults from Malaysia and the United Kingdom, with Malaysian adults having significantly higher FAS scores ($\eta_p^2 = .07$).

More can be done to assess the psychometric properties of the FAS in other linguistic and national groups (cf. Swami, 2018). As a contribution to this literature, the present study sought to examine the psychometric properties of a Romanian translation of the FAS. There are a number of additional reasons why a focus on Romania is worthwhile. First, from a practical point-of-view, research on positive body image in the Romanian context has grown dramatically in the past several years (e.g., Swami, Mohd. Khatib et al., 2020; Vintilă et al.,

2020) and the availability of a psychometrically validated Romanian translation of the FAS would enhance opportunities for scholars in the country and neighbouring region to conduct high-quality research. Indeed, Romanian is spoken by around 24 million people as a first language, as well as by several million more as a second language (European Commission, 2012), yet studies of Romanian-speaking populations remain relatively under-represented in the body image literature.

Second, from a theoretical point-of-view, Romania offers a relatively unique locale in which to consider the construct of functionality appreciation. Following the collapse of the Soviet Block in 1991, Romanian lifestyles underwent a period of rapid transformation, resulting in an increase in sedentary behaviours (López-Valenciano et al., 2020), a rapid rise in the prevalence of adult overweight and obesity (Roman et al., 2015), and an ongoing nutrition transition involving increased intake of high-fat foods (Popescu-Spineni, 2011). Yet, despite these changes, Romanian culture continues to valorise physical ability, individual physical capacities, and sporting prowess in everyday life (Chacón-Cuberos et al., 2018; Zaharia & Rața, 2014), as was common during the Soviet era (Schneidman, 1979). Indeed, despite rapid socioeconomic and political changes, some scholars have written that Romanian cultural norms continue to promote self-accomplishment, primarily through bodily expression and capability (e.g., Mîndruț, 2006). How these contrasting pulls – what Dumitrescu (2006, p. iv) identified as the divergence between “communist reminiscences” and “capitalist ideals” – have affected functionality appreciation in Romanian adults is difficult to conceptualise, but is a goal the present study is well-placed to begin answering.

1.1. The Present Study

In view of the commentary above, the present study sought to examine the psychometric properties of a Romanian translation of the FAS. First, we assessed the factor structure of FAS scores in a sample of Romanian adults through the use of exploratory factor

analysis (EFA) and confirmatory factor analysis (CFA). The use of EFA allowed us to consider the most suitable model of FAS scores without the imposition of modelling limitations (i.e., to consider item behaviour in our sample), whereas the use of CFA allowed us to confirm the factorial validity of any derived or hypothesised models (i.e., to examine the fit of models based on earlier analyses, as well as theory). The use of this EFA-to-CFA strategy is widely recommended for test adaptation studies (Hambleton, 2005), including for body image instruments (Swami & Barron, 2019). Following earlier studies (Alleva et al., 2017; Linardon et al., 2020; Swami, Todd et al., 2019), we expected that FAS scores would reduce to a 1-dimensional model of scores. Beyond factorial validity, we also assessed the extent to which FAS scores would be invariant at the configural, metric, and scalar levels between women and men. This is important because multi-group scalar or partial scalar invariance is a precondition of between-group comparisons on latent scores (Boer et al., 2018; Han et al., 2019). Based on previous work (Alleva et al., 2017; Linardon et al., 2020; Swami, Todd et al., 2019), we expected to achieve scalar invariance across sex. Were scalar invariance achieved, we also intended to examine sex differences in functionality appreciation, with the expectation – following previous work (Alleva et al., 2017; Swami, Todd et al., 2019) – of a lack of significant sex differences. Here, we also examined test-retest reliability after four weeks – with the expectation of generating support for adequate test-retest reliability (cf. Alleva et al., 2017).

We also assessed the construct validity of FAS scores through associations with scores on measures of positive body image (i.e., body appreciation), negative body image (weight discrepancy in women, drive for muscularity in men), disordered eating, and psychological well-being (i.e., self-esteem and gratitude), which were selected on the basis of significant associations reported by Alleva and colleagues (2017) and the availability of validated measures in Romanian. Evidence of construct validity would be established through

significant and positive associations between FAS scores and measures of positive body image and psychological well-being, and significant and negative correlations with disordered eating and negative body image scores. Finally, we hypothesised that FAS scores would predict unique variance in self-esteem above-and-beyond associations with other measures of body image, as well as symptoms of disordered eating (which we included because of overlap between this construct and body image constructs). This would support the incremental validity of FAS scores.

2. Method

2.1. Participants

Participants of the main study consisted of an online sample of 497 women and 462 men recruited from Romania. Participants ranged in age from 18 to 73 years ($M = 26.35$, $SD = 11.20$) and in body mass index (BMI) – calculated from self-reported height and weight – from 15.96 to 54.01 kg/m² ($M = 23.54$, $SD = 4.41$). All participants were ethnic Romanians. These participants completed all the measures described in Section 2.2. A subsample of the main participant pool was asked to complete the FAS at two time-points four weeks apart in order to allow us to determine test-retest reliability. This subsample consisted of 100 women and 100 men, who ranged in age from 18 to 60 years ($M = 27.27$, $SD = 9.88$) and in self-reported BMI from 16.22 to 42.45 kg/m² ($M = 23.27$, $SD = 4.22$).

2.2. Measures

2.2.1. Functionality appreciation. Participants completed a Romanian (*limba română* or лимба ромыніэ in Moldovan Cyrillic) translation of the 7-item FAS (Alleva et al., 2017). All items were rated on a 5-point scale ranging from 1 (*strongly disagree*; Romanian: *dezacord puternic*) to 5 (*strongly agree*; Romanian: *acord puternic*). The translation

procedure is described in Section 2.3 and the FAS items in English and Romanian are reported in Table 1.

2.2.2. Positive body image. To measure a facet of positive body image distinct from functionality appreciation, we used the Body Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015; Romanian translation: Swami et al., 2017). The 10-item BAS-2 assesses acceptance of one's body, respect and care for one's body, and protection of one's body from unrealistic beauty standards. All items were rated on a 5-point scale (1 = *never*, 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 Romanian version of the BAS-2 have been shown to reduce to a 1-dimensional factor and to have adequate internal consistency, construct validity, and test-retest reliability across a 3-week period (Swami et al., 2017). In the present study, internal consistency as assessed using McDonald's ω for BAS-2 scores was .96 (95% CI = .95, .96) in women and .93 (95% CI = .93, .95) in men.

2.2.3. Symptoms of disordered eating. Eating disorder symptomatology was assessed using the Body Image Screening Questionnaire for Eating Disorder Early Detection (BISQ; Jenaro et al., 2011; Romanian translation: Tomsa et al., 2012). The 24-item BISQ assesses symptomatology of disordered eating along five dimensions, namely bulimia, anorexia, orthorexia, self-perceived obesity, and muscle dysmorphia. All items were rated on a 6-point scale (1 = *Never*, 6 = *Always*). Internal consistency coefficients for subscale scores on the Romanian BISQ have been shown to be less-than-adequate, while total scores have adequate reliability and discriminant validity (Tomsa et al., 2012). We, therefore, computed a total score as the mean of all items, following reverse-coding of five items. Higher scores on this scale reflect greater eating disorder symptomatology. Internal consistency of BISQ scores in the present study was adequate in women (McDonald's ω = .84, 95% CI = .81, .86) and men (McDonald's ω = .85, 95% CI = .83, .87).

2.2.4. Weight discrepancy. To measure an index of negative body image, women were asked to complete the Photographic Figure Rating Scale (PFRS; Swami et al., 2008). Because the PFRS required minimal translation into Romanian, this was accomplished using the back-translation method (Brislin, 1970). The PFRS is a figural rating scale that depicts 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*). A measure of actual-ideal weight discrepancy was computed as the difference between absolute current and ideal ratings, so that higher scores reflect greater weight discrepancy. Previous work has shown that the PFRS has adequate patterns of construct validity (Swami et al., 2012). Men did not complete the PFRS because no male version of the PFRS is available.

2.2.5. Drive for muscularity. To measure a facet of negative body image, men were asked to complete the Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000; Romanian translation: Swami et al., 2018). The DMS is a 16-item instrument that assesses an individual's desire to have a more muscular body. 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. Based on the results of exploratory and confirmatory factor analyses with Romanian men, Swami and colleagues (2017) recommended scoring the Romanian DMS along two dimensions reflective of muscularity-oriented behaviours (8 items) and muscularity-oriented body image attitudes (7 items). Scores on the Romanian DMS have been shown to have adequate internal consistency and good construct validity (Swami et al., 2018). In the present study, McDonald's ω was .90 (95% CI = .89, .92) for Muscularity-Oriented Behaviour and .91 (95% CI = .90, .92) for Muscularity-Oriented Body Image Attitudes.

2.2.6. Self-esteem. To measure a facet of psychological well-being, we asked participants to complete the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965; Romanian translation: Schmitt & Allik, 2005). This is a 10-item measure of global self-evaluations of worth as a human being, with all items rated on a 4-point scale (1 = *definitely disagree*, 4 = *definitely agree*). An overall score was computed as the mean of all 10 items, following reverse-coding of five items. Higher scores on this scale reflect greater self-esteem. The Romanian version of the RSES has evidenced factorial validity (Schmitt & Allik, 2005) and patterns of construct validity (e.g., Sava et al., 2011). In the present study, McDonald's ω for scores on this scale was .90 (95% CI = .89, .92) in women and .90 (95% CI = .89, .92) and .90 (95% CI = .89, .91) in men.

2.2.7. Gratitude. Participants were asked to complete the Gratitude Questionnaire-6 (GQ-6; McCullough et al., 2002; Romanian translation: Balgiu, 2020), a 6-item instrument that measures one's disposition toward gratitude. All items were rated on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Exploratory and confirmatory factor analyses of scores on the Romanian GQ-6 have shown that a 5-item, 1-dimensional model shows improved fit over the 6-item model. In the present study, therefore, we computed an overall score as the mean of the five relevant items, with higher scores reflective of greater dispositional gratitude. Scores on the Romanian version of the GQ-5 have been shown to have adequate construct validity and internal consistency (Balgiu, 2020). In the present study, McDonald's ω for GQ-5 scores was .77 (95% CI = .74, .80) in women and .78 (95% CI = .75, .81) in men.

2.2.8. Body mass index. We asked participants to self-report their height and weight information. These data were used to compute BMI as kg/m^2 , which we used for sample descriptive purposes.

2.2.7. Demographics. We requested demographic details consisting of sex and age.

2.3. Test Adaptation

The FAS was translated from English into Romanian using the 5-stage test adaptation procedure proposed by Beaton and colleagues (2000). First, two translators – one informed (i.e., aware of the study’s objectives), the other uninformed – independently forward-translated the FAS items, instructions, and response options from English to Romanian. Second, the two translations were examined by a third independent and uninformed translator, who resolved discrepancies between the translations and produced a synthesised translation. Third, two new independent translators who were naïve to the FAS back-translated the synthesised translation into English. Fourth, the forward- and back-translations were examined by a bilingual committee comprising all the aforementioned translators and all authors of the present study. This step did not highlight any concerns with the translations. Fifth, a pre-final version of the FAS was pre-tested in a purposively-selected sample of 20 individuals (women $n = 10$, men $n = 10$; age $M = 24.25$, $SD = 10.57$, range = 18-51 years) who broadly matched the target sample. These participants were asked to rate each item for understanding on a 5-point scale (1 = *do not understand at all*, 5 = *understanding completely*). The mean responses per item were then assessed and, given high ratings for all items (all $M_s \geq 4.35$), no further revisions were made to item content. The items of the final translation used in the present study are reported in Table 1.

2.4. Procedures

Ethics approval for this study was obtained from the relevant departmental ethics committee (approval code: Nr 25627/0-1/16.06.2020 RC 2020-69) and all research was conducted in accordance with the principles of the Declaration of Helsinki. Participants were recruited via advertisements placed on social media sites, which was supplemented through the use of a snowball sampling method. The project was advertised as a study about “psychological well-being and attitudes toward the body” and all potential participants were

provided with further information about the study requirements. Inclusion criteria included being a Romanian citizen and resident, and being of Romanian ethnicity. When a participant agreed to take part, they were asked to provide digital informed consent before completing an online questionnaire containing the scales listed above in a pre-randomised order. All data were collected in November 2020. Internet Protocol (IP) addresses were examined to ensure that no participant took the survey more than once and no participant failed an attention check item placed halfway through the survey. The questionnaire was anonymous and participants took part on a voluntary basis and without remuneration. Upon completing the questionnaire, participants were asked to provide their email addresses if they were willing to be contacted for a future (retest) study and were debriefed.

Four weeks after initial testing, a randomly-selected subsample of 230 participants were invited to complete a follow-up questionnaire. Of these participants, 200 agreed and completed only the FAS following the same procedures as above. Email addresses, which were destroyed prior to analyses, were used to link test and retest data. All retest participants took part on a voluntary basis and did not receive any remuneration. At the end of this testing session, participants were provided with debriefing information about the retest portion of the study.

2.5. Analytic Strategy

2.5.1. Data treatment. There were no missing responses in the dataset. To examine the factor structure of the FAS, we used the EFA-to-CFA analytic method recommended by Swami and Barron (2019) for test adaptation of body image instruments. To ensure adequate sample sizes for both EFA and CFA, we first split the main sample using a computer-generated semi-random seed, resulting in one split-half for EFA (women $n = 287$, men $n = 270$) and a second split-half for CFA (women $n = 210$, men $n = 192$). There were no significant differences between the two subsamples in terms of mean age, $t(957) = 0.63$, $p =$

.531, $d = 0.04$, and BMI, $t(957) = 0.07$, $p = .280$, $d < 0.01$, as well as the distribution of sexes, $\chi^2(1) = 0.05$, $p = .827$.

2.5.2. Exploratory factor analysis. Data from the first split-half were subjected to principal-axis EFA using the *psych* package (Revelle, 2019) in *R* (R Development Core Team, 2014). Because we did not want to rule out *a priori* the possibility of sex differences in factor structure and following the methodology of Alleva and colleagues (2017), the EFAs were run separately for women and men. Our subsample sizes satisfied 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). As per Hair and colleagues (2009), data factorability was assessed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (which should ideally be $\geq .80$) and Bartlett's test of sphericity (which should be significant). Principal-axis factoring was used for the EFAs as it yields results similar to commonly used maximum likelihood estimation without assuming multivariate normality (Goretzko et al., 2020). Given the expectation of a single orthogonal factor, a quartimax rotation was applied (Pedhazur & Schmelkin, 1991).

To estimate the number of factors to extract and factor structure adequacy, we examined fit statistics using commonly used fit indices (Finch, 2020). Specifically, we used the normed model chi-square (χ^2/df ; values < 3.0 considered indicative of good fit), 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), the standardised root mean square residual (SRMR; values $< .09$ indicative of good fit), the Tucker-Lewis index (TLI; values close to or $> .95$ indicative of good fit), and the comparative fit index (CFI; values close to or $> .95$ indicative of adequate fit) (Hu & Bentler, 1999; Steiger, 2007). Corrections to fit indices were not required as EFA is robust to violations of univariate and multivariate normality (Curran et al., 1996). Item retention was

based on the recommendation that items with “fair” loadings and above (i.e., $\geq .33$) and with low inter-item correlations (suggestive of low item redundancy) as indicated by the anti-image correlation matrix should be retained (Comrey & Lee, 1992; Tabachnick & Fidell, 2013). We also assessed the degree of factor similarity across women and men using Tucker’s (1951) congruence coefficient of agreement, with values between .85 and .94 corresponding to fair similarity across groups and values $\geq .95$ suggesting that factor structures can be considered equal across groups (Lorenzo-Seva & ten Berge, 2006).

2.5.3. Confirmatory factor analysis. We used data from the second split-half to conduct a CFA using the *lavaan* (Rosseel, 2012), *semTools* (Jorgensen et al., 2018), and *MVN* packages (Korkmaz et al., 2014) with *R* (R Development Core Team, 2014). Proactive Monte Carlo simulations (Marcoulides & Chin, 2013) with different seed values and based on factor loadings reported by Alleva and colleagues (2017) indicated that a sample size of about 180 would be sufficient for this analysis, which was surpassed in this subsample. 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 data for normality indicated that they were neither univariate (Shapiro-Wilks $p < .001$) nor multivariate normal (Mardia’s skewness = 1825.86, $p < .001$, Mardia’s kurtosis = 69.81, $p < .001$), so parameter estimates were obtained using the robust maximum likelihood method and fit indices (see Section 2.5.2.) were interpreted with the Satorra-Bentler correction applied (Satorra & Bentler, 2001).

2.5.4. Sex invariance. To examine sex invariance of FAS scores, we conducted multi-group CFA (Chen, 2007) using the second split-half subsample. Measurement invariance was assessed at the configural, metric, and scalar levels (Vandenberg & Lance, 2000). Configural invariance implies that the latent FAS variable(s) and the pattern of loadings of the latent variable(s) on indicators are similar across sex (i.e., the unconstrained

latent model should fit the data well in both groups). Metric invariance implies that the magnitude of the loadings is similar across sex. This is tested by comparing two nested models consisting of a baseline model and an invariance model. Because the $\Delta\chi^2$ statistic is overly stringent criterion invariance (Meade et al., 2008), we used $\Delta\text{CFI} \geq -.01$ as an indicator of metric invariance (Cheung & Rensvold, 2002). Lastly, scalar invariance implies that both the item loadings and item intercepts are similar across sex 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 $\Delta\text{CFI} \geq -.01$ and $\Delta\text{RMSEA} \geq .015$ or $\Delta\text{SRMR} \geq .030$, although other scholars suggest that $\Delta\text{CFI} < -.01$ is sufficient (Cheung & Rensvold, 2002). We aimed to test for sex differences on FAS scores using an independent-samples *t*-test only if scalar or partial scalar invariance were established.

2.5.5. Further analyses. Internal consistency in both subsamples was assessed using McDonald's ω and its associated 95% CI (Dunn et al., 2014), with values greater than .70 reflecting adequate internal reliability (Nunnally, 1978). Specifically, we computed hierarchical ω using the *semTools* package for *R* (Jorgensen et al., 2018), which allows for models that do not fit the data perfectly (Kelley & Pornprasertmanit, 2016). Evidence of convergent validity was assessed using the Fornell-Larcker criterion (Fornell & Larcker, 1981), with average variance extracted (AVE) values of $\geq .50$ considered adequate (Malhotra & Dash, 2011) and meaning that a latent variable is able to explain more than half of the variance of its indicators on average (i.e., items converge into a uniform construct). To assess construct validity, we examined bivariate correlations between FAS scores and scores on the additional measures included in the survey. Based on Cohen (1992), values $\leq .10$ were considered weak, $\sim .30$ were considered moderate, and $\sim .50$ were considered strong correlations. Incremental validity was assessed by examining whether FAS scores predicted

self-esteem over-and-above the variance accounted for by body image and disordered eating variables, and would be supported if we found a statistically significant increment in Adj. R^2 in the regression. Finally, intraclass correlation coefficients (ICCs; with higher values preferred; Charter & Feldt, 2001) and a paired-samples t -test were used to estimate the test-retest stability of FAS scores after four weeks.

3. Results

3.1. Exploratory Factor Analysis

3.1.1. Female subsample. For the female subsample from the first split-half ($n = 287$), Bartlett's test of sphericity, $\chi^2(21) = 1178.4, p < .001$, and the KMO measure of sampling adequacy, $KMO = .91$, indicated that the FAS items had adequate common variance for factor analysis. Principal axis EFA indicated that only a single factor ($\lambda_1 = 4.55; \lambda_2 = 0.62$), which explained 59.8% of common variance, should be extracted. The fit indices for this model were: $\chi^2(14) = 47.86, p < .001$, $CFI = .971$, $TLI = .956$, $RMSEA = .092$ (90% CI = .064, .121), $SRMR = .04$. Factor loadings, reported in Table 1, indicated that all seven items should be extracted. In this subsample, FAS scores had adequate internal consistency ($\omega = .90$, 95% CI = .87, .93).

3.1.2. Male subsample. For the male subsample from the first split-half ($n = 270$), Bartlett's test of sphericity, $\chi^2(21) = 1110.3, p < .001$, and the KMO measure of sampling adequacy, $KMO = .90$, indicated that the FAS items had adequate common variance for factor analysis. The EFA again indicated that only a single factor ($\lambda_1 = 4.57; \lambda_2 = 0.61$) should be extracted. This factor explained 60.1% of common variance. The fit indices for this model were: $\chi^2(14) = 62.36, p < .001$, $CFI = .956$, $TLI = .933$, $RMSEA = .113$ (90% CI = .086, .143), $SRMR = .04$. As reported in Table 1, factor loadings indicated that all seven

items should be extracted. In this subsample, FAS scores had adequate internal consistency ($\omega = .91$, 95% CI = .88, .94).

3.1.3. Factor structure congruence. The factor loadings reported in Table 1 for the female and male subsamples suggest a fair degree of similarity across factor structures. Tucker's congruence coefficient for the extracted factor was indicative of factor structure equivalence (.99).

3.2. Confirmatory Factor Analysis

In the second split-half subsample ($n = 402$), we examined the fit of the hypothesised 1-factor model of FAS scores proposed by Alleva and colleagues (2017), which was supported by the results of our EFAs. Fit indices were adequate: $SB\chi^2(14) = 31.37$, $SB\chi^2_{normed} = 2.24$, robust RMSEA = .083 (90% CI = .044, .122), SRMR = .037, robust CFI = .972, robust TLI = .958. The standardised estimates of factor loadings ranged from .63 to .80 (see Figure 1). The convergent validity for this model was acceptable, as AVE was greater than .50 (AVE = .54). Internal consistency coefficients for FAS scores were adequate for women ($\omega = .89$, 95% CI = .86, .92) and men ($\omega = .89$, 95% CI = .85, .91) in this split-half subsample.

3.3. Sex Invariance

Next, we tested for measurement invariance of the 1-dimensional model of FAS scores across sex in the second split-half subsample. As reported in Table 2, all indices suggested that configural, metric, and scalar invariance were supported across sex. An independent-samples t -test showed that there was no sex difference in FAS scores in this split-half (women $M = 4.54$, $SD = 0.57$; men $M = 4.45$, $SD = 0.60$), $t(400) = 1.53$, $p = .201$, $d = 0.15$.

3.4. Test-Retest Reliability

Retest participants were not significantly different from the main sample in terms of mean BMI, $t(957) = 1.01, p = .315, d = 0.07$. They were, however, significantly younger than the same sample, $t(957) = 2.97, p = .003, d = 0.19$, although the difference was small in magnitude. The ICCs between the FAS scores at the first and second administration were .85 for women and .87 for men. In addition, FAS scores were not significantly different over time in women, $t(99) = 0.15, p = .882$, and men, $t(99) = 0.56, p = .575$. These findings support the test-retest reliability of FAS scores over a 4-week period. Repeating these analyses with using repeated-measures analyses of covariance, with age entered as a covariate, did not alter the null effects, so are omitted here.

3.5. Construct Validity

To assess the construct 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 gratitude, and negatively correlated with actual-ideal weight discrepancy and symptoms of disordered eating. In men, functionality appreciation was significantly and positively associated with body appreciation, self-esteem, and gratitude, and negatively associated with muscularity-oriented behaviours, muscularity-oriented attitudes, and symptoms of disordered eating. 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 and negative association between functionality appreciation and BMI in women.

3.6. Incremental Validity

To test for incremental validity, we conducted separate hierarchical regressions for women and men with self-esteem as the criterion variable. In women, body appreciation, actual-ideal weight discrepancy, and symptoms of disordered eating were entered as predictor

variables in a first step and functionality appreciation was entered in a second step. The first step of this regression was significant, $F(3, 493) = 120.38, p < .001, \text{Adj. } R^2 = .41$, as was the second step, $F(4, 492) = 94.68, p < .001, \text{Adj. } R^2 = .43$ (see Table 4 for full regression coefficients). The addition of functionality appreciation in the second step accounted for a significant incremental change in $\text{Adj. } R^2$ ($\Delta R^2 = .02, p = .001$). In men, body appreciation, muscularity-oriented behaviours and attitudes, and symptoms of disordered eating were entered as predictor variables in a first step and functionality appreciation was entered in a second step. The first step of the regression was significant, $F(4, 457) = 54.94, p < .001, \text{Adj. } R^2 = .32$. The second step of the regression was also significant, $F(5, 456) = 49.42, p < .001, \text{Adj. } R^2 = .34$ (see Table 4), with the addition of functionality appreciation accounting for a significant incremental change in $\text{Adj. } R^2$ ($\Delta R^2 = .03, p < .001$).

4. Discussion

The FAS has quickly become a widely used instrument for the measurement of a core facet of the positive body image construct (Alleva & Martijn, 2019). To date, however, its psychometric properties have been predominantly assessed in Anglophone samples (Alleva et al., 2017; Linardon et al., 2020; Soulliard & Vander Wal, 2020). To add to the under-developed international literature on functionality appreciation (Swami, Todd et al., 2019), we assessed the psychometric properties of a novel Romanian translation of the FAS. Overall, our results provide strong evidence that scores on the Romanian FAS are psychometrically valid. To wit, our results support the factorial, convergent, construct, and incremental validity of Romanian FAS scores, as well as invariance of scores across sex, internal consistency, and test-retest reliability.

In terms of factorial validity, the results of our EFAs indicated that Romanian FAS scores reduced to a single dimension with all seven items. This FAS model was identical to

that derived in previous studies (Alleva et al., 2017; Linardon et al., 2020; Soulliard & Vander Wal, 2020; Swami, Todd et al., 2019) and was further supported by the results of our CFA. Also consistent with previous work, factor loadings in the present study were very high, suggesting that the 1-factor model of FAS scores is robust. In addition, the results of Tucker's (1951) test of congruence of agreement indicated that the EFA-derived unidimensional model was equivalent across sex, while multi-group CFA showed that FAS scores achieved scalar invariance across sex. In short, our results support the 1-dimensional factor structure of Romanian FAS scores in both women and men.

Our results also indicated that Romanian FAS had adequate test-retest reliability up to four weeks and that scores had adequate internal consistency, with McDonald's ω coefficients consistently exceeding Nunnally's (1978) conventional cut-off of .70. In addition, convergent validity was supported as the average variance extracted value exceeded the cut-off of .50, and construct validity was supported through significant associations with other indices of body image (i.e., body appreciation, weight discrepancy in women, and muscularity-oriented attitudes and behaviours in men), symptoms of disordered eating, and indices of psychological well-being (self-esteem and gratitude). Further, our results provided support for the incremental validity of functionality appreciation, in so far as FAS scores uniquely predicted self-esteem once the variance explained by other positive and negative body image constructs had been accounted for. Although functionality appreciation accounted for only a small incremental percentage of the variance explained by the second step of the regression (~2-3%), this translated to a robust effect in terms of incremental validity (Smith et al., 2003) and is broadly in line with the findings of Alleva and colleagues (2017).

Of particular note, our results indicated that functionality appreciation and body appreciation – the two measures of positive body image included in our study – were only

moderately correlated (r s .60 to .64), which is consistent with previous work in a range of predominantly Anglophone samples (Alleva et al., 2017, 2020; He et al., 2020; Swami, Barron et al., 2019; Swami, Laughton et al., 2019; Swami, Todd et al., 2019; Todd et al., 2019). This is important because the available body of research points to functionality appreciation and body appreciation being conceptually distinct facets that tap a higher-order positive body image construct (see Swami, Furnham et al., 2020). This, in turn, has notable practical implications: For scholars seeking to operationalise the positive body image construct in Romanian-speaking adults, there may be value in utilising both the FAS and Body Appreciation Scale-2 (Tylka & Wood-Barcalow, 2015), which has been previously validated in Romanian (Swami et al., 2017). Doing so is likely to provide better conceptual coverage of the positive body image construct and would help to identify possible unique or conjoined relationships between these facets and outcome variables.

In our study, we were able to establish scalar invariance of FAS scores across sex, which provided a basis for examining sex differences in latent FAS scores. Previous studies have returned mixed results in this regard: While most studies have indicated no significant sex difference in FAS scores (Alleva et al., 2017; Swami, Barron et al., 2019; Swami, Todd et al., 2017; Todd et al., 2019; Todd & Swami, 2020), men were found to have significantly higher functionality appreciation than women in an online sample of adults ($d = 0.44$; Linardon et al., 2020) and in student athletes from the United States ($d = 0.63$; Soulliard et al., 2019). Our results are consistent with the former body of work, indicative of a lack of significant differences. Like the findings of Swami, Todd and colleagues with a Malaysian sample, however, we found that mean FAS scores were very high ($M \sim 4.50$), which appears substantively higher than those reported by Anglophone samples (e.g., Alleva et al., 2017; Linardon et al., 2020; Swami, Barron et al., 2019). While we caution against drawing strong conclusions in the absence of assessments of multi-group invariance (see Todd & Swami,

2020), it is possible that the use of a 5-point response scale may introduce ceiling effects in some cultural or linguistic groups (e.g., because of culturally-induced difficulties associated with disagreeing with FAS statements). That is, the lack of sex differences in FAS scores may be explained, in part at least, by small individual variances across scores, which overall tended to be quite high. As Swami, Todd and colleagues (2019) have suggested, it may be useful for future work to use (with permission from the FAS developers) a 7- or 9-point response scale to minimise ceiling effects.

Although the present study benefitted from a number of strengths, primarily the large sample size and assessment of multiple psychometric indices, a number of limitations should be considered. For example, given our recruitment method, we cannot claim that our sample is representative of the broader Romanian population, let alone Romanian-speaking adults in other nations. This is noteworthy because of the large inter and intra-regional differences in factors such as socioeconomic, educational outcomes, urban-rural residence, exercise and eating habits, and the prevalence of overweight and obesity in Romania (e.g., Vintilă et al., 2020; Voinea et al., 2019). Indeed, given that we did not collect demographic information beyond age and sex, and given that our sample was relatively young, it would be useful for future work to recruit a representative sample of Romanian adults and to request further demographic information that would enable further tests of invariance along neglected social identity groups. Doing so would also provide a stronger basis for the development of Romanian FAS norms (International Test Commission, 2017), particularly if the issue of ceiling effects could be addressed concurrently.

More broadly, the use of the FAS itself may be construed as a limitation of the design of the present study. That is, it may be argued that the FAS, whose original development was based on data from North American adults, may not fully capture the meaning and understandings of functionality appreciation in the Romanian context. For example, various

authors have discussed how the importance of sporting prowess and ability in Eastern European nations reflects not just the structures of the Eastern European model of sport, but also complex attitudes, behaviours, and sociocultural values relevant to body functionality (Dumitrescu, 2006; Girginov & Sandanski, 2004; Schneidman, 1979). It is difficult to know to what extent such sentiments and bodily experiences are captured by the FAS as it is currently constructed. One way of examining this issue would be to utilise an emic approach in which Romanian understandings of functionality appreciation are developed through qualitative methods (Brislin et al., 1973). Such an approach would help identify any potential gaps in the FAS, which could then be plugged through the construction of novel items to supplement existing items.

Another issue worth noting is that, during the period of data collection in November to December 2020, Romania entered a “soft lockdown” to reduce the transmission of the COVID-19 virus. This included the closure of schools and kindergartens, mandatory use of masks in all public spaces, and a restriction of night-time movement. It is difficult to know how these conditions may have affected the present findings. Certainly, there is some evidence from the United Kingdom that COVID-19-related stress and anxiety was associated with more negative body image under conditions of physical and social distancing (Swami et al., 2021). Given that lockdown conditions are likely to have affected changes to daily routines (e.g., exercise, eating, and sleep patterns), impede adaptive body image coping mechanisms, and heighten negative body ruminations (e.g., Cooper et al., 2020; Rodgers et al., 2020), we cannot entirely rule out the possibility that our findings were similarly affected by such challenges.

These limitations and issues aside, the present results provide strong evidence for the reliability and validity of Romanian FAS scores. From a conceptual point-of-view, these results are important because they add to the available research (Alleva et al., 2017; Linardon

et al., 2020; Soulliard & Vander Wal, 2020; Swami, Todd et al., 2019) indicating that functionality appreciation, as operationalised using the FAS, is a unique facet of positive body image that is associated with healthier body image and psychological well-being. This, in turn, highlights the practical value of the present study: The availability of the Romanian FAS adds to the arsenal of body image scholars working in the Romanian context. In particular, the reliability and validity of scores on the Romanian FAS opens up possibilities for designing interventions that focus on the promotion of functionality appreciation, such as the Expand Your Horizon programme (Alleva et al., 2015, 2018b) and interventions based on yoga (Alleva et al., 2020).

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Table 1

Items of the Functionality Appreciation Scale in English and Romanian (in Italics) and Factor Loadings Derived from the Exploratory Factor Analyses with Women and Men in the First Split-Half Subsample.

Item	Women	Men
(1) I appreciate my body for what it is capable of doing / <i>Îmi apreciez corpul pentru ceea ce este capabil să facă.</i>	.73	.78
(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 / <i>Sunt recunoscător pentru sănătatea corpului meu, chiar dacă nu este întotdeauna atât de sănătos pe cât aş vrea să fie.</i>	.76	.72
(3) I appreciate that my body allows me to communicate and interact with others / <i>Apreciez că corpul meu îmi permite să comunic şi să interacţionez cu ceilalţi.</i>	.82	.80
(4) I acknowledge and appreciate when my body feels good and/or relaxed / <i>Recunosc şi apreciez când corpul meu se simte bine şi / sau relaxat.</i>	.72	.74
(5) I am grateful that my body enables me to engage in activities that I enjoy or find important / <i>Sunt recunoscător că corpul meu imi permite să mă angajez în activităţi care îmi plac sau pe care le consider importante.</i>	.81	.82
(6) I feel that my body does so much for me / <i>Simt că corpul meu face atât de mult pentru mine.</i>	.68	.75
(7) I respect my body for the functions it performs / <i>Îmi respect corpul pentru funcţiile pe care le îndeplineşte.</i>	.86	.78

Table 2

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

Model	SB χ^2	df	Robust CFI	Robust RMSEA	SRMR	Model Comparison	Δ SB χ^2	Δ Robust CFI	Δ Robust RMSEA	Δ SRMR	Δ df	p	PGFI
Configural	89.31	28	.968	.093	.030								.399
Metric	94.54	34	.969	.083	.037	Configural vs. metric	5.23	.001	.010	.007	6	.630	.484
Scalar	106.89	40	.968	.078	.039	Metric vs. scalar	12.35	.001	.010	.002	6	.182	.570

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)	(10)
(1) Functionality appreciation		.64**	-.22**	-	-	-.39**	.50**	.60**	-.10*	.08
(2) Body appreciation	.60**		-.11*	-	-	-.51**	.61**	.47**	-.23**	.07
(3) Actual-ideal weight discrepancy	-	-		-	-	.05	-.05	-.06	-.24**	-.16**
(4) Muscularity-oriented behaviour	-.14*	-.09*	-		-	-	-	-	-	-
(5) Muscularity-oriented attitudes	-.22**	-.19**	-	.32**		-	-	-	-	-
(6) Eating disorder symptomatology	-.42**	-.30**	-	.25**	.23**		-.48**	-.31**	.30**	-.13*
(7) Self-esteem	.50**	.50**	-	-.08	-.17**	-.41**		.44**	-.02	.17**
(8) Gratitude	.54**	.39**	-	-.12*	-.07	-.24**	.39**		-.02	.02
(9) Body mass index	-.07	-.18**	-	-.20**	-.25**	.25**	.01	.02		.37**
(10) Age	-.01	-.05	-	-.24**	-.40**	-.13*	.13**	.04	.36**	

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

Table 4*Results of Multiple Hierarchical Regression Analyses for the Prediction of Self-Esteem*

Step	Variable	Women (<i>n</i> = 497)					Men (<i>n</i> = 462)				
		B	SE	β	<i>t</i>	<i>p</i>	B	SE	β	<i>t</i>	<i>p</i>
1	Body appreciation	.36	.03	.50	12.53	< .001	.33	.03	.42	9.99	< .001
	Weight discrepancy ^a	-.04	.01	-.09	-2.72	.007	-	-	-	-	-
	Muscularity-oriented behaviour ^a	-	-	-	-	-	-.02	.02	-.04	-0.89	.373
	Muscularity-oriented attitudes ^a	-	-	-	-	-	-.01	.02	-.02	-0.51	.609
	Eating disorder symptomatology	-.23	.04	-.23	-5.76	< .001	-.27	.04	-.27	-6.41	< .001
2	Body appreciation	.30	.04	.41	8.64	< .001	.24	.04	.30	6.04	< .001
	Weight discrepancy ^a	-.03	.01	-.08	-2.33	.020	-	-	-	-	-
	Muscularity-oriented behaviour ^a	-	-	-	-	-	-.01	.02	-.01	0.27	.788
	Muscularity-oriented attitudes ^a	-	-	-	-	-	-.01	.02	-.02	0.35	.723
	Eating disorder symptomatology	-.22	.04	-.22	-5.49	< .001	-.22	.04	-.22	-5.15	< .001
	Functionality appreciation	.16	.05	.15	3.25	.001	.22	.05	.22	4.33	< .001

Note. ^aActual-ideal weight discrepancy was included as a predictor in the regression for women but not men, whereas Drive for Muscularity Scale subscale scores were entered in the regression for men but not women.

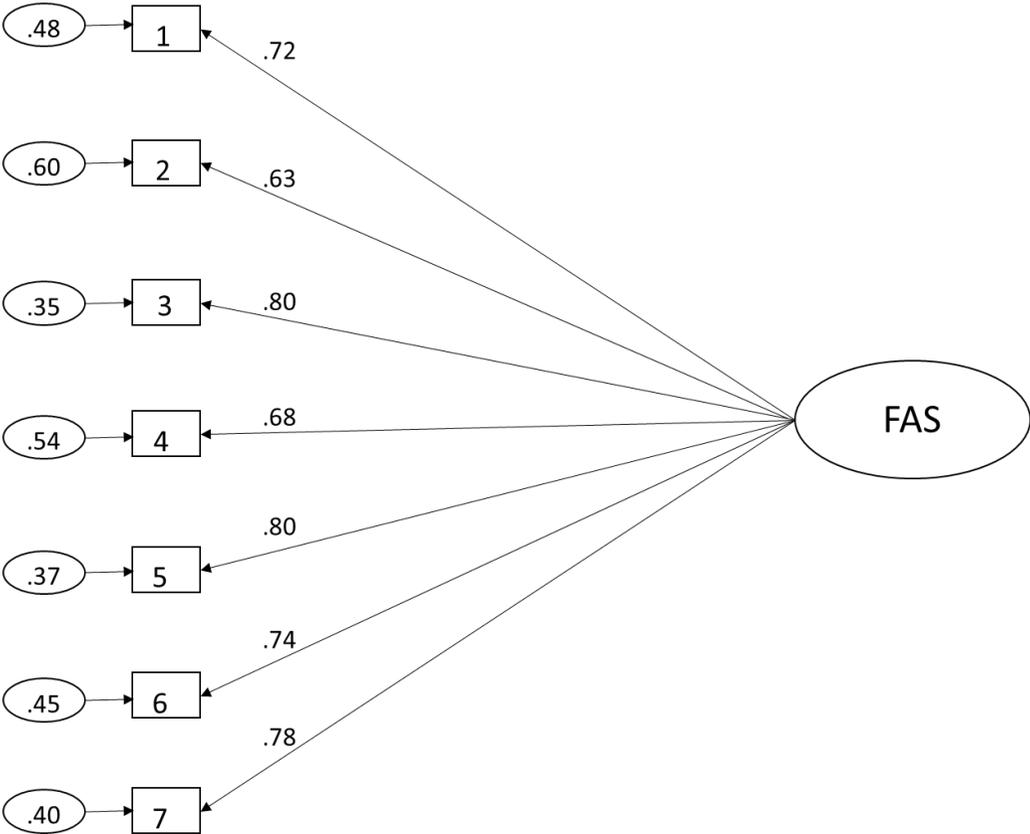


Figure 1

Path diagram and estimates for the 1-dimensional model of Functionality Appreciation Scale (FAS) scores in the second split-half subsample.

The large oval is the latent construct, with the rectangles representing measured variables, and the small circles with numbers representing the residual variables (variances). The path factor loadings are standardised with significance levels were determined by critical ratios (all $p < .001$).