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**Psychometric Properties of a Greek Translation of the Functionality Appreciation Scale  
(FAS) in Adults From the Republic of Cyprus**

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### Abstract

The Functionality Appreciation Scale 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*). In the present study, we examined the psychometric properties of a novel Greek translation of the FAS in Cypriot adults. A total of 448 women and 345 men from the Republic of Cyprus completed the FAS, as well as validated measures of body appreciation, appearance evaluation, and symptoms of disordered eating, and self-esteem. Exploratory and confirmatory factor analyses supported a unidimensional model of FAS scores, with all 7 items retained. Scores achieved scalar invariance across gender, with the gender difference in FAS scores not reaching significance. FAS scores were also found to have adequate composite reliability and convergent (significant associations with body appreciation, appearance evaluation, and symptoms of disordered eating) and concurrent validity (significant associations with self-esteem). Finally, functionality appreciation predicted self-esteem once the effects of all other variables had been accounted for, supporting incremental validity. Overall, these results suggest that the Greek FAS is a psychometrically valid tool for the assessment of functionality appreciation in adults from Cyprus.

**Keywords:** Functionality appreciation; Positive body image; Psychometrics; Test adaptation; Cyprus; Greek

## 1. Introduction

*Body functionality*, as defined by Alleva and Tylka (2021, p. 149), is an aspect of body image that refers to “everything that the body can do or is capable of doing” and includes one’s physical capabilities, internal processes and sensations, creative activities, and communication with others (Alleva & Martijn, 2019). Having languished in a scholarly blind-spot, research on aspects of body functionality has grown substantively over the past decade (for a review, see Alleva & Tylka, 2021). Within this body of work, various instruments have been used to operationalise the construct of body functionality, though it is notable that most are concerned with evaluations (i.e., satisfaction) of body functionality. In contrast, and in tandem with the growth of research on positive body image more generally (see Daniels et al., 2018; Tylka & Piran, 2019), scholars have noted that it is sometimes more useful to focus on one’s appreciation for what the body can do rather than whether one is satisfied with what the body can do (Alleva et al., 2019).

More specifically, *functionality appreciation* has been defined as “appreciating, respecting, and honouring the body for what it is capable of doing” (Alleva et al., 2017, p. 29). This conceptualisation shifts attention away from simple awareness and evaluation of body functionality (e.g., being aware and satisfied that one’s body is able to walk) onto gratitude for the body-as-process (e.g., being grateful that one’s body is able to walk). In this view, functionality appreciation is not contingent on one’s ability or health (i.e., individuals can appreciate their bodily functions irrespective of their ability or health; Bailey et al., 2015; Rice et al., 2021). Moreover, functionality appreciation is now recognised as an important facet of the multidimensional positive body image construct (Swami et al., 2020) and uniquely predicts a range of positive outcomes, including adaptive eating styles and gratitude (Alleva et al., 2017; Linardon, 2022). In light of such findings, scholars are increasingly

integrating aspects of functionality appreciation into body image interventions (e.g., Alleva et al., 2018, 2021; Davies et al., 2022; Linardon et al., 2022).

The construct of functionality appreciation is most commonly measured using the Functionality Appreciation Scale (FAS; Alleva et al., 2017), developed with the intention of being non-specific regarding body functions, in a way that captures individuality and the unique capabilities of each individual. To achieve this, the items were constructed to reflect body functionality holistically (i.e., without referring to specific functions) and inclusively (i.e., capturing the overall appreciation of the body's ability to function the best it can). To develop the FAS, Alleva and colleagues (2017) first generated a pool of 26 items, of which 10 were eliminated following exploratory factor analysis (EFA) with data from an online sample of adults from the United States. The retained pool of 16 items was further purified (e.g., by eliminating items that overlapped in terms of content), leaving a final pool of 7 items. A second EFA and a confirmatory factor analysis (CFA) with adults from the United States both supported a unidimensional model of FAS scores and the invariance of scores across gender. Additionally, Alleva and colleagues (2017) also reported that FAS scores showed adequate test-retest reliability up to three weeks, composite reliability, and construct validity (convergent, criterion-related, divergent, and predictive validity). More recent work has supported the unidimensionality of FAS scores in samples of sexual minority adults from the United States (Soulliard & Vander Wal, 2021, 2022) and an international sample of English-speaking adults (Linardon et al., 2020).

Additionally, the psychometric properties of the FAS have also been investigated in a diverse range of national contexts. To date, the 7-item unidimensional model of FAS scores has been supported in samples of adults from Brazil (Faria et al., 2020), Italy (Cerea et al., 2021), Japan (Namatame et al., 2022), Lebanon (Swami et al., 2022), Malaysia (Swami et al., 2019), and Romania (Swami et al., 2021a), a sample of different age groups (adolescents to

older adults) in China (He et al., 2022; see also Wang et al., 2022), as well as adolescents from the United Kingdom (Todd et al., 2019) and Iran (Sahlan et al., 2022). Most translational studies have also supported the invariance of FAS scores gender (see also Marmara & Zarate, 2022), with gender differences in functionality appreciation generally non-significant or negligible. Additionally, these studies have also supported the concurrent, convergent, and divergent validity of FAS scores (see also Yurtsever et al., 2021), although the nomological overlap between functionality appreciation and body appreciation is sometimes high (Cerea et al., 2021). Finally, one study has demonstrated that the FAS is partially invariant across adults two national contexts (i.e., Malaysia and the United Kingdom; Todd & Swami, 2020).

### **1.1. The Greek Cypriot Context**

As a contribution to ongoing cross-national work, the present study examined the psychometric properties of a novel Greek translation of the FAS in a sample of adults from Cyprus (officially the Republic of Cyprus), an island country in the Mediterranean Sea<sup>1</sup>. Beyond ensuring that psychometrically valid tools are available for the measurement of positive body image in a population that has historically been neglected in body image research (Argyrides, 2020; Karekla et al., 2019), there are a number of additional reasons that make Cyprus a useful national context in which to further our understanding of the FAS. First, there is a very long history of unique understandings of, and relationships with, the physical self in Cyprus (Mina, 2008). In prehistoric Cyprus, for example, the human body was often manipulated and modified (e.g., artificial head-shaping) with the goal of ensuring conformity to socio-culturally negotiated ideals of the “proper” form and physical capabilities (Lorentz, 2003). Even in modern history, Greek Cypriots tend to draw a distinction between the “enslaved”, corrupted body and the pure *psychí* or soul (Bryant, 2002). While the latter is viewed as timeless, unchanging, and always consistent with itself, perceptions of the physical

self are seen as more malleable and in flux, but also open to investment (see Damianidou & Georgiadou, 2021).

Such views of the physical self may shape understandings and experiences of functionality appreciation. For instance, Argyrides and colleagues (2015, 2019) have suggested that, following the partition of Cyprus in 1974, Greek Cypriot culture placed a heavy emphasis on social and personal image. Thus, in constructing the Greek Cypriot nation as essentially victimised and in constant danger from the north, post-war Greek Cypriot pedagogy has sought to mobilise broader masculine discourse of physical and militaristic preparedness (Efthymiou, 2011). Indeed, a “micro-culture” of masculine discourse (Nagel, 1998, p. 252) pervades Greek Cypriot culture and everyday life, demanding a masculinised self-understanding that prioritises physical prowess, bravery, and militaristic excellence (Christou, 2006). In this conceptualisation of the republic as victimised and under constant threat, physical abilities linked to militarism are located as both an idealised form of being for individuals, as well as a shield against future national victimhood. At the same time, however, and particularly since Cyprus entry into the European Union in 2004, there has been increasing tension between the cultural prioritisation of physical prowess and increasingly sedentary lifestyles.

For instance, in tandem with increasing rates of physical inactivity in Cyprus, particularly in younger generations (Lazarou et al., 2010), scholars and practitioners have raised concerns that – in part due to deteriorating pedagogy around physical education (Christodolou, 2010; Constantinides et al., 2013) – Cypriot children and adults do not possess fundamental skills in movement and adequate understanding of the importance of physical activity (Christodoulides et al., 2022). Indeed, there is evidence that participation in sports and physical activity decreased in Cyprus between 2013 and 2017 (European Union, 2018), a trend that may have been exacerbated by the COVID-19 pandemic (Kolokotroni et al., 2021).

In response, scholars have called for wide-ranging interventions to promote what has been termed “physical literacy” in Cyprus (Christodoulides et al., 2022; Gerovasili et al., 2015), which would be supported through both a better theoretical understanding of functionality appreciation in this regional context, as well as the availability of suitable, psychometrically validated instruments.

## **1.2. The Present Study**

In view of the discussion above, the overall aim of the present study was to assess the psychometric properties of a novel Greek translation of the FAS in a sample of adults from Cyprus. Our primary objective was to examine the factorial validity of scores on the Greek FAS. To do so, we followed current best-practice recommendations in adopting an EFA-to-CFA strategy (Swami & Barron, 2019; Swami et al., 2021b). This strategy allowed to first arrive via EFA at the most suitable model of FAS scores for our sample without any modelling limitations and, second, to cross-validate this model using CFA (as well as the original unidimensional model, if discrepant) in a separate subsample. Given that the extant evidence robustly posits a unidimensional model of FAS scores across national contexts (e.g., Namatame et al., 2022; Swami et al., 2022) and social identity groups within nations (Soulliard & Vander Wal, 2021, 2022), we expected to be able to replicate this model of FAS scores with all 7 items retained in the Cypriot context.

Additionally, we also sought to examine whether the final model of FAS scores would be invariant across gender. Given that most previous studies have indicated that the FAS evidences scalar invariance across gender (e.g., Marmara & Zarate, 2022), we expected to be able to replicate this finding here. Following from this, and based on the assumption of scalar invariance – a minimum threshold for comparison of mean scores; Chen, 2007; Putnick & Bornstein, 2016) – we also expected to assess gender differences in FAS scores. Here, we hypothesised that there would not be any significant gender difference in

functionality appreciation, which would be consistent with previous work (e.g., Alleva et al., 2017; He et al., 2022; Namatame et al., 2022; Swami et al., 2021a). Finally, to assess the broader indices of construct validity, we explored associations with constructs that have been previously been shown to be significantly associated with functionality appreciation (e.g., Alleva et al., 2017; Swami et al., 2022).

More specifically, to assess convergent validity, we examined associations between functionality appreciation and a theoretically distinct facet of positive body image (i.e., body appreciation) and appearance evaluation. Positive and small-to-moderate associations between these constructs and functionality appreciation would provide evidence of convergent validity. Additionally, we also examined associations with symptoms of disordered eating (i.e., eating restriction and eating concern), with the expectation of negative and small-to-moderate correlations. To estimate concurrent validity, we examined associations between functionality appreciation and self-esteem. Positive and small-to-moderate associations would be taken as evidence of concurrent validity. Finally, incremental validity would be supported to the extent that FAS scores predict self-esteem over-and-above body appreciation, appearance evaluation, and symptoms of disordered eating.

## **2. Method**

### **2.1. Participants and Procedures**

Data for the present study were taken from a larger project (Anastasiades et al., 2022, Study 2). The sample consisted of 448 women and 345 men who ranged in age from 18 to 70 years ( $M = 33.69$ ,  $SD = 11.22$ ) and in self-reported body mass index from 14.53 to 47.40  $\text{kg/m}^2$  ( $M = 24.99$ ,  $SD = 5.11$ ). In terms of ethnicity, the majority of the sample (74.1%) of the sample identified as Greek and 25.0% identified as Greek Cypriot (missing = 0.9%).

### **2.2. Materials**



**2.2.1. Functionality appreciation.** Participants completed a novel Greek translation of the 7-item FAS (Allewaert et al., 2017), with items rated on a 5-point scale ranging from 1 (*strongly disagree*; Greek: *συμφωνώ απόλυτα*) to 5 (*strongly agree*; Greek: *διαφωνώ απόλυτα*). The FAS was translated into Greek following the 5-step procedure recommended by Beaton et al. (2000). Specifically, two translators – one informed, and one uninformed – first independently forward-translated the FAS instructions, items, and response options from English to Greek. Next, the two translations were examined by a third, independent translator who resolved any discrepancies and produce a synthesised translation. Third, the synthesised translation was then back-translated by two translators naïve to the FAS back into English. Fourth, the forward- and back- translations were compared by an expert committee comprising all the translators, as well as the first and third authors of the present study, who resolved any minor inconsistencies between versions. In the fifth and final stage, the translated FAS was pre-tested in a sample of 18 individuals (women = 55.56%) who broadly matched the target sample. Participants in the pre-test study provided qualitative feedback regarding their level of understanding, as well as suggestions for improvements to enhance comprehension (based on open-ended questions). This feedback was returned to the committee, who agreed that no further revisions were necessary. The FAS items in English and Greek are reported in Table 1.

**2.2.2. Body appreciation.** All participants completed the Body Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015; Greek translation: Argyrides, 2020). 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. 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 Greek version of the BAS-2 have been shown to reduce to a unidimensional factor and to have adequate composite reliability and construct

validity (Argyrides, 2020). In the present study, McDonald's  $\omega$  for scores on this scale was .95 (95% CI = .94, .95).

**2.2.3. Appearance evaluation.** Participants also completed the Appearance Evaluation (AE; 7 items) subscale of the Multidimensional Body-Self Relations Questionnaire-Appearance Subscales (MBSRQ-AS; Cash, 2000; Greek translation: Argyrides & Kkeli, 2013). The AE subscale of the MBSRQ-AS measures of one's feelings of physical attractiveness and satisfaction with one's looks. All items on this measure were rated on a 5-point scale ranging from 1 (*definitely disagree*) to 5 (*definitely agree*), with higher mean scores reflecting higher satisfaction with one's appearance. Scores on the Greek version of the MBSRQ-AS have been shown to reduce to a 2-factor structure, with the AS subscale nomologically distinct, and to have adequate composite reliability and structural validity (Argyrides & Kkeli, 2013). In the present study, McDonald's  $\omega$  for scores on this subscale was .92 (95% CI = .90, .92).

**2.2.4. Symptoms of disordered eating.** Participants were asked to complete the Restriction (5 items) and Eating Concern (5 items) subscales of the Eating Disorders Examination Questionnaire (EDE-Q; Fairburn & Harrison, 2003; Greek translation: Giovazolias et al., 2013), which measure assessing eating attitudes and behaviours over the previous 28 days. Items were rated on a 7-point scale ranging from 0 (*no days*) to 6 (*every day*), and 0 (*not at all*) to 6 (*markedly*) and subscale scores were computed as the mean of all items, with higher scores reflecting greater disordered eating symptomatology. Adequate internal consistency and construct validity have been reported for scores on the Greek version of the EDE-Q (Giovazolias et al., 2013). In the present study, McDonald's  $\omega$  was .83 (95% CI = .81, .85) for Eating Restriction and .83 (95% CI = .79, .83) for Eating Concern.

**2.2.5. Self-esteem.** To measure self-esteem, we used the 10-item Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965; Greek translation: Galanou et al., 2014), a widely

used measure of global self-esteem, with items rated on a 4-point scale (1 = *strongly disagree*, 4 = *strongly agree*). Higher mean scores reflect greater self-esteem. Scores on the Greek version of the RSES have been shown to have adequate internal consistency and construct validity (Galanou et al., 2014). In the present study, McDonald's  $\omega$  for RSES scores was .91 (95% CI = .90, .92).

**2.2.6. Demographics.** All participants completed a demographics questionnaire which included questions on age, gender, and ethnicity. Participants were also required to provide self-reported height and weight which were used to calculate BMI ( $\text{kg/m}^2$ ) for sample descriptive purposes.

### **2.3. Procedures**

The study was carried out in accordance with the principles of the Declaration of Helsinki and Ethics approval was obtained from the relevant departmental ethics committee (approval code: EEBK EII 2021.01.69). All data were collected between January and April 2022. The sample was recruited using a snowball sampling method via advertisements inviting individuals to take part in a study about “body image and eating behaviours”. Inclusion criteria included being a Cypriot resident and citizen, being fluent in the Greek language (the national language of Cyprus), and being over 18 years of age. Due to the comparability of Greek and Greek Cypriot social and cultural norms and use of the Greek language (Hitchens 1989; Pantelis, 1990; Sciriha, 1996), individuals of both Greek and Greek Cypriot ethnicity were considered eligible for the study. Those who met the inclusion criteria were required to provide their informed consent after being presented with additional information regarding the study; including that participation was voluntary, anonymous and without remuneration, as well as their right to withdraw their data at any time. Participants received written debriefing information upon completion of the survey.

### **2.4. Analytic Strategy**

**2.4.1. Data treatment.** There were no missing responses in the dataset. To examine the factor structure of the FAS, we used an EFA-to-CFA strategy (Swami & Barron, 2019). To ensure adequate sample sizes for both EFA and CFA, we split the total sample using a computer-generated random seed, resulting in one split-half for EFA (women  $n = 215$ , men  $n = 182$ ) and a second split-half for CFA (women  $n = 233$ , men  $n = 163$ ). There were no significant differences between the two subsamples in terms of mean age,  $t(791) = 0.91$ ,  $p = .365$ ,  $d = 0.06$ , and BMI,  $t(791) = 0.35$ ,  $p = .727$ ,  $d = .03$ , as well as the distribution of women and men,  $\chi^2(1) = 1.77$ ,  $p = .184$ .

**2.4.2. Exploratory factor analysis.** To explore the factor structure of FAS scores, we computed a principal-axis EFA with the first split-half subsample using the *psych* package (Revelle, 2019) in *R* (R Development Core Team, 2021). Our sample size 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  $\geq .80$ ) 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., 2021). 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 ( $\chi^2/\text{df}$ ; 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; Swami & Barron, 2019). Corrections to fit indices were not required as EFA is robust to violations of univariate and multivariate normality (Curran et al., 1996). However, because EFA cannot account for item covariance and fit indices are generally sensitive to correlated residuals and non-specific error, we followed the recommendation of Swami and colleagues (2021b) to also examine the results of parallel analysis (Hayton et al., 2004). Parallel analysis works by creating a random dataset with the same number of cases and variables as the actual dataset. Factors in the actual data are only retained if their eigenvalues are greater than the eigenvalues from the random data (Hayton et al., 2004).

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 (Tabachnick & Fidell, 2019). 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).

**2.4.3. 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, 2021). Previous Monte Carlo simulations with different seed values and based on factor loadings reported by Alleva and colleagues (2017) have indicated that a sample size of about 180 would be sufficient for this analysis (Cerea et al., 2021), which was surpassed in this subsample. Our intention was to test the parent model of FAS scores (i.e., a unidimensional 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 = 823.18,  $p < .001$ , Mardia's kurtosis = 31.26,  $p < .001$ ), so parameter estimates were obtained using the robust maximum likelihood method and fit indices (see Section 2.3.2) were interpreted with the Satorra-Bentler correction applied (Satorra & Bentler, 2001). Additionally, evidence of convergent validity was assessed in this subsample 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).

**2.4.4. 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.

**2.4.5. Further analyses.** Composite reliability in both subsamples was assessed using McDonald's (1970)  $\omega$  and its associated 95% CI, with values greater than .70 reflecting adequate composite reliability (Dunn et al., 2014). McDonald's  $\omega$  was selected as a measure of composite reliability because of known problems with the use of Cronbach's  $\alpha$  (e.g., McNeish, 2018). Hierarchical  $\omega$  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). To assess construct validity, we examined bivariate correlations between FAS scores and scores on the additional measures included in the survey using the total sample. 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 appreciation, symptoms of disordered eating, and appearance evaluation, and would be supported if we found a statistically significant increment in Adj.  $R^2$  in the regression.

### 3. Results

#### 3.1. Exploratory Factor Analysis

**3.1.1. Factor analysis with women.** For women, Bartlett's test of sphericity,  $\chi^2(21) = 804.24$ ,  $p < .001$ , 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  $\lambda > 1$  ( $\lambda_1 = 4.41$ ,  $\lambda_2 = 0.65$ ), and parallel analysis confirmed that only one factor from the actual data had  $\lambda$  greater than the criterion  $\lambda$  generated from the simulation ( $\lambda_1 = 4.41 > 1.26$ ). As such, we retained one factor, which explained 57.4% of the common variance. The fit indices for this model were adequate:  $\chi^2(14) = 38.55$ ,  $p < .001$ ,  $\chi^2_{\text{normed}} = 2.75$ , CFI = .969, TLI = .953, RMSEA = .080 (90% CI = .057, .125), SRMR = .04. All 7 items loaded strongly onto the extracted factor (item-factor loadings  $\geq .66$ ; see Table 1).

**3.1.2. Factor analysis with men.** For men, Bartlett's test of sphericity,  $\chi^2(21) = 405.01$ ,  $p < .001$ , and KMO (.87) again indicated that the FAS items had adequate common variance for factor analysis. The results of the EFA revealed one factor with  $\lambda > 1.0$  ( $\lambda_1 = 3.57$ ,  $\lambda_2 = 0.84$ ), and parallel analysis confirmed that only one factor from the actual data had  $\lambda$  greater than the criterion  $\lambda$  generated from the simulation ( $\lambda_1 = 3.57 > 1.30$ ), which explained 43.2% of the common variance. The fit indices for this model were adequate:  $\chi^2(14) = 25.87$ ,  $p = .027$ ,  $\chi^2_{\text{normed}} = 1.85$ , CFI = .969, TLI = .953, RMSEA = .068 (90% CI = .023, .109), SRMR = .05. All 7 items loaded strongly onto the extracted factor (item-factor loadings  $\geq .58$ ; see Table 1).

**3.1.3. Factor structure congruence and composite reliability.** 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  $\omega$  was adequate in women (.90, 95% CI = .87, .93), men (.83, 95% CI = .78, .88), and the total subsample (.88, 95% CI = .85, .90).

### 3.2. Confirmatory Factor Analysis and Composite Reliability

CFA indicated that fit of the unidimensional model of FAS scores was acceptable:  $SB\chi^2(14) = 26.57$ ,  $p = .022$ ,  $SB\chi^2_{\text{normed}} = 1.90$ , robust RMSEA = .059 (90% CI = .022, .092), SRMR = .032, robust CFI = .983, robust TLI = .975. The standardised estimates of factor loadings were all adequate (see Table 1). The convergent validity for this model was adequate, as AVE = .51. Composite reliability of scores was adequate in women (.88, 95% CI = .85, .90), men (.87, 95% CI = .83, .90), and the total sample (.88, 95% CI = .86, .90).

### 3.3. Gender Invariance

Next, we tested for gender invariance based on the unidimensional 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 using the second split-half subsample. The results showed that there was no significant difference in functionality appreciation between women ( $M = 4.24$ ,  $SD = 0.61$ ) and men ( $M = 4.19$ ,  $SD = 0.62$ ) in this split-half subsample,  $t(394) = 0.79$ ,  $p = .433$ ,  $d = 0.08$ .

### 3.4. Construct 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, functionality appreciation was significantly and moderately associated with body appreciation and appearance evaluation, respectively, in both women and men. Additionally, functionality appreciation was significantly and weakly-to-moderately associated with symptoms of disordered eating in women. In men, functionality appreciation was significantly associated with scores on only one of the two EDEQ subscales. These findings broadly uphold the convergent validity of the Greek FAS. In terms of concurrent validity, we found that functionality appreciation was significantly and weakly-to-moderately associated with self-esteem in women and men. Functionality appreciation was also significantly associated with older age in both women and men.

### 3.5. 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, symptoms of disordered eating, and appearance evaluation entered as predictors variables in a first step and functionality appreciation added in a second step. For women, the first step of this regression was significant,  $F(4, 443) = 138.73$ ,  $p < .001$ , Adj.  $R^2 = .552$ , as was the second step,  $F(5, 442) = 112.71$ ,  $p < .001$ , Adj.  $R^2 = .555$  (see Table 4 for full regression coefficients). The addition of functionality appreciation in the second step accounted for a

significant incremental change in Adj.  $R^2$ ,  $F(1, 442) = 4.39$ ,  $p = .037$ ,  $\Delta R^2 = .003$ . In men, first step of the regression was significant,  $F(4, 344) = 53.14$ ,  $p < .001$ , Adj.  $R^2 = .377$ . The second step of the regression was also significant,  $F(5, 339) = 43.28$ ,  $p < .001$ , Adj.  $R^2 = .381$  (see Table 4). The addition of functionality appreciation in the second step accounted for a significant incremental change in Adj.  $R^2$ ,  $F(1, 339) = 2.74$ ,  $p = .041$ ,  $\Delta R^2 = .004$ .

#### 4. Discussion

The FAS has been previously shown to be a valid and reliable instrument for the measurement of functionality appreciation in a wide range of national contexts (Alleva et al., 2017; Cerea et al., 2021; Faria et al., 2020; He et al., 2022; Namatame et al., 2022; Swami et al., 2019, 2021a, 2022), age groups (Sahlan et al., 2022; Todd et al., 2019), and social identity groups (Soulliard & Vander Wal, 2021, 2022). As a contribution to this growing literature, the present study examined the psychometric properties of a novel Greek translation of the FAS in a sample of adults from Cyprus. Overall, our results corroborated previous findings suggesting that the FAS evidences strong psychometric properties. Specifically, our findings supported a unidimensional model of FAS scores using both EFA and CFA, and indicated that this model achieved scalar invariance across gender. FAS scores consistently evidenced adequate composite reliability, and also presented adequate convergent, concurrent, and incremental validity.

In terms of the factor structure of Greek FAS scores, our EFA results indicated supported the extraction of a unidimensional model with all seven items in both women and men. Likewise, our CFA results also provided supported for a unidimensional model of FAS scores, with standardised estimates of factor loadings showing that all seven items loaded strongly onto the hypothesised FAS factor. These findings are consistent with all previous psychometric studies of the FAS across national groups (Alleva et al., 2017; Cerea et al., 2021; Faria et al., 2020; He et al., 2022; Namatame et al., 2022; Swami et al., 2019, 2021a,

2022), which in turn will be important for cross-national comparisons of functionality appreciation. However, beyond further examinations of the fit of the unidimensional model in new national contexts, an important next step for researchers will be to investigate the extent to which the FAS is invariant across national groups (cf. Todd & Swami, 2020). Given that scalar or partial scalar invariance is an important precondition of between-group comparisons (Chen, 2007), demonstrating that this is the case *vis-à-vis* the FAS would greatly strengthen not only opportunities for cross-national work but also scholarly understanding of the construct of functionality appreciation across nations.

Additionally, our results also indicated that the unidimensional model of FAS scores achieved full scalar invariance across gender, suggesting that the instrument measures the same latent construct of functionality appreciation in women and men. On this basis, we examined gender differences in FAS scores and found no significant differences in FAS scores between women and men ( $d = 0.08$ ). Broadly speaking, these results are consistent with previous work indicating that the FAS achieves scalar invariance across gender in a range of national groups and that gender differences tend to be null or negligible (Alleva et al., 2017; Cerea et al., 2021; He et al., 2022; Marmara & Zarate, 2022; Namatame et al., 2022; Swami et al., 2021a; but see Linardon et al., 2020, and Swami et al., 2022, who reported more marked gender differences in an international, English-speaking sample and in Lebanon, respectively). These results are particularly notable in the Cypriot context, where existing test adaptation studies have tended to rely solely on female participants or to neglect examinations of gender invariance (e.g., Argyrides, 2020; Karekla et al., 2019). More to the point, our results suggest that the meaning of functionality appreciation may be similar across women and men in Cyprus, and that the national context in this case may not perceptibly shape the manifestation of this facet of positive body image.

The results of the present study also broadly indicated that the Greek FAS evidences construct validity. In terms of convergent validity, we found that functionality appreciation was significantly, positively, and moderately associated with body appreciation, suggesting that these facets of positive body image are nomologically distinct. Additionally, we also found that functionality appreciation was positively and moderately associated with appearance evaluation, again supporting convergent validity. Associations between functionality appreciation and symptoms of disordered eating were also consistent and as hypothesised in women, but more equivocal in men. Specifically, in men functionality appreciation was only significantly associated with scores on the EDE-Q subscale of Eating Concern, but not Restriction, although this may simply reflect the fact that restrictive eating patterns are less common in men than in women (Lavender et al., 2010).

Additionally, the present study also indicated that the FAS evidences adequate concurrent validity, insofar as FAS scores were significant, positively, and weakly-to-moderately associated with self-esteem in women and men. Importantly, we were also able to demonstrate that the Greek FAS evidenced incremental validity, such that FAS scores significantly predicted self-esteem once the effects of body appreciation, appearance evaluation, and symptoms of disordered eating had been accounted for. Qualifying this finding somewhat, however, was the fact that FAS scores – although a significant, incremental predictor in the second step of our regressions – only accounted for a very small portion of the variance in self-esteem (< 1% in women and men). In contrast, body appreciation was consistently the strongest predictor of self-esteem in the present study, which is broadly consistent with the suggestion that body appreciation is a more central or core facet of positive body image (Swami et al., 2020) and thus more likely to account for substantial portions of variance in outcome variables (see also Linardon et al., 2022).

Although the present results broadly support the psychometric properties of the Greek FAS, a number of limitations of the present study should be considered. First, for both political and practical reasons, recruitment in the present study was limited to the Republic of Cyprus (i.e., excluding respondents from Northern Cyprus, under Turkish occupation). Additionally, although we validated a Greek version of the FAS, it remains important to assess the psychometric properties of this instrument in other Greek-speaking populations (e.g., in Greece). Indeed, given that some work has suggested that adults from Greece may evidence greater appearance satisfaction and lower investment in appearance than adults from Cyprus (Argyrides et al., 2019), it may be particularly useful to assess the extent to which Greek FAS scores are invariant across these national contexts. Relatedly, we did not consider other potential participant-related factors that may impact functionality appreciation in the Cypriot context, such as urbanicity and socioeconomic status (see Argyrides & Sivitanides, 2017). As such, it would be useful in future research to recruit more representative samples of Cypriot adults, not to mention considering the extent to which FAS scores are also invariant in younger Cypriot age groups.

A further limitation of the present study was that we did not assess test-retest reliability. Although other studies have reported that FAS scores remain stable across a period of several weeks (e.g., Alleva et al., 2017; Cerea et al., 2021), this omission could be rectified in future work. Likewise, future work would also do well to assess associations with other hypothesised correlates of functionality appreciation, such as self-objectification, gratitude, and adaptive eating styles, although doing so will require validated measures in Greek. A final issue worth considering is the extent to which the FAS items are too easy for community adults. For example, the results of one Rasch analysis – although supportive of the unidimensionality of FAS scores in adults from the United States – suggested that the FAS may require more difficult items to improve the targeting of the scale, at least in non-

clinical adults from the community (Feng et al., 2022). This is certainly an issue worthy of further investigation across national contexts.

These limitations notwithstanding, our results present evidence that the Greek FAS is psychometrically valid in Cypriot adults, which extends scholarly understanding of the functionality appreciation construct to a hitherto neglected national context. It is our hope that the availability of the Greek FAS will facilitate future scholarly work on positive body image in this national and regional context. Indeed, this may be particularly important given that scholars have noted that the lack of validated instruments for measuring functionality appreciation in the Greek language (Argyrides 2020). Additionally, the Greek FAS should also provide a useful instrument for use in intervention designed to promote “physical literacy” in Cyprus (Christodoulides et al., 2022; Gerovasili et al., 2015). Specifically, inclusion of the FAS in such interventions will likely help public health practitioners better understand the impact of such interventions in promoting healthier body image outcomes and possibly also downstream benefits in terms of psychological and physical well-being.

### Footnotes

<sup>1</sup>After almost eight decades under British rule, the majority Greek Cypriot population of Cyprus began pursuing a policy of *énosis* (union with Greece) in the 1950s, while the minority Turkish Cypriot population advocated for a policy of *taksim* (the partition of Cyprus and the creation of a Turkish polity in the north). When the island ultimately achieved independence rather than *énosis* in 1960, some of those disappointed by the failure of the *énosis* movement revived a campaign that resulted, in 1974, in a *coup d'état* against the elected president. This action precipitated the Turkish invasion of Cyprus, which led to the present-day partition of the island into the Republic of Cyprus (which has *de jure* sovereignty over the entire island but effectively controls about 60% of the island in the south and west)

and the Turkish Republic of Northern Cyprus (considered an illegal occupation by the international community; for extended histories, see Hitches, 1989; Pantelis, 1990).

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Table 1

*Items of the Functionality Appreciation Scale in English and Greek and Factor Loadings Derived from the Exploratory Factor Analyses (EFA) with Women and Men in the First Split-Half Subsample, and Standardised Estimates of Factor Loadings from the Confirmatory Factor Analysis (CFA) in the Second Split-Half Subsample.*

Item	EFA		CFA
	Women	Men	Total
(1) I appreciate my body for what it is capable of doing / Εκτιμώ το σώμα μου για αυτά που είναι ικανό να κάνει.	.72	.65	.71
(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 / Είμαι ευγνώμων για την υγεία του σώματός μου, ακόμα κι αν δεν είναι πάντα τόσο υγιές όσο θα ήθελα να είναι.	.71	.61	.61
(3) I appreciate that my body allows me to communicate and interact with others / Εκτιμώ το γεγονός ότι το σώμα μου, μου επιτρέπει να επικοινωνώ και να αλληλοεπιδράω με άλλους.	.81	.58	.71
(4) I acknowledge and appreciate when my body feels good and/or relaxed / Αναγνωρίζω και εκτιμώ όταν το σώμα μου αισθάνεται καλά ή/και χαλαρό.	.66	.60	.67
(5) I am grateful that my body enables me to engage in activities that I enjoy or find important / Είμαι ευγνώμων που το σώμα μου, μου επιτρέπει να συμμετέχω σε δραστηριότητες που απολαμβάνω ή θεωρώ σημαντικές.	.76	.75	.70
(6) I feel that my body does so much for me / Νιώθω ότι το σώμα μου κάνει τόσα πολλά για μένα.	.80	.68	.80

(7) I respect my body for the functions it performs / Σέβομαι το σώμα μου για τις λειτουργίες που εκτελεί.	.80	.71	.78
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Table 2

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

Model	SB $\chi^2$	<i>df</i>	Robust CFI	Robust RMSEA	SRMR	Model Comparison	$\Delta$ SB $\chi^2$	$\Delta$ Robust CFI	$\Delta$ Robust RMSEA	$\Delta$ SRMR	$\Delta$ <i>df</i>	<i>p</i>
Configural	69.60	28	.972	.077	.033							
Metric	81.94	34	.969	.073	.046	Configural vs metric	12.34	.003	.004	.013	6	.069
Scalar	92.07	40	.969	.068	.048	Metric vs scalar	10.13	<.001	.005	.002	6	.229

*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, and Age in Women (Top Diagonal) and Men (Bottom Diagonal).*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Functionality appreciation		.70**	.61**	-.18**	-.44**	.57**	.11*
(2) Body appreciation	.56**		.82**	-.33**	-.62**	.73**	.17**
(3) Appearance evaluation	.42**	.74**		-.27**	-.54**	.61**	.03
(4) EDEQ – Restriction	-.01	-.13*	-.12*		.53**	-.15*	.08
(5) EDEQ – Eating Concern	-.12*	-.36**	-.34**	.45**		-.49**	-.11*
(6) Self-esteem	.40**	.59**	.52**	.06	-.23*		.31**
(7) Age	.07	.11*	.02	.14*	.06	.23**	

*Note.* EDEQ = Eating Disorders Examination Questionnaire. \* $p < .05$ , \*\* $p < .001$ .

Table 4

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

		Women ( <i>n</i> = 448)					Men ( <i>n</i> = 345)				
Step	Variable	B	SE	$\beta$	<i>t</i>	<i>p</i>	B	SE	$\beta$	<i>t</i>	<i>p</i>
1	Body appreciation	.49	.04	.68	11.34	< .001	.33	.05	.45	7.09	< .001
	Appearance evaluation	.02	.04	.02	0.40	.692	.12	.04	.18	2.77	.006
	EDEQ - Restriction	-.06	.01	-.16	-4.14	< .001	-.06	.02	-.17	-3.66	< .001
	EDEQ – Eating Concern	-.06	.02	-.14	-3.16	.002	-.05	.02	-.08	-.165	.100
2	Body appreciation	.45	.05	.62	9.53	< .001	.29	.05	.40	5.74	< .001
	Appearance evaluation	.01	.04	.01	0.22	.824	.12	.04	.17	2.74	.006
	EDEQ - Restriction	-.06	.01	-.15	-3.96	< .001	-.06	.02	-.17	-3.59	< .001
	EDEQ – Eating Concern	-.06	.02	-.14	-3.05	.002	-.05	.03	-.09	-1.77	.077
	Functionality appreciation	.09	.04	.09	2.09	.037	.08	.05	.09	1.755	.041