Running head: FUNCTIONALITY APPRECIATION SCALE

Psychometric Properties of an Italian Translation of the Functionality Appreciation Scale (FAS)

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Abstract

The Functionality Appreciation Scale (FAS; Alleva et al., 2017) is a widely used instrument for the measurement of an individual's appreciation of their body for what it can do and is capable of doing (i.e., *functionality appreciation*). Here, we examined the psychometric properties of a novel Italian translation of the FAS. A sample of 950 Italian adults completed the FAS, as well as previously validated measures of body image (body appreciation, body esteem, body surveillance), disordered eating symptoms, and psychological well-being (self-esteem, general distress). Exploratory and confirmatory factor analyses supported a 1-dimensional model of FAS scores, with all 7 items retained. Scores achieved scalar invariance across gender, and the gender difference in latent FAS scores was not significant. FAS scores were found to have adequate internal consistency, test-retest reliability up to three weeks, and convergent and criterion-related validity through significant correlations with all additional constructs. However, evidence of incremental validity was weak, and likely reflected high nomological and conceptual similarity between functionality and body appreciation in this national context. Overall, these results provide strong evidence that scores on the Italian FAS are psychometrically valid, which may aid future development of interventions to promote more positive body image in Italian-speaking samples.

Keywords: Functionality appreciation; Positive body image; Factor structure; Psychometrics; Italy

1. Introduction

Positive body image broadly refers to an "overarching love and respect for the body" (Tylka, 2018, p. 9) and is distinct from low levels of negative body image (Tylka & Wood-Barcalow, 2015a). Although the construct is acknowledged as being complex and multi-faceted (e.g., Swami et al., 2020), much of the available research has focused on the facet of body appreciation (see Tylka, 2018). Beyond body appreciation, however, another core facet of positive body image is *functionality appreciation*, which is defined as "appreciating, respecting, and honouring the body for what it is capable of doing" (Alleva et al., 2017, p. 29). In this view, functionality appreciation extends beyond simple awareness of body functionality (i.e., an aspect of body image that refers to what the body can do or is capable of doing) to emphasise gratitude for body functionality (Alleva & Tylka, 2021). Because of its centrality to the construct of positive body image (Swami et al., 2020), functionality appreciation has increasingly been the focus of interventions aimed at promoting healthier attitudes and feelings toward the body (e.g., Alleva et al., 2018a, 2018b).

To measure functionality appreciation, Alleva and colleagues (2017) developed the Functionality Appreciation Scale (FAS). This is a 7-item measure that has been shown to have a 1-dimensional factor structure in samples of English-speaking heterosexual and sexual minority adults (Alleva et al., 2017; Linardon et al., 2020; Soulliard & Vander Wal, 2020). These studies have also reported that FAS scores are internally consistent, are invariant across gender, and have adequate test-retest reliability. In the parent study, Alleva and colleagues (2017) further reported that FAS scores evidence adequate convergent, criterion-related, and divergent validity, as indexed by 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 have adequate incremental validity, insofar as scores were

found to predict psychological well-being over-and-above scores on other body image measures.

Limited evidence also suggests that the psychometric properties of the FAS are impressive beyond Anglophone samples. For instance, the 1-dimensional factor structure of FAS scores has been supported in online samples of Malaysian (Swami, Todd et al., 2019) and Romanian adults (Swami, Todd et al., 2021), and in a sample of university students from Brazil (Faria et al., 2020). These studies have also provided evidence to support the internal consistency, convergent and criterion-related validity, and – in the case of the Romanian sample – test-retest reliability of FAS scores. Scores have also been shown to be invariant across gender in the Malaysian and Romanian samples, but the gender difference in latent mean scores did not reach significance (Swami, Todd et al., 2019, 2021). Of note, the invariance of FAS scores across adults from Malaysia and the United Kingdom has also been supported (Todd & Swami, 2019), with Malaysian adults found to have significantly higher scores ($\eta_p^2 = .07$). Finally, a Chinese translation of the FAS has also been prepared and used in a sample of elderly adults (He et al., 2020), but the authors of this study neglected to assess the psychometric properties of scores on the measure.

As a contribution to this growing literature, we examined the psychometric properties of a novel Italian translation of the FAS. This is important, firstly, because it would extend research on the FAS to a national context where the study of positive body image remains relatively under-developed (Casale et al., 2021). Indeed, Italy is an interesting context to study functionality appreciation given competing pulls between a historic focus on athleticism, particularly in terms of the construction of masculinities (Morgan, 2006), and idealised and perfectionist self-presentation (Pipyrou, 2014; Severgnini, 2007). From a more practical point-of-view, the availability of a psychometrically valid translation of the FAS would be useful in Italy, where high levels of physical inactivity have been documented more

recently, particularly in older age groups (Instituto Nazionale di Statistica, 2018). For instance, understanding the determinants associated with improved physical activity, which may include functionality appreciation (see Soulliard et al., 2019), would allow for the development of more effective intervention programmes.

1.1.The Present Study

The objective of the present study was to assess the psychometric properties of a novel Italian translation of the FAS. First, to assess the factor structure of Italian FAS scores, we used the exploratory-to-confirmatory factor analytic method, which has been recommended for the test adaptation of body image instruments (Swami & Barron, 2019). This allowed us to explore the most suitable model of FAS scores without modelling constraints (i.e., to consider item behaviour in our sample) and to confirm the factorial validity of hypothesised and, if divergent, derived models of FAS scores (i.e., to examine the fit of models based on our own analyses, as well as theory). Based on the extant research to date (Alleva et al., 2017; Faria et al., 2020; Linardon et al., 2020; Swami, Todd et al., 2019, 2021), we expected that Italian FAS scores would reduce to a single dimension, with all 7 items retained. We also expected that FAS scores would be internally consistent and invariant at the configural, metric, and scalar levels between women and men. We also expected that there would be no significant gender difference in FAS scores, which would be consistent with previous work (Alleva et al., 2017; Linardon et al., 2020; Swami, Todd et al., 2019, 2021).

Here, we also assessed test-retest reliability of FAS scores, with the expectation that scores would be temporally stable up to three weeks. Finally, we examined the convergent validity of FAS scores through associations with scores on measures of positive body image (i.e., body appreciation and body esteem) and negative body image (i.e., body surveillance). Criterion-related validity was assessed through correlations with symptoms of disordered

eating and psychological well-being (i.e., self-esteem and general distress). These variables were selected on the basis of significant associations reported in previous studies (Alleva et al., 2017; Swami, Todd et al., 2019, 2021) and the availability of validated measures in Italian. Evidence of validity would be established through positive associations with body appreciation, body esteem, and self-esteem, and negative associations with body surveillance, symptoms of disordered eating, and general distress measures. Finally, we hypothesised that FAS scores would predict unique variance in self-esteem above-and-beyond associations with other measures of body image, which would support the incremental validity of FAS scores.

2. Method

2.1. Participants

2.1.1. Main sample. The participants of this study consisted of an online sample of 500 women and 450 men recruited from Italy. Participants ranged in age from 18 to 71 years (M = 26.99, SD = 8.42) and in self-reported body mass index (BMI) from 15.78 to 58.06 kg/m^2 (M = 23.31, SD = 4.59). All participants were Italian citizens and, in terms of occupation, 53.3% were students, 21.1% were in full-time employment, 3.7% were in part-time employment, and the remainder had some other occupational status.

2.1.2. Retest sample. A subsample of the main group was invited to complete the FAS at two time-points three weeks apart (henceforth "retest subsample"). The retest subsample consisted of 149 participants (96 women, 53 men), who ranged in age from 18 to 71 years (M = 31.52, SD = 12.93) and in self-reported BMI from 17.07 to 58.06 kg/m^2 (M = 23.29, SD = 4.99).

2.2. Measures

2.2.1. Functionality appreciation. Participants completed a novel Italian translation of the 7-item FAS (Alleva et al., 2017). All items were rated on a 5-point scale ranging from

1 (*strongly disagree*; Italian: *fortemente in disaccordo*) to 5 (*strongly agree*; Italian: *fortemente d'accordo)*. The translation procedure is described in Section 2.3 and the FAS items in English and Italian are reported in Table 1.

2.2.2. Positive body image. Participants were asked to complete the 10-item Body Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015; Italian translation[1]: Casale et al., 2021), which 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, so that higher scores reflect greater body appreciation. Scores on the Italian version of the BAS-2 have been shown to reduce to a 1-dimensional factor and to have adequate internal consistency and good indices of validity (Casale et al., 2021). In the present study, internal consistency as assessed using McDonald's ω for BAS-2 scores was .95 (95% CI = .94, .96) in women and .94 (95% CI = .93, .95) in men.

2.2.3. Body esteem. Participants also completed the 14-item Body Esteem Scale (BES; Mendelson et al., 2001; Italian translation: Confalonieri et al., 2008), which assesses participants' attitudes and feelings about their bodies and appearance on a 5-point Likert scale ranging from 0 (*never*) to 4 (*always*). The scale measures three factors: attribution (the evaluation attributed to others about one's body and appearance), weight (satisfaction with one's weight), and appearance (general feeling about one's appearance). A total score can also be computed (Confalonieri et al., 2008), with higher scores indicating greater body esteem. Scores on the Italian version of the BES shows adequate reliability and validity (Confalonieri et al., 2008). In the present study, McDonald's ω for BES scores was .95 (95% CI = .90, .99) in women and .91 (95% CI = .86, .97) in men.

2.2.4. Disordered eating. Participants completed the Drive for Thinness (DT; 7 items), Bulimia (B; 7 items), and Body Dissatisfaction (BD; 9 items) subscales of the Eating

Disorder Inventory-3 (EDI-3; Garner, 2004; Italian translation: Giannini et al., 2008), a self-report questionnaire assessing psychological features and behaviors associated with disordered eating on a 6-point Likert scale (1 = *never*, 6 = *always*). Subscale scores were computed as the mean of all relevant items. Scores on the Italian version of the EDI-3 have adequate internal consistency and good indices of validity in clinical and non-clinical samples, and across gender (Giannini et al., 2008). In the present study, McDonald's ω for EDI-3 subscales was as follows: EDI-DT, women: .91 (95% CI = .89, .92), men: .87 (95% CI = .85, .90); EDI-B, women: .87 (95% CI = .85, .89), men: .83 (95% CI = .78, .87); EDI-BD, women: .88 (95% CI = .86, .90), men: .87 (95% CI = .84, .89).

2.2.5. Body surveillance. Participants also completed the 8-item Body Surveillance subscale of the Objectified Body Consciousness Scale (OBCS; McKinley & Hyde, 1996; Italian translation: Dakanalis et al., 2017), measuring participants' tendency to monitor their external appearance rather than focus on their body functions. Items were rated on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*), and higher scores reflect higher levels of body surveillance. Scores on the Italian version of the OCBS have been shown to have adequate internal consistency, good test-retest reliability over a 4-week period, and adequate construct validity (Dakanalis et al., 2017). In the present study, McDonald's ω for body surveillance scores was .81 (95% CI = .79, .84) in women and .82 (95% CI = .79, .85) in men.

2.2.6. Self-esteem. Participants completed the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965; Italian translation: Prezza et al., 1997), a 10-item self-report questionnaire assessing global self-esteem on a 4-point Likert scale (1 = *strongly disagree*, 4 = *strongly agree*). Higher scores represent greater self-esteem. Good internal consistency values and adequate indices of validity have been reported for scores on the Italian version of the RSES

(Prezza et al., 1997). In the present study, McDonald's ω for RSES scores was .90 (95% CI = .89, .92) in women and .89 (95% CI = .87, .91) in men.

2.2.7. General distress. Participants were asked to complete the Depression Anxiety Stress Scale-21 (DASS-21; Lovibond & Lovibond, 1995; Italian translation: Bottesi et al., 2015), a 21-item self-report questionnaire assessing depression, anxiety, and stress on a 4-point Likert scale (0 = *did not apply to me at all*, 3 = *applied to me very much*). Three subscale scores are generally computed, but validation work with the Italian version of the scale indicated that use of a total score representing "general distress" is more appropriate than subscale scores (Bottesi et al., 2015). This is what we did in the present study, with higher scores indicating greater distress. Scores on the Italian version of the DASS-21 have been shown to have adequate internal consistency and construct validity (Bottesi et al., 2015). In the present study, McDonald's ω for total DASS-21 scores was .96 (95% CI = .95, .96) in women and .94 (95% CI = .93, .95) 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.

2.2.9. Demographics. We requested demographic details consisting of gender, age, and occupational status.

2.3. Test Adaptation

To prepare an Italian version of the FAS, we followed Beaton and colleague's (2000) 5-stage test adaptation procedure (Beaton et al., 2000). In the first stage, an informed and an uninformed translator independently forward-translated the FAS items, instructions, and response options from English to Italian. In a second stage, a third translator examined the two forward-translations, resolved any discrepancies, and produced a synthesised translation. In a third stage, two new independent translators who were naïve to the FAS back-translated the synthesised translation into English. In a fourth stage, a bilingual committee comprising

all the aforementioned translators and authors of the present study considered the forward- and back-translations. Because the committee did not identify any concerns at this stage, we proceeded to a fifth stage, in which a pre-final version of the FAS was pre-tested in a purposively selected sample of 15 individuals (women $n = 9$, men $n = 6$; age $M = 24.67$ years, $SD = 2.69$). 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 Ms ≥ 4.25), 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 at the School of Psychology, University of Padova (approval code: 2871BB770B52DDDABE6903EFFD81C9C7). Participants were recruited via advertisements placed on social media sites (i.e., Instagram, Facebook), which was supplemented through the use of a snowball sampling method. Inclusion criteria included being an Italian citizen and at least 18 years old. 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 between September 2020 and January 2021. To ensure that no participant completed the survey more than once, we examined personal codes provided by participants (consisting of the first letters of their first and last names followed by their year of birth), as well Internet Protocol (IP) addresses. The survey was deidentified and participants took part on a voluntary basis and without reimbursement.

Three weeks after initial testing, a randomly selected subsample of 150 participants were invited to complete a follow-up questionnaire. All but one of these participants agreed

and completed only the FAS following the same procedures as above. Personal codes were used to link test and retest data. All retest participants took part on a voluntary basis and did not receive any reimbursement.

The study was conducted in accordance with the Declaration of Helsinki.

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 exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), as recommended by Swami and Barron (2019). To ensure adequate sample sizes for both EFA and CFA, we split the main sample using a computer-generated random seed, resulting in one split-half for EFA (women $n = 257$, men $n = 220$) and a second split-half for CFA (women $n = 243$, men $n = 230$). There were no significant differences between the two subsamples in terms of mean age, $t(948) = 0.61$, $p = .540$, $d < .01$, and BMI, $t(948) = 1.04$, $p = .300$, $d < .01$, as well as the distribution of women and men, $\chi^2(1) = 0.60$, $p = .441$.

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). Following the analytic strategy of Alleva and colleagues (2017), EFAs were conducted EFAs separately for women and men. 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). Data factorability was assessed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (which should ideally be ≥ .80) and Bartlett's test of sphericity (which should be significant) (Hair et al., 2009). Principal-axis factoring was used for the EFAs as it yields results similar to commonly used maximum likelihood estimation without assuming

multivariate normality (Fabrigar et al., 1999; 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 followed the recommendation of Swami and colleagues (2021) and used the combination of parallel analysis and an examination of the following fit indices (Finch, 2020): 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., ≥ .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 ≥ .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 intention was to test the parent model of FAS scores (i.e., a 1-dimensional model; Alleva et al., 2017) and, if divergent, any models extracted from our EFAs. Assessment of the data for normality indicated that they were neither univariate (Shapiro-Wilks $p < .001$) nor multivariate normal (Mardia's skewness = 900.69, $p < .001$, Mardia's kurtosis = 32.66, $p < .001$), 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. Gender invariance. To examine gender 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 (Vandenburg & 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 gender (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 gender; this is tested by comparing two nested models consisting of a baseline model and an invariance model. Lastly, scalar invariance implies that both the item loadings and item intercepts are similar across gender and is examined using the same nested-model comparison strategy as with metric invariance (Chen, 2007). Following the recommendations of Cheung and Rensvold (2002) and Chen (2007), we accepted $\Delta CFI \leq .010$ and $\Delta RMSEA \leq .015$ or $\Delta SRMR \leq .010$ (.030 for factorial invariance) as evidence of invariance. We aimed to test for gender differences on latent 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). Hierarhical ω was computed using the *semTools* package for *R* (Jorgensen et al., 2018) and 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 ≥ .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 convergent and criterion-related validity, we examined bivariate correlations between FAS scores and scores on the additional measures included in the survey. Based on Cohen (1992), values ≤ .10 were considered weak, ~ .30 were considered moderate, and ~ .50 were considered strong correlations. Incremental validity was assessed by examining whether FAS scores predicted self-esteem over-and-above the variance accounted for body image and disordered eating variables, and would be supported if we found a statistically significant increment in Adj. R^2 in the regression. Self-esteem was selected for this purposes given that it provides a global assessment of psychological well-being. Finally, intraclass correlation coefficients (ICCs; with higher values preferred; Charter & Feldt, 2001; Shrout, 1998) and a paired-samples *t*-test were used to estimate the test-retest stability of FAS scores after three weeks.

3. Results

3.1. Exploratory Factor Analysis

3.1.1. Factor analysis with women. For women, Bartlett's test of sphericity, $\chi^2(21) = 893.33$, $p < .001$, and the KMO (.91) indicated that the FAS items had adequate common variance for factor analysis. The results of the EFA revealed a single factor with $\lambda > 1$, and parallel analysis confirmed that only one factor from the actual data had λ greater than the criterion λ generated from the random data ($\lambda_1 = 4.26 > 3.14$, $\lambda_2 = 0.70 < 0.92$). As such, we retained one factor, which explained 55% of the common variance. The fit indices for this

model were adequate: $\chi^2(14) = 34.90$, $p = .002$, $\chi^2_{normed} = 2.49$, CFI = .976, TLI = .964, RMSEA = .076 (90% CI = .045, .109), SRMR = .04. All 7 items loaded strongly onto the extracted factor (item-factor loadings ≥ .60; see Table 1).

3.1.2. Factor analysis with men. For men, Bartlett's test of sphericity, $\chi^2(21) = 783.77$, $p < .001$, and KMO (.90) again indicated that the FAS items had adequate common variance for factor analysis. The results of the EFA revealed one factor with $\lambda > 1.0$, and parallel analysis confirmed that only one factor from the actual data had λ greater than the criterion λ generated from the random data ($\lambda_1 = 4.23 > 3.14$, $\lambda_2 = 0.72 < .81$), which explained 54% of the common variance. The fit indices for this model were adequate: $\chi^2(14) = 40.58$, $p < .001$, $\chi^2_{normed} = 2.90$, CFI = .965, TLI = .948, RMSEA = .093 (90% CI = .060, .127), SRMR = .04. All 7 items loaded strongly onto the extracted factor (item-factor loadings ≥ .53; see Table 1).

3.1.3. Factor structure congruence and internal consistency. The factor loadings reported in Table 1 for women and men separately suggest strong similarity across factor structures. Indeed, Tucker's congruence coefficient (.99) indicated that there was factor structure equivalence across the models for women and men. McDonald's ω was adequate in women (.89, 95% CI = .86, .92), men (.89, 95% CI = .85, .92), and the total sample (.89, 95% CI = .87, .91).

3.2. Confirmatory Factor Analysis

CFA indicated that fit of the 1-factor model of FAS scores was acceptable: $SB\chi^2(14) = 33.07$, $p = .003$, $SB\chi^2_{normed} = 2.36$, robust RMSEA = .066 (90% CI = .037, .095), SRMR = .027, robust CFI = .983, robust TLI = .974. The standardised estimates of factor loadings were all adequate (see Figure 1). The convergent validity for this model was adequate, as AVE = .55, and internal consistency of scores was adequate in women (ω = .89, 95% CI = .87, .91), men (ω = .90, 95% CI = .88, .92), and the total sample (ω = .89, 95% CI = .88, .91).

3.3. Gender Invariance

Next, we tested for gender invariance based on the 1-factor model of FAS scores. As reported in Table 2, all indices suggested that configural, metric, and scalar invariance was supported across gender. Given these results, we computed an independent-samples *t*-test to examine gender differences in FAS scores. The results showed no significant gender difference in FAS scores in this split-half (women $M = 4.08$, $SD = 0.74$; men $M = 4.09$, $SD = 0.76$), $t(948) = 0.25$, $p = .80$, $d = .01$.

3.4. Test-Retest Reliability

Retest participants were not significantly different from the main sample in terms of mean BMI, $t(944) = 0.06$, $p = .950$, $d < .01$; however, they differed in terms of age, $t(948) = 7.35$, $p < .001$, $d = .11$. The ICCs between the FAS scores at the first and second administration were .83 for women and .73 for men. In addition, FAS scores were not significantly different over time in women, $t(95) = 0.81$, $p = .42$, and men, $t(52) = 0.10$, $p = .92$. To rule out age effects, we repeated these analyses using a repeated-measures analysis of covarying, with age entered as a covariate, but the effects were still null (full results omitted here for brevity).

3.5. Convergent and Criterion-Related Validity

To assess the 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 both women and men, functionality appreciation was significantly, positively, and strongly correlated with body appreciation, body esteem, and self-esteem. In both women and men, FAS scores were also significantly, negatively, and moderately correlated with symptoms of disordered eating, body surveillance, and general distress. For descriptive purposes, we also report associations between FAS scores, BMI, and

age in Table 3. FAS scores were not significantly associated with age in women or men, but they were significantly, negatively, and weakly associated with self-reported BMI.

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 and body appreciation, body esteem, body surveillance, and symptoms of disordered eating, respectively, as the predictor variables in a first step and functionality appreciation as a predictor in a second step. For women, the first step of this regression was significant, $F(6, 493) = 84.48$, $p < .001$, Adj. $R^2 = .501$, as was the second step, $F(7, 492) = 73.57$, $p < .001$, Adj. $R^2 = .50$ (see Table 4 for full regression coefficients). The addition of functionality appreciation in the second step accounted for a significant incremental change in Adj. R^2 ($\Delta R^2 = .004$, $p = .03$). In men, first step of the regression was significant, $F(6, 443) = 49.60$, $p < .001$, Adj. $R^2 = .394$. The second step of the regression was also significant, $F(7, 442) = 42.55$, $p < .001$, Adj. $R^2 = .39$ (see Table 4); however, the addition of functionality appreciation did not account for a significant incremental change in Adj. R^2 ($\Delta R^2 = .001$, $p = .45$). All variance inflation factors in both regressions were < 1.74, suggesting that multicollinearity was not a limiting factor.

4. Discussion

In tandem with the rapid growth of interest in positive body image, scholars have developed a wide array of instruments that measure the construct. The FAS is one such measure and, in combination with the BAS-2, offers scholars the opportunity to comprehensively measure the construct of positive body image (Swami et al., 2020). To ensure cross-national applicability of these instruments, however, it is first important to examine the psychometric properties of measures such as the FAS in different linguistic and cultural groups (Swami & Barron, 2019). To wit, the present study examined the psychometric properties of an Italian translation of the FAS and our results generally provide

strong evidence that the FAS is a valid and reliable measure for use in Italian-speaking populations. More specifically, the present results supported the factorial, convergent, and criterion-related construct validity of Italian FAS scores, as well as invariance of scores across gender, internal consistency, and test-retest reliability, although evidence of incremental validity was weak and equivocal.

In terms of factorial validity, our results provide strong evidence for a 1-factor model of FAS scores through both EFA and CFA. Of note here is our finding that item-factor loadings in EFA were strong, as were path factor loadings in CFA. In broad outline, these findings are consistent both with the parent study (Alleva et al., 2017), as well as other validation studies in English-speaking (Linardon et al., 2020; Soulliard & Vander Wal, 2020) and non-English-speaking samples (Faria et al., 2020; Swami, Todd et al., 2019, 2021). Taken together, these findings are encouraging and suggest that the construct of functionality appreciation retains its unidimensionality across disparate linguistic groups. However, an important next step for this literature will be to examine the invariance of FAS scores across national and/or linguistic groups, which is a precondition of conducting comparisons of FAS scores across groups (cf. Todd & Swami, 2019).

Our results also indicated that that the factor structure of FAS scores identified through EFA was identical across women and men, and that FAS scores were scalar invariant across gender based on the results of multi-group CFA. This, in turn, allowed us to examine gender differences in FAS scores; our results indicated no significant gender difference, which is consistent both with the parent study (Alleva et al., 2017), as well as previous test adaptation and cross-national studies (Swami, Todd et al., 2019, 2021; Todd & Swami, 2019; but see Linardon et al., 2020, who reported that men had significantly higher functionality appreciation than women in an international, online sample). Mean FAS scores were broadly in line with those reported in North America and Western Europe (e.g., Alleva et al., 2017;

Swami, Barron et al., 2019), though lower than mean scores reported in Southeast Asia and Eastern Europe (Swami, Todd et al., 2019, 2021). Clearly, it would be useful to examine whether these differences reach significance, though it will first be necessary to establish scalar invariance across national groups. That, in turn, may help to identify groups that may have especially high functionality appreciation, which could lead to the identification of putative factors that promote greater functionality appreciation.

The findings of the present study also showed that Italian FAS scores achieved test-retest reliability after three weeks and that scores were internally consistent. Our results also provided multiple indices of validity of Italian FAS scores. First, convergent validity was supported based on the average variance extracted in our CFA. Second, convergent validity was supported through significant associations with other indices of body image (i.e., body appreciation, body esteem, body surveillance), whereas criterion-related validity was supported through associations with symptoms of disordered eating, and psychological well-being (self-esteem, general distress). Notably, functionality appreciation and body appreciation scores were strongly correlated in the present study, which is possibly indicative of construct overlap. That is, although we found no evidence of multicollinearity, the high inter-correlation between functionality and body appreciation in the present study may reflect conceptual and nomological similarity that is worthy of further investigation in this national context (e.g., through the use of Item Pool Visualisation; Swami et al., 2020). Finally, evidence of incremental evidence was mixed: results supported incremental validity of FAS scores over-and-above other measures of body image and symptoms of disordered eating in women but not men, though effects in women were weak at best. This again may be reflective of the conceptual and nomological similarity between body and functionality appreciation in the Italian context.

A strength of the present study was the recruitment of a comparatively large sample and the use of previously validated measures to determine the psychometric properties of FAS scores. Conversely, however, a number of limitations of the present study leave room for improvement in future work. First, given the online recruitment of participants, it is unlikely that our sample is representative of the wider Italian population. This is important because of regional differences in factors such as the prevalence of obesity and eating practices (e.g., Lauria et al., 2019), which may have an impact on levels of functionality appreciation. The recruitment of a representative sample of Italian adults would, therefore, be a useful direction for future research, as would the inclusion of further socio-demographic information that would allow for finer-grained analyses of inter-group differences (e.g., race, migration status, social class). Also related to data collection was the fact that our participants were recruited between September 2020 and January 2021, during which time Italy underwent various forms of lockdown. Importantly, data from the United Kingdom has shown that COVID-19-related stress and anxiety have had a detrimental effect on body image outcomes (Swami, Horne et al., 2021). As such, it is difficult to know how the COVID-19 pandemic and related measures to restrict the transmission of the virus may have impacted on our results.

These issues notwithstanding, the present study provides evidence that scores on the Italian FAS are psychometrically valid, although it may be important in future work to fully examine links between functionality and body appreciation in this national context. In the meantime, the present results add to the growing body of evidence indicating that the FAS is reliable and valid for use in disparate national, linguistic, and social identity groups (Alleva et al., 2017; Linardon et al., 2020; Soulliard & Vander Wal, 2020; Swami, Todd et al., 2019, 2021). This is particularly important in the Italian context, where the availability of the Italian FAS adds to the arsenal of body image scholars who are interested in studying aspects of

positive body image (Casale et al., 2021). Indeed, the availability of both the BAS-2 and FAS in Italian should provide broader and more comprehensive coverage of the positive body image construct, which in turn widens possibilities for the inclusion of positive body image in future interventionist studies for Italian-speaking populations.

Footnotes

[1]The translation of the BAS-2 by Casale and colleagues (2021) was not available when we began our study. We had prepared our own translation, following the procedures outlined in Section 2.3, but comparison of our translation with that of Casale and colleagues (2021) indicated no substantive differences.

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Table 1

Items of the Functionality Appreciation Scale in English and Italian (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 / *Apprezzo il mio corpo per quello che è capace di fare.*	.72	.64
(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 / *Sono grato/a per la salute del mio corpo, anche se non è sempre in salute come mi piacerebbe che fosse.*	.60	.53
(3) I appreciate that my body allows me to communicate and interact with others / *Apprezzo che il mio corpo mi permetta di comunicare e interagire con gli altri.*	.69	.73
(4) I acknowledge and appreciate when my body feels good and/or relaxed / *Riconosco e apprezzo quando il mio corpo sta bene e/o è rilassato*	.74	.75
(5) I am grateful that my body enables me to engage in activities that I enjoy or find important / *Sono grato/a che il mio corpo mi permetta di svolgere attività piacevoli o che ritengo importanti*	.76	.82
(6) I feel that my body does so much for me / *Sento che il mio corpo fa molto per me*	.81	.80
(7) I respect my body for the functions it performs / *Rispetto il mio corpo per le funzioni che esercita*	.83	.84

Table 2

Measurement Invariance Across Gender.

Model	SBχ^2	*df*	Robust CFI	Robust RMSEA	SRMR	Model Comparison	ΔSBχ^2	ΔRobust CFI	ΔRobust RMSEA	ΔSRMR	Δdf	*p*
Configural	81.91	28	.975	.079	.028							
Metric	87.60	34	.976	.070	.035	Configural vs metric	5.69	.001	.009	.007	6	.659
Scalar	93.77	40	.977	.063	.035	Metric vs scalar	6.17	.001	.007	< .001	6	.903

Note. SB = Satorra-Bentler; CFI = Comparative fit index; RMSEA = Steiger-Lind root mean square error of approximation; SRMR = Standardised root mean square residual.

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)	(11)
(1) Functionality appreciation	1	.72**	.56**	-.47**	-.29**	-.36**	-.35**	.54**	-.31**	-.16**	.03
(2) Body appreciation	.73**	1	.80**	-.67**	-.42**	-.51**	-.48**	.68**	-.46**	-.18**	.09
(3) Body esteem	.56**	.78**	1	-.78**	-.49**	-.64**	-.50**	.57**	-.38**	-.39**	.05
(4) Body dissatisfaction (EDI-3)	-.45**	-.62**	-.71**	1	.50**	.69**	-45**	-.38**	.30**	.43**	-.03
(5) Bulimia symptoms (EDI-3)	-.27**	-.34**	-.37**	.48**	1	.52**	.35**	-.35**	.39**	.32**	.09*
(6) Drive for thinness (EDI-3)	-.25**	-.38**	-.54**	.60**	.49**	1	.57**	-.30**	.32**	.24**	.06
(7) Body surveillance	-.33**	-.40**	-.48**	.34**	.22**	.43**	1	-33**	.30**	-.04	-.25**
(8) Self-esteem	.47**	.63**	.52**	-.36**	-.24**	-.25**	-.26**	1	-.63**	-.05	.18**
(9) General distress	-.42**	-.54**	-.46**	.34**	.36**	.30**	.35**	-.64**	1	.08	-.08
(10) Body mass index	-.17**	-.23**	-.31**	.45**	.38**	.34**	-.05	-.04	.03	1	.29**
(11) Age	.05	.10*	.08	-.05	-.11*	.01	-.11*	.17**	-.14**	.23**	1
Means	4.08	3.48	29.51	13.08	4.80	7.93	4.16	28.83	23.79	23.31	26.99

Note. EDI-3 = Eating Disorder Inventory-3. *$p < .05$, **$p < .001$.

Table 4

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

		Women (n = 500)					Men (n = 450)				
Step	Variable	B	SE	β	t	p	B	SE	β	t	p
1	Body appreciation	4.72	.39	.65	11.96	< .001	4.25	.43	.59	9.79	< .001
	Body esteem	.14	.04	.22	3.38	.001	.09	.05	.13	1.93	.05
	Body dissatisfaction (EDI-3)	.16	.04	.24	4.34	< .001	.10	.05	.13	2.20	.03
	Bulimia symptomatology (EDI-3)	-.14	.04	-.13	-3.39	.001	-.05	.06	-.04	-0.97	.33
	Drive for thinness (EDI-3)	.07	.04	.09	1.72	.09	-.02	.05	-.02	-0.43	.66
	Body surveillance	-.11	.24	-.02	-.44	.66	.11	.25	.02	0.44	.66
2	Body appreciation	4.19	.47	.58	8.98	< .001	4.04	.51	.56	7.85	< .001
	Body esteem	.14	.04	.22	3.47	.001	.09	.05	.13	1.94	.05
	Body dissatisfaction (EDI-3)	.16	.04	.24	4.35	< .001	.10	.05	.13	2.21	.03
	Bulimia symptomatology (EDI-3)	-.14	.04	-.13	-3.43	.001	-.05	.06	-.04	-0.92	.36
	Drive for thinness (EDI-3)	.07	.04	.08	1.72	.09	-.03	.05	-.02	-0.49	.63
	Body surveillance	-.09	.24	-.02	-0.41	.68	.12	.25	.02	0.49	.62

Functionality appreciation	.86	.41	.09	2.13	.03	.35	.46	.04	0.75	.45

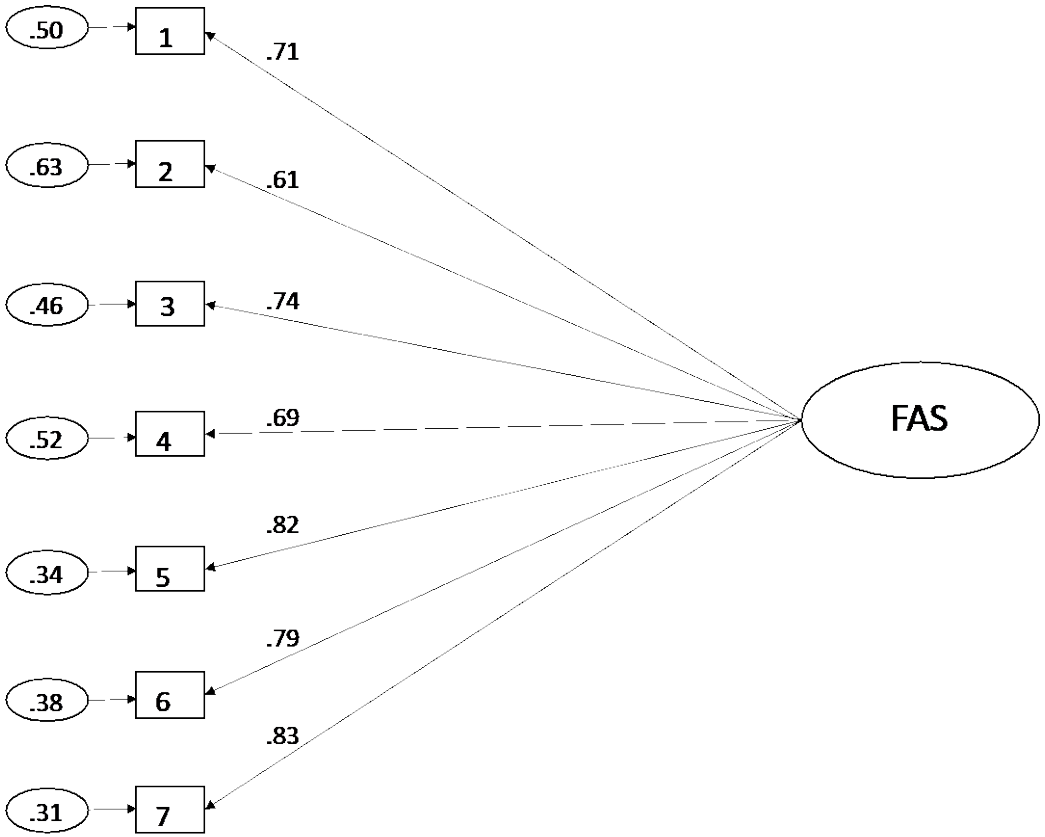

Figure 1

Path diagram and estimates for the 1-dimensional model of Functionality Appreciation Scale (FAS) scores. 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 $p < .001$).