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Research Article

Latent structure and measurement invariance by gender of the Embodied Image Scale

Marija Volarov [1], Bojan Janičić [1], Stanislava Popov [2] ✉ and Vesna Barzut [3]

[1] *Department of Psychology, Faculty of Philosophy, University of Novi Sad, Serbia*
[2] *Department of Psychology, Faculty of Sport and Psychology, Educons University, Serbia*
[3] *Faculty of Health, Legal and Business Studies, Singidunum University, Serbia*

ABSTRACT

Body image is a multidimensional construct that includes both aesthetic (how our body looks) and functional components (what our body can do physically). Our study aimed to investigate latent structure and measurement invariance (MI) by gender of the Serbian translation of Embodied Image Scale using a large sample of adults from the general population (N = 1035; M = 26.33, SD = 9.94; 66.7% females). The Embodied Image Scale (EIS) incorporates aesthetic and functional body image. According to the results of the confirmatory factor analysis, the following five factors described the latent structure of the EIS the best: functional investment (FI), functional values (FV), functional satisfaction (FS), aesthetic satisfaction (AS), and aesthetic values and investment (AVI). The results of the MI suggested that the EIS achieved the strict (residual) level of invariance. In addition, the convergent validity of the EIS was tested by correlating the EIS scores with positive and negative mental health indicators. The results suggested that FV, FI, FS, and AS had a positive correlation with positive affect and unconditional self-acceptance (USA), FS and AS correlated negatively with negative affect (NA), symptoms of depression (D), and conditional self-acceptance (CSA), while the AVI had a positive correlation with NA, CSA, D, and negative correlation with USA. Finally, we compared physically inactive participants, recreationists, and active athletes on the EIS scores. The results revealed that all groups differed in FV, FS, and AS in a way that scores on these subscales increased with increased physical activity.

Keywords: embodied image scale, aesthetic body image, functional body image, measurement invariance

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✉ Corresponding email: stanislava.popov@tims.edu.rs

Introduction

Body image refers to our perception of different aspects of our own body. Numerous authors (e.g., Brown et al., 1990; Cash et al., 2004) emphasized that body image is a multidimensional construct with three different components: affective (satisfaction), cognitive (value), and behavioral (investment). For a long period, body image was investigated in the context of psychopathology (e.g., Cohane et al., 2001; Tiwari, 2014; Pesa et al., 2000) and the focus was on the *negative body* image and its impact on mental and physical health. The association between negative body image (or its subcomponent *body dissatisfaction*) and depression (Cohane et al., 2001; Johnson & Wardle, 2005; Pesa et al., 2000), low self-esteem (Tiwari, 2014; Johnson & Wardle, 2005), and eating disorders (Peat et al., 2008; Wei et al., 2021) is well-documented in the literature.

In recent years more researchers started to investigate the concept of *positive body image* in the context of mental health. Studies showed that body appreciation had a positive association with better care about one's own body (such as healthy eating, using sunscreen, and regular medical screening) and a negative association with dieting behavior (Andrew et al., 2016a). Furthermore, positive body image was also associated with some indicators of mental health such as higher self-esteem, self-compassion, and life satisfaction and it was shown that it could be a protective factor regarding negative environmental appearance messages (Halliwell, 2013; Tylka & Wood-Barcalow, 2015). Similar results were also obtained in the teenage population. Namely, body appreciation was shown to be associated with decreased dieting behavior, smoking, and alcohol consumption in girls aged 12 to 16 (Andrew et al., 2016b).

Aesthetic vs. functional component of body image

As we previously mentioned, body image is a multidimensional construct and the growing body of literature showed that is not only important what we think about how we look but also how much we appreciate our body based on what it is capable of doing physically (Alleva et al., 2017; Cash & Smolak, 2011). Therefore, it is vital to make a distinction between two separate components of body image:

aesthetic and functional components. *The aesthetic component* of body image could be described as an evaluation based on external appearance (i.e., how our body looks) while the *functional component* refers to the evaluation of one's body based on what it is capable of achieving (i.e., how our body functions; Vally et al., 2019). Furthermore, both aesthetic and functional components consist of affective, cognitive, and behavioral domains (i.e., Abbott & Barber, 2010).

Some authors believe (e.g., Fredrickson & Roberts, 1997) that current beauty standards in Western societies emphasize different aspects of body image in males and females. While female bodies are valued based on aesthetic criteria, male bodies are evaluated regarding functionality. Therefore, it is not surprising to know that, although dissatisfaction with one's own body occurs in both genders, it is manifested differently. According to this, numerous studies showed that in women thinness-oriented dissatisfaction is more often while males showed more muscularity-oriented dissatisfaction (Finne et al., 2011; Karazsia et al., 2017; McCabe & Ricciardelli, 2003; Pritchard & Cramblitt, 2014). Vartanian's study (2009) is also suggestive of gender differences when it comes to the internalization of societal standards. According to this author, lower self-concept clarity (less clear sense of one's identity) is a significant predictor of greater internalization of body image-related social norms among women, but not among men (Vartanian, 2009). In another study, Vartanian and Dey (2013) reported that self-concept clarity was negatively correlated with thin-ideal internalization and appearance-related social comparison tendencies, but also that the relation between self-concept clarity and body dissatisfaction was mediated by thin-ideal orientation. Some studies (e.g., Lemon et al., 2009) showed that males, in general, have more positive body image than females. The higher average body dissatisfaction in females compared to males was also detected in the longitudinal study that followed participants over 15 years from adolescence to adulthood (Wang et al., 2019).

Available literature suggests that focusing on aesthetic aspects of body image might have a more negative impact on mental health. Aesthetic aspects of body image are associated with body shame, anxiety, lower body esteem, body dissatisfaction, and poor interoceptive awareness (Frederickson & Roberts, 1997; McKinley, 1998; McKinley & Hyde, 1996; Tylka & Hill, 2004). Contrarily, some studies showed the positive impact of focusing on body functionality on feelings towards one's own body (Greenleaf et al., 2009), body appreciation, and more intuitive eating (Avalos & Tylka, 2006). Similar results were obtained also in children. For example, one study (Allen et al., 2019) showed that kids who had more positive attitudes toward physical education also had better functional body image. The same study also showed positive effects of physical activity on the behavioral component of functional body image. In another study, Abbott and Barber (2011) compared adolescent girls actively engaged in sports activities, girls that were generally physically active, and sedentary girls. Active athletes reported significantly higher functional body image (in terms of value, investment, and satisfaction) compared to the other two groups (Abbott & Barber, 2011). Additionally, while physically active girls reported higher scores on the functional investment (behavioral domain of functional body image) than sedentary girls, these two groups did not differ in the functional satisfaction domain (Abbott & Barber, 2011).

The aim of this study was to explore the latent structure of the Serbian translation of Embodied Image Scale (EIS; Abbott & Barber, 2010) using a sample from the general population. The translation and adaptation of this scale could advance current research on body image, self-esteem, body (dis)satisfaction, eating disorders, body dysmorphia, etc. This is especially important because it seems that studies of this kind are lacking in our country. To our knowledge, this is the first time that the EIS is validated in another language-speaking country. Moreover, as opposed to the original study conducted by Abbott and Barber (2010) in which the scale was validated using a sample of adolescents, the present study used a sample of adults. According to Abbott and Barber (2010), the scale was designed to measure both aesthetic and functional domains of body image. For that reason, these authors split the scale into two parts - one that contained the items they assumed belonged to the aesthetic dimension and the other that supposedly measured the functional domain of body image. Then, they conducted two principal component analyses (PCA), for each part of the scale separately. In both PCAs, Abbott and Barber (2010) chose to extract three components, based on the theory that body image is a multidimensional construct. Consequently, extracted components from the first PCA were labeled as aesthetic values (the cognitive component), aesthetic investment (the behavioral component), and aesthetic satisfaction (the emotional component). Extracted components from the second PCA were labeled as functional values (the cognitive component), functional investment (the behavioral component), and functional satisfaction (the emotional component). However, it should be noted that there are several limitations regarding the statistical procedure that the authors originally used to identify the underlying structure of the EIS. Given that the EIS was conducted as a single scale, splitting it into two different parts beforehand and running two PCAs on these two parts separately was not justified. Next, the authors of the scale used varimax rotation even though it is less likely that the cognitive, emotional, and behavioral domains are not correlated. Moreover, while it is generally recommended that a factor has at least three indicators (i.e., Kenny, 1979), the *aesthetic values* component from the original study had two indicators. Considering all the limitations of the study mentioned above, we used the CFA approach to test the correlated six-factor model using all items from the EIS at once. These factors were defined based on the results from the original study and the only difference was in defining three functional and three aesthetic factors within the same model. We also tested and compared four levels of measurement invariance (MI; configural, metric, scalar, and residual) across gender groups, prior to testing gender differences. Besides, we tested the convergent validity by correlating EIS scores with symptoms of depression, positive affect (PA), negative affect (NA), conditional self-acceptance, and unconditional self-acceptance. We also compared active athletes, recreationists, and physically inactive individuals on EIS scores.

Method

Sample and Procedure

The sample of this study included 1035 participants from the general population in Serbia (66.7% female). The age ranged from 18-75 (*M* = 26.33, *SD* = 9.94). The link to the survey was shared online by the researchers and psychology students (e.g., on social networks such as Facebook) using the Google Forms platform from March to May 2022. The data were collected using the snowball method. Two percent of the sample had primary education, 56% had secondary school education, and 42% had higher education (either completed higher education level or currently being a student at the moment of testing). It took approximately twenty minutes to complete the survey, and there were no missing data due to the 'required question' options. All >=18 years old individuals were eligible to participate in the study. Data used in this study were part of a larger project that aimed to investigate the effects of physical activity on mental health outcomes. All participants consented to participate in the study prior to filling in the survey. Participants did not receive any compensation for their participation. The study was approved by the institutional ethical committee and complied with the Declaration of Helsinki.

Instruments

Embodied Image Scale (EIS)

Embodied Image Scale (EIS; Abbott & Barber, 2010) consists of 17 items that measure the "value of, investment in, and satisfaction with the aesthetic and functional body dimensions" (p. 24). The responses are collected using a 5–point Likert scale (1 – not at all true for me, 5 – very true for me). Originally, the scale consisted of 19 items, but researchers discarded two items based on the results of PCA (Abbot & Barber, 2010). The final version of the original scale has the following six subscales: functional values (3 items), functional behavioral investment (3 items), functional satisfaction (3 items), aesthetic values (3 items), aesthetic behavioral investment (2 items), aesthetic satisfaction (3 items). The Serbian translation of the EIS is in Appendix A.

The Depression, Anxiety, and Stress Scale (DASS–21)

The Depression, Anxiety, and Stress Scale (DASS–21; Lovibond & Lovibond, 1995; the Serbian translation of the scale was validated using a student sample [Jovanović et al., 2014], and clinical and community samples [Mihić et al., 2021]) is a scale consisting of 21 items that measure depression, anxiety, and stress (7 items per subscale). The participants are instructed to rate how frequently they experienced the symptoms over the past week prior to completing the questionnaire. Responses are collected using the 4–point Likert scale (0 – never, 4 – almost always). In the present study, only the depression score that resembles the presence of the symptoms such as low mood, anhedonia, and worthlessness was used and its reliability was satisfactory (α = .89).

Serbian Inventory of Affect Based on the Positive and Negative Affect Schedule–X (SIAB-PANAS)

Serbian Inventory of Affect Based on the Positive and Negative Affect Schedule–X (SIAB-PANAS; Mihić et al., 2010) is a self-report measure that has 20 items (affect descriptors) that indicate positive (PA, α = .88, 10 items) and negative affectivity (NA, α = .90, 10 items). It is a Serbian adaptation of Watson & Clark's PANAS-X (1994). In our study, we assessed trait-like PA and NA. Participants were asked to rate how frequently they typically experience the described affects (1 – not at all, 5 – extremely).

The Unconditional Self-Acceptance Questionnaire–short scale (USAQ)

The Unconditional Self-Acceptance Questionnaire–short scale (USAQ – short scale; Popov & Sokić, 2022). The USAQ-short scale contains 10 items of which 4 items measure unconditional self-acceptance (USA; α = .90) and 6 items (α = .79) measure conditional self-acceptance (CSA). The participants used a 7-point Likert scale to mark their responses to items (1 - almost always untrue, 7 - almost always true).

Self-assessment of Physical Activity

Participants were asked to describe themselves as active athletes, recreationists, or physically inactive individuals.

Data Analytic Plan

Before conducting the CFA, Mardia's multivariate test (Mardia's multivariate skew and multivariate kurtosis) and the generalized Shapiro-Wilk test were used to assess the deviation of item responses from the multivariate normality. Multivariate outliers were removed from the database (standardized Mahalanobis distance > 2). Additionally, multicollinearity among items was tested, and the Variance inflation factor (VIF) < 10 was used as a threshold (Bowerman & O'Connell, 1990; Myers, 1990).

In CFA, Maximum Likelihood with robust standard errors (MLR) was used to estimate model parameters. Robust fit indices were evaluated using the following criteria: the value of the Comparative fit index (CFI) was considered optimal if > .95 and acceptable if > .90 (Kline, 2015); the Tucker-Lewis index (TLI) was considered optimal if > .95 and acceptable if > .90 (Kline, 2015); the root mean square error of approximation (RMSEA) was considered as optimal if < .05 and acceptable if < .08 (Kline, 2015) and it should be non-significant (p > .01; van Zyl & Klooster, 2022); lower limit < .05 of the 90% confidence interval around RMSEA was indicating good model fit, while upper limit > .10 implied that there is a chance that model does not fit the data well (Bentler, 1990; Hu & Bentler, 1999; MacCallum et al., 1996); the standardized root mean squared residual (SRMR) was considered as optimal if < 0.08 and acceptable if < 0.10 (Hu & Bentler, 1999; Kline, 2015). Models were also compared based on the Akaike Information Criterion (AIC; which balances out model parsimony and goodness of fit) and Bayesian Information Criterion (BIC; which favors more parsimonious models). Typically, models with lower AIC and BIC are interpreted as better fitting (Kline, 2015). When it comes to indicators (individual items), standardized factor loadings should be > .35.

Considering MI, we tested the following models: configural MI, metric (weak factorial) MI, scalar (strong factorial) MI, and residual (strict) MI. Configural MI implies that the factor structure of the instrument is equivalent across groups (e.g., gender groups). Metric MI assumes the equivalence of factor structure and factor loadings across groups. When testing scalar MI, we check the equivalence of factor structure, factor loadings, and intercepts across groups. And finally, in the residual invariance model, apart from configuration, loadings, and intercepts, residual variances were constrained to be equal in both groups. To decide whether a certain level of MI was achieved, changes in CFA and RMSEA across levels were evaluated (ΔCFI < -.01 and ΔRMSEA < .015 were considered acceptable according to Chen, 2007). Given the results referring to MI, we ran series of t-tests for independent samples to test gender differences (Holm-Bonferroni sequential procedure was applied to adjust for familywise error; Holm, 1979). Finally, an analysis of variance was conducted to compare active athletes, recreationists, and physically inactive participants on EIS subscales scores. All statistical analyses were conducted in R software (R Core Team, 2022), using *MVN* (Korkmaz et al., 2014), *mvnormtest* (Jarek, 2022), *psych* (Revelle, 2018), *semTools* (Jorgensen et a., 2022), and *lavaan* (Rossel, 2012) packages.

Results

Before testing CFA models, 44 multivariate outliers were removed (see Appendix B for a normal QQ plot after removing the outliers). The VIF was below 10 for all items, suggesting no multicollinearity (Appendix C). The first confirmatory model that we tested (Model 1) was a six-factor model with Aesthetic values (AV), Aesthetic satisfaction (AS), Aesthetic investment (AI), Functional values (FV), Functional satisfaction (FS), and Functional investment (FI) factors. We tested a six-factor model because we wanted to check whether the model that the authors of the original version of the scale assumed fit the data in the case of the Serbian version of the scale, too. After inspecting the fit indices of Model 1 and modification indices, we tested whether its fit could be improved after adding the covariance of residuals of items #14 and #17 (Model 2). Model 2 fitted data well. But, given that the AI factor was composed of only two items and that AI and AV factors were highly correlated (r = .88), we proceeded with testing a five-factor model with FV, FS, FI, AS, and Aesthetic values and investment (AVI) factors (Model 3). Finally, based on the results of Model 3, we decided to test Model 4 – a five-factor model defined as Model 3, but with the covariance of residuals of items #14 and #17 and between items #3 and #11 that we added based on model modification indices. Items #14 and #17 belonged to the FV factor and had a similar item content related to the belief that one of the most important reasons why people should take good care of their bodies is because that would allow them to be physically active. Items #3 and #11 belonged to the AVI factor and indicated the importance of how well others perceive one's appearance. Finally, we tested two more models that were plausible from the theoretical stance – one factor model (Model 5) and two-factor model comprised of Functional body image and Aesthetic body image factors (Model 6), and both models performed poorly. Fit indices for all six tested models are shown in Table 1. Although Model 2 had an acceptable fit, we chose the five-factor model with allowed covariance of residuals as the best-fitting one due to the abovementioned limitations of the six-factor model. All standardized factor loadings of Model 4 were > .35 (Table 2) and even met stricter criteria (> .50; Hair et al., 2010).

Table 1

Fit indices from the Confirmatory Factor Analyses (CFA)

	χ^2 scaled	df scaled	*p* scaled	CFI robust	TLI robust	RMSEA [LCI-UCI] robust	RMSEA *p* robust	SRMR	AIC	BIC
Model 1	539.993	104	< .001	.945	.929	0.067 [0.062-0.073]	< .001	.068	45997.59	46237.63
Model 2	449.868	103	< .001	.956	.942	0.060 [0.055-0.066]	.001	.064	45904.69	46149.63
Model 3	596.468	109	< .001	.939	.923	0.070 [0.064-0.075]	< .001	.075	46051.30	46266.84
Model 4	**474.675**	**107**	**< .001**	**.953**	**.941**	**0.061 [0.056-0.067]**	**.001**	**.070**	**45926.16**	**46151.50**
Model 5	3617.535	119	< .001	.562	.499	0.178 [0.173-0.183]	< .001	.138	49253.47	49420.03
Model 6	2288.911	118	< .001	.722	.679	0.142 [0.137-0.148]	< .001	.131	47894.32	48065.78

Note. Model 1 – six-factor model with Aesthetic values (AV), Aesthetic satisfaction (AS), Aesthetic investment (AI), Functional values (FV), Functional satisfaction (FS), and Functional investment (FI) factors. Model 2 – six-factor model is defined as in Model 1 but with the covariance of residuals of items 14 and 17. Model 3 – five-factor model with FV, FS, FI, AS, and Aesthetic values and investment (AVI) factors. Model 4 – five-factor model defined as in Model 3, but with the covariance of residuals of items 14 and 17, and between items 3 and 11. Model 5 – one-factor model. Model 6 – two-factor model with Functional and Aesthetic body image factors. $\chi 2$ – Chi-square. df – degrees of freedom. CFI – comparative fit index. TLI – Tucker-Lewis Index. RMSEA – root-mean-square error of approximation. LCI – lower confidence interval. UCI – upper confidence interval. SRMR - standardized root mean squared residual. AIC – Akaike Information Criterion. BIC –Bayesian Information Criterion.

Table 2

Standardized factor loadings of the five-factor model with correlated residuals

	FV	FI	FS	AVI	AS
#10 How good I feel about my body depends a lot on what my body can do physically.	.69 (.03)				
#14 One of the most important reasons why people should take care of their bodies is so they can be physically active.	.53 (.04)				
#17 One of the most important reasons why people should take care of their bodies is so they can feel good about their physical abilities (e.g., strength, fitness, endurance).	.52 (.04)				
#2 I do physically active things often (e.g., sports, hiking, exercise).		.87 (.01)			
#4 I always try to physically challenge myself during physical activities.		.68 (.02)			
#6 I participate in physical activities whenever I can (e.g., sports, hiking, exercise).		.88 (.01)			
#12 I feel really good about what I can do physically.			.81 (.02)		
#16 I am very happy with my performance in physical activities.			.85 (.01)		
#8 Overall, I am very satisfied with my physical abilities.			.84 (.02)		
#1 How good I feel about my body depends a lot on how I look.				.55 (.03)	
#3 How good I feel about my body depends a lot on whether people consider me good-looking.				.65 (.03)	
#7 One of the most important reasons why people should take care of their bodies is so they can look good.				.51 (.03)	
#11 I always try to look the best I can.				.56 (.04)	
#9 I wear certain things to make myself look as attractive as I can.				.68 (.03)	
#5 I feel really good about the way I look.					.87 (.01)
#13 I am very happy with the appearance of my body.					.93 (.01)
#15 Overall, I am very satisfied with my appearance.					.91 (.01)

Note. Values in brackets are standard errors. FV – Functional values. FI – Functional investment. FS – Functional satisfaction. AVI – Aesthetic values and investment. AS – Aesthetic satisfaction.

The obtained values of inter-correlations between five factors ranged from negligible to high (Table 3). Aesthetic values and investment did not correlate with AS and had a weak correlation with FS. The highest positive correlations were between AS and FS, as well as between FI and FS factors. Also, FV correlated moderately with FI, FS, and AVI.

Table 3

Correlations between the five factors from the Embodied Image Scale

	M (SD)	2	3	4	5
1 Functional values	10.17 (2.74)	.59***	.58***	.48***	.25***
2 Functional investment	9.62 (3.75)		.70***	.22***	.37***
3 Functional satisfaction	10.69 (3.15)			.13***	.74***
4 Aesthetic values and investment	14.83 (4.19)				.06
5 Aesthetic satisfaction	10.93 (3.11)				

Note. ***$p < .001$.

Table 4

Test of measurement invariance of the Embodied Image Scale across gender groups (N = 988)

	χ^2 scaled	df scaled	*p* scaled	CFI robust	TLI robust	RMSEA [LCI-UCI] robust	RMSEA *p* Robust	SRMR	Comparison	ΔCFI	ΔRMSEA
M1: Configural	581.229	214	< .001	.953	.940	0.061 [0.055-0.067]	.001	.069			
M2: Metric	596.006	226	< .001	.953	.943	0.060 [0.054-0.065]	.004	.070	M2-M1	.000	-.001
M3: Scalar	652.003	238	< .001	.947	.940	0.061 [0.056-0.067]	.001	.072	M3-M2	-.006	.001
M4: Residual	662.168	255	< .001	.948	.944	0.059 [0.053-0.064]	.004	.072	M4-M3	.001	-.002

Note. χ2 – Chi-square. df – degrees of freedom. CFI – comparative fit index. TLI – Tucker-Lewis Index. RMSEA – root-mean-square error of approximation. LCI – lower confidence interval. UCI – upper confidence interval. SRMR - standardized root mean squared residual. ΔCFI – change in CFI value compared to the preceding model. ΔRMSEA – change in RMSEA value compared to the preceding model.

Finally, the results of MI testing implicated that the strict (residual) invariance was achieved (Table 4; Appendix D). This means that the EIS works in the same way in men and women, and thus can be used for testing gender differences. Cronbach's alphas calculated in the subsample of men were as follows: functional values α = .72, functional investment α = .84, functional satisfaction α = .84, aesthetic values and investment α = .77, and aesthetic satisfaction α = .91. In the subsample of women, alphas were slightly lower compared to the values from the subsample of men for functional values (α = .68) and aesthetic values and investment (α = .67), and slightly higher for functional satisfaction (α = .88), functional investment (α = .84), and aesthetic satisfaction (α = .94). Statistically significant gender differences were found for functional values, $t(1, 1030) = 2.98$, $p = .009$[1], $d = 0.197$, functional investment, $t(1, 1030) = 5.91$, $p < .001$, $d = 0.391$, functional satisfaction, $t(1, 1030) = 5.85$, $p <.001$, $d = 0.387$, and aesthetic satisfaction, $t(1, 1030) = 2.31$, $p = .042$, $d = 0.153$, all in favor of men. There were no significant differences in AVI, $t(1, 1030) = -1.49$, $p = .135$, $d = -0.099$.

The validity of EIS subscales scores was further investigated by correlating them with NA (*M* = 22.69, *SD* = 8.69), PA (*M* = 38.15, *SD* = 7.23), symptoms of depression (*M* = 10.03, *SD* = 10.72), CSA (*M* = 17.60, *SD* = 9.18), and USA (*M* = 21.60, *SD* = 5.24)[2]. Values of the correlation coefficient are given in Table 5. Functional values subscale score was significantly correlated positively with PA, CSA, and USA (although correlations with CSA and USA were negligible). Next, functional investment had a small positive correlation with PA and USA, and a significant negative (but very low) correlation with the symptoms of depression. In addition, functional satisfaction and aesthetic satisfaction correlated significantly with all indicators of mental health in the expected direction – negatively with NA, CSA, and depression, and positively with PA and USA. Aesthetic values and investment had a positive, small correlation with NA, symptoms of depression, and CSA, but a small negative correlation with USA. Finally, it should be noted that lower reliability of the scale scores can lead to unexpectedly lower correlations.

[1] Adjusted *p* values are provided after applying Holmes-Bonferroni procedure.

[2] Values of skewness and kurtosis for all variables were acceptable according to Tabachnick and Fidell's criterion (< ± 1.5; 2007).

Table 5

Correlation of EIS subscales' scores with positive and negative indicators of mental health

	Functional values	Functional investment	Functional satisfaction	Aesthetic values and investment	Aesthetic satisfaction
	α = .68	α = .84	α = .85	α = .70	α = .92
NA	.05	-.05	-.22***	.24***	-.29***
PA	.22***	.31***	.45***	.02	.42***
Depression	.05	-.09**	-.19***	.26***	-.23***
CSA	.07*	-.05	-.22***	.34***	-.32**
USA	.09*	.13***	.26***	-.12***	.36***

Note. NA – Negative affect. PA – Positive affect. CSA – Conditional self-acceptance. USA – Unconditional self-acceptance. *** $p < .001$. ** $p < .01$. * $p < .05$.

Lastly, we compared active athletes (n = 173), recreationists (n = 545), and physically inactive study participants (n = 317) in their scores on functional values, functional satisfaction, aesthetic values and investment, and aesthetic satisfaction (Table 6). We did not compare the groups on functional investment because two items from the subscale already ask participants about their engagement in physical activity (e.g., *I do physically active things often [sports, hiking, exercise]*), thus, this comparison would be redundant. The statistically significant univariate effect was found for the following dependent variables: functional values, functional satisfaction, and aesthetic satisfaction. On the other hand, active athletes, recreationists, and physically inactive participants did not differ in aesthetic values and investment.

Table 6

Differences in EIS subscales' scores due to level of physical activity

		Games-Howell post-hoc test		
	M (SD)	M_{dif}	95% CI	*p*
Functional values	0: 9.14 (2.87)	0-1	-1.78, -0.87	< .001
	1: 10.46 (2.56)	0-2	-2.58, -1.41	< .001
	2: 11.13 (2.45)	1-2	-1.18, -0.17	.008
	$F(2, 1032) = 38.90$, $p < .001$, ω2 = .068			
Functional satisfaction	0: 8.48 (3.21)	0-1	-3.21, -2.22	< .001
	1: 11.19 (2.57)	0-2	-5.21, -4.10	< .001
	2: 13.13 (1.99)	1-2	-2.38, -1.50	< .001
	$F(2, 1032) = 186.14$, $p < .001$, ω2 = .263			
Aesthetic values and investment	0: 14.45 (4.26)			
	1: 14.93 (4.13)	-	-	-
	2: 15.19 (4.24)			
	$F(2, 1032) = 2.09$, $p = .124$, ω2 = .002			
Aesthetic satisfaction	0: 9.79 (3.42)	0-1	-1.89, -0.82	< .001
	1: 11.15 (2.84)	0-2	-3.16, -1.89	< .001
	2: 12.3 (2.59)	1-2	-1.71, -0.62	< .001
	$F(2, 1032) = 42.67$, $p < .001$, ω2 = .075			

Note. 0 - physically inactive (n = 317). 1 - recreationists (n = 545). 2 - active athletes (n = 173). Values for partial ω2 of value ≥.01 indicate small effect, ≥.06 indicate medium effect, and ≥.14 indicate large effect (Field, 2013).

Due to unequal group sizes and heteroscedasticity, the Games-Howell post hoc test with Tukey's corrected *p*-value for multiple comparisons was used. Post hoc testing revealed that all groups statistically differ from each other. Namely, physically inactive individuals scored lower than recreationists on functional values, functional satisfaction, and aesthetic satisfaction. Additionally, physically inactive scored lower than active athletes on functional values, functional satisfaction, and aesthetic satisfaction. Finally, recreationists scored lower than the active athletes on functional values, functional satisfaction, and aesthetic satisfaction.

Discussion

The aim of the present study was to evaluate the internal structure and MI by gender groups of the Serbian translation of the Embodied Image Scale (Abbott & Barber, 2010), using a sample of the general population. The Embodied Image Scale is a psychological instrument constructed to measure how people perceive their bodies, encompassing two separate body image components: physical appearance (aesthetic) and body functionality. Thus, the EIS consists of statements related to different aspects of the body, such as appearance, functionality, sensations, and body satisfaction. These items reflect one's subjective perception of their body rather than requiring an assessment of the body based on objective physical characteristics. So far, according to the theory and Abbott and Barber's study (2010), items from the scale are divided into two groups (dimensions), labeled as functional and aesthetic body image, within which the cognitive, behavioral, and affective components of body image could be assessed. The goal behind creating the EIS was to provide a quantitative measure of subjective evaluation of the body image that incorporates both aesthetic and functional dimensions. This is important especially because it seems that perception of aesthetic and body functionality correlates in opposite directions with different mental health indicators. The present study is valuable given that it represents the first validation of the EIS in a different language context. Additionally, unlike the original study by Abbott and Barber (2010), where the scale was validated using a group of adolescents, our sample comprised adults.

When it comes to examining the latent structure of the EIS, the key difference between our study and the original study was in the model setup. Even though we took into consideration the original six-factor model that came as a result of Abbott and Barber's two principal component analyses (cognitive, behavioral, and emotional aspects of the functional body image plus cognitive, behavioral, and emotional aspects of aesthetic body image; 2010), our models were defined using all items from the scale at once. On the contrary, Abbott and Barber tested separate PCA models after dividing items into two groups (aesthetic and functional) beforehand, mostly relying on the content of the items, which is subjected to certain limitations (as mentioned in the introduction). Also, while the authors of the original scale used orthogonal rotation in both PCAs, in our models factors were allowed to correlate. In spite of these differences between the studies, the overall fit of the six-factor model was acceptable. However, due to the high correlation between AI and AV factors in the six-factor model, and because the AI had only two indicators we decided to accept the five-factor model in which AV and AI items were loaded on the same factor. Additionally, we allowed the covariance of residuals between two item pairs (one pair of items that initially loaded on the AV factor, and two items that initially loaded on the AI factor) in the five-factor model because it resulted in an improved model fit.

According to the five-factor model, the Serbian version of the EIS scale can be explained by the following dimensions: Functional values (e.g., "*How good I feel about my body depends a lot on what my body can do physically.*"), Functional investment (e.g., *"I participate in physical activities whenever I can [e.g., sports, hiking, exercise].*"), Functional satisfaction (e.g., *"I am very happy with my performance in physical activities.*"), Aesthetic values and investment (e.g., *"I wear certain things to make myself look as attractive as I can.*") and Aesthetic satisfaction ("*I am very happy with the appearance of my body.*"). As already noted, the proposed factor structure represents the original one to a great extent. Based on the item content it seems reasonable that aesthetic values and investment belong to the same factor given that some items contain cognitive and behavioral components. For example, item #9 (*"I wear certain things to make myself look as attractive as I can.*") implies that behavioral action is intertwined with the expectations people might have on what conditions their body should meet to be valued. It should also be noted that this item although belonging to the AI component in the original study, had a significant cross-loading (.43) on the AV component (Abbott & Barber, 2010).

According to our results, all factors were significantly intercorrelated in a positive direction, except for AS and AVI. It raises the question of whether items that supposedly measure cognitive, emotional, and behavioral aspects of aesthetic body image measure only that. At the same time, if one agrees with items such as *How good I feel about my body depends a lot on how I look* (AVI), it does not automatically mean that they would agree with items such as *I am very happy with the appearance of my body* (AS). In other words, if someone, in general, values their body based on their appearance, it does not imply neither that they will be nor that they will not be satisfied with their appearance at the moment of testing.

Correlations among factors in our study cannot be directly compared with the correlations obtained in the original study because they calculated correlation coefficients for males and females separately, without testing MI before that (Abbott & Barber, 2010). Moreover, because the Serbian EIS has residual (strict) MI, we can conclude that correlations among factors do not differ between males and females in our sample. In their study, the correlation between AV and AS in females was -.21, and .10 in males (pooled correlation was -.07, regardless of gender), while the correlation between AI and AS was lacking in females (.01) and was .20 in males (pooled correlation was .10; Abbott & Barber, 2010). If we compare pooled correlations calculated for AV-AS and AI-AS, with the correlation between AVI and AS from our study (.06) we can conclude that they are not essentially different. Also, it should not be neglected that Abbott and Barber conducted a study using a sample of adolescents (2010), while our study included adults.

Another novelty in our study was testing MI of the EIS across gender groups. Although Abbott and Barber reported slightly different correlations between the factors in groups of males and females (2010), our results implied that the EIS demonstrated the most stringent MI. In other words, our results suggested that the EIS has the same factor structure across gender groups (five-factor structure with covariances of residuals), the strength of the relationship between latent factors and indicators (items) is the same across gender groups, and item residual variances are the same across gender groups. Thus, it is justified to use EIS for researching gender differences in body image. The coefficients of internal consistency of the Serbian version of the instrument are satisfactory in the male subsample (.72-.91), while in the female sample, it is slightly lower on some dimensions (.67-.94). In the overall sample, values of

Cronbach's alpha coefficient ranged from .68 (FV) to .92 (AS). However, it should be kept in mind that all factors (except for the AVI) consisted of three items only which can contribute to lower alpha.

Our study provided some evidence for gender differences in functional (values, investment, and satisfaction) and aesthetic (satisfaction) components of body image measured by EIS. Precisely, male participants had significantly higher scores on these subscales compared to female participants. These results support findings from some cross-sectional (e.g., Lemon et al., 2009) and longitudinal (Wang et al., 2019) studies that showed males are, in general, more satisfied with their bodies compared to females. Abbott and Barber (2010) also reported higher functional values, functional investment, functional satisfaction, and aesthetic satisfaction in boys than in girls. In addition, taking into account masculinity-oriented narratives, it is expected that males consider functional aspects of the body as more significant for their positive body image compared to females. Finally, it is understandable that there were no gender differences in AVI scores because items from this subscale contain general ideas that are equally probable for both males and females (i.e., both males and females may want to be good-looking, but as we can see from the scores on other subscales of the EIS, they can differ in terms of whether they actually perceive themselves that way).

To check the convergent validity of the Serbian version of the EIS, we correlated the obtained scores with CSA, USA, trait PA, trait NA, and symptoms of depression. All three scores related to body functionality (FV, FI, and FS) correlated positively with PA and USA (although correlations with the USA were very small). These results are in line with some notions that focusing on body functionality positively affects feelings that people have about their bodies (e.g., Avalos & Tylka, 2006; Greenleaf et al., 2009). Positive correlations between FV, FI, and FS on the one hand, and USA on the other hand, are comparable with positive correlations that Abbott and Barber (2010) found between these body functionality domains and self-esteem given that USA and self-esteem are related constructs. The aesthetic satisfaction subscale score is also positively correlated with PA and USA, which is also aligned with theoretical expectations

- those who are generally prone to experiencing positive emotions are more likely to be satisfied with and happy about the appearance of their body, but also those who accept themselves unconditionally might be more self-compassionate when it comes to evaluating their bodies. Negative correlations that FS and AS had with NA and symptoms of depression are also expected because FS and AS items included words that describe pleasant emotions. Functional satisfaction and AS also had a negative correlation with CSA.

According to our results, it seemed that AVI was related to the mental health indicators in the opposite direction from other subscale scores. Aesthetic values and investment was positively correlated with NA, CSA, and symptoms of depression, and negatively with USA. This is also in line with the result of the previous studies (e.g., Frederickson & Roberts, 1997; McKinley, 1998; McKinley & Hyde, 1996; Tylka & Hill, 2004) that showed an association between aesthetic aspects of body image and some indicators of poorer mental health such as body shame and dissatisfaction, low body esteem, and anxiety symptoms. A positive correlation between AVI and CSA, and a negative correlation between AVI and USA is also expected, given that the AVI factor is saturated with items related to the assessment of physical appearance concerning how attractive they are to other people.

When comparing body image concerning the subjects' physical activity level, the results indicate that all three groups (physically inactive individuals, recreationists, and active athletes) significantly differed in FV, FS, and AS, but not in the AVI score. The results indicated that FV, FS, and AS scores were increasing with the increase in the physical activity level. Similar results were obtained in one earlier study with adolescent girls (Abbott & Barber, 2011) where it was shown that active athletes scored higher than recreationists and physically inactive girls on all dimensions of functional body image. Our results are also comparable with Allen et al.'s notion (2019) that children who had better functional body image also had a positive perspective toward physical education. Finally, the finding that more physically active scored higher on aesthetic satisfaction seems logical because people frequently engage in physical activities in order to look better. These findings are important because they suggest that sports could improve at least some aspects of body image (and indirectly some aspects of mental health) in adolescents and adults, and vice versa, that having a genuinely positive attitude towards one's physical capabilities could motivate people to be more physically active. Physically inactive participants, recreationists, and active athletes did not significantly differ in AVI scores which is not surprising if we take into account the content of the items from this subscale (e.g., "*I wear certain things to make myself look as attractive as I can.*").

An important limitation of our study comes from the fact that it was an online study such that the survey link was distributed via social media networks. Thus, self-selection bias cannot be excluded (Bethlehem, 2010). In addition, potential respondents were exclusively social media network users. Furthermore, information about the sociodemographic characteristics of the participants (aside from the education level) is lacking. Finally, future studies should include a measure of motives for physical activity and test how these motives are related to different aspects of body image.

To sum up, the advantage of the present study is that it represents the first study that evaluated the psychometric properties of the translated version of the EIS in a different cultural context compared to the context where the instrument originally came from. The Serbian version of the EIS represents a satisfactory measure of aesthetic and functional body image. However, considering the lower reliability of some subscale scores some refinements of the scale are recommended (e.g., rewriting some of the existing items or adding the new ones). On a practical note, our results could initiate more studies on body image defined as a multidimensional construct, eating disorders, and similar constructs in Serbia.

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Conflict of Interest

We have no conflicts of interest to disclose.

Data availability statement

Data used in this paper are available upon a reasonable request.

References

Abbott, B. D., & Barber, B. L. (2011). Differences in functional and aesthetic body image between sedentary girls and girls involved in sports and physical activity: Does sport type make a difference? *Psychology of Sport and Exercise, 12*(3), 333–342. https://doi.org/10.1016/j.psychsport.2010.10.005

Abbott, B. D., & Barber, B. L. (2010). Embodied image: Gender differences in functional and aesthetic body image among Australian adolescents. *Body Image*, *7*(1), 22-31. https://doi.org/10.1016/j.bodyim.2009.10.004

Allen, C. P., Telford, R. M., Richard, D. T., & Olive, L. S. (2019). Sport, physical activity and physical education experiences: Associations with functional body image in children. *Psychology of Sport and Exercise*, *45*, https://doi.org/10.1016/j.psychsport.2019.101572

Alleva, J. M., Tylka, T. L., & Kroon Van Diest, A. M. (2017). The Functionality Appreciation Scale (FAS): Development and psychometric evaluation in U.S. community women and men. *Body Image*, *23*, 28–44. https://doi.org/10.1016/j.bodyim.2017.07.008

Andrew, R., Tiggemann, M., & Clark, L. (2016a). Positive body image and young women's health: Implications for sun protection, cancer screening, weight loss and alcohol consumption behaviours. *Journal of Health Psychology, 21*(1), 28–39. https://doi.org/10.1177/1359105314520814

Andrew, R., Tiggemann, M., & Clark, L. (2016b). Predictors and health-related outcomes of positive body image in adolescent girls: A prospective study. *Developmental Psychology, 52*(3), 463–474. https://doi.org/10.1037/dev0000095

Asparouhov, T., & Muthén, B. (2009). Exploratory Structural Equation Modeling. *Structural Equation Modeling: A Multidisciplinary Journal, 16*(3), 397–438. https://doi.org/10.1080/10705510903008204

Avalos, L. C., & Tylka, T. L. (2006). Exploring a model of intuitive eating with college women. *Journal of Counseling Psychology, 53*(4), 486-497. https://doi.org/10.1037/0022-0167.53.4.486

Bethlehem, J. (2010). Selection bias in web surveys. *International Statistical Review, 78*(2), 161–188. https://doi.org/10.1111/j.1751-5823.2010.00112.x

Bowerman, B. L., & O'Connell, R. T. (1990). *Linear statistical models: An applied approach* (2nd ed.). Duxbury.

Brown, T. A., Cash, T. F., & Mikulka, P. J. (1990). Attitudinal body-image assessment: Factor analysis of the Body-Self Relations Questionnaire. *Journal of Personality Assessment, 55,* 135–144. https://doi.org/10.1080/00223891.1990.9674053

Campbell, J. D., Trapnell, P. D., Heine, S. J., Katz, I. M., Lavallee, L. F., & Lehman, D. R. (1996). Self-concept clarity: Measurement, personality correlates, and cultural boundaries. *Journal of Personality and Social Psychology, 70*(1), 141–156. https://doi.org/10.1037/0022-3514.70.1.141

Cash, T. F., Melnyk, S. E., & Hrabosky, J. I. (2004). The assessment of body image investment: An extensive revision of the Appearance Schemas Inventory. *International Journal of Eating Disorders, 35,* 305–316. https://doi.org/10.1002/eat.10264

Chen, F. F. (2007). Sensitivity of Goodness of Fit Indexes to Lack of Measurement Invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 14*(3), 464–504. https://doi.org/10.1080/10705510701301834

Cohane, G., & Pope, H. (2001). Body image in boys: a review of the literature. The *International Journal of Eating Disorders, 29*(4), 373-379. https://doi.org/10.1002/eat.1033

Field, A. (2013). Discovering statistics using IBM SPSS statistics (4th ed.). SAGE Publications.

Finne, E., Bucksch, J., Lampert, T., & Kolip, P. (2011). Age, puberty, body dissatisfaction, and physical activity decline in adolescents. Results of the German Health Interview and Examination Survey (KiGGS). *International Journal of Behavioral Nutrition and Physical Activity 8:119.* https://doi.org/10.1186/1479-5868-8-119

Fredrickson, B. L., & Roberts, T. (1997). Objectification theory: Toward understanding women's lived experiences and mental health risks. *Psychology of Women Quarterly, 21,* 173-206. https://doi.org/10.1111/j.1471-6402.1997.tb00108.x

Greenleaf, C., Boyer, E. M., & Petrie, T. A. (2009). High school sport participation and subsequent psychological well-being and physical activity: The mediating influence of body image, physical competence, and instrumentality. *Sex Roles, 61*(9-10), 714-726. https://doi.org/10.1007/s11199-009-9671-z

Hair, J. F. Jr., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Pearson Prentice Hall. https://doi.org/10.2307/2007941

Halliwell, E. (2013). The impact of thin idealized media images on body satisfaction: Does body appreciation protect women from negative effects? *Body Image, 10*(4), 509–514. https://doi.org/10.1016/j.bodyim.2013.07.004

Holm, S. (1979). A simple sequential rejective method procedure. *Scandinavian Journal of Statistics, 6*, 65-70.

Hu, L.-t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Jarek, S. (2012). mvnormtest: Normality Test for Multivariate Variables. R package version 0.1-9.

Johnson, F., & Wardle, J. (2005). Dietary restraint, body dissatisfaction, and psychological distress: a prospective analysis. *Journal of Abnormal Psychology, 114*(1), 119–125. https://doi.org/10.1037/0021-843X.114.1.119

Jorgensen, T. D., Pornprasertmanit, S., Schoemann, A. M., & Rosseel, Y. (2022). semTools: Useful tools for structural equation modeling. R package version 0.5-6. Retrieved from https://CRAN.R-project.org/package=semTools

Jovanović, V., Gavrilov-Jerković, V., Žuljević, D., & Brdarić, D. (2014). Psychometric evaluation of the depression anxiety stress scales–21 (DASS–21) in a Serbian student sample. *Psihologija, 47*(1), 93–112. https://doi.org/10.2298/PSI1401093J

Karazsia, B. T., Murnen, S. K., & Tylka, T. L. (2017). Is body dissatisfaction changing across time? A cross-temporal meta-analysis. *Psychological Bulletin*, 143, 293–320. https://doi.org/10.1037/bul0000081

Kenny, D. A. (1979). *Correlation and causality.* Wiley.

Kline, R. B. (2015). *Principles and practice of structural equation modeling* (4th ed.). Guilford Press.

Korkmaz, S., Goksuluk, D., & Zararsiz, G. (2014). MVN: An R Package for Assessing Multivariate Normality. *The R Journal, 6*(2), 151–162. https://journal.r-project.org/archive/2014-2/korkmaz-goksuluk-zararsiz.pdf

Lemon, S. C., Rosal, M. C., Zapka, J., Borg, A., & Andersen, V. (2009). Contributions of weight perceptions to weight loss attempts: Differences by body mass index and gender. *Body Image*, 6, 90–96. https://doi.org/10.1016/j.bodyim.2008.11.004

Marsh, H. W., Morin, A. J., Parker, P. D., & Kaur, G. (2014). Exploratory structural equation modeling: an integration of the best features of exploratory and confirmatory factor analysis. *Annual Review of Clinical Psychology, 10*, 85–110. https://doi.org/10.1146/annurev-clinpsy-032813-153700

Myers, R. (1990). *Classical and modern regression with applications* (2nd ed.). Duxbury.

McCabe, M. P., & Ricciardelli, L. A. (2003). Body image and strategies to lose weight and increase muscle among boys and girls. *Health Psychology, 22*(1), 39-46.

McKinley, N. M., & Hyde, J. S. (1996). The objectified body consciousness scale: Development and validation. *Psychology of Women Quarterly, 20*, 181-215. https://doi.org/10.1111/j.1471-6402.1996.tb00467.

Mckinley, N. M. (1998). Gender differences in undergraduates' body esteem: The mediating effect of objectified body consciousness and actual/ideal weight discrepancy. *Sex Roles, 39*(1/2), 113-123. https://doi.org/10.1023/A:1018834001203

Mihić, Lj., Novović, Z., Čolović, P., & Smederevac, S. (2010). Serbian adaptation of the positive and negative affect schedule (PANAS): its facets and second-order structure. *Psihologija, 47*(4), 393–414. https://doi.org/10.2298/PSI1404393M

Mihić, LJ., Volarov, M., Oljača, M., Novović, Z. (2021). The Depression Anxiety and Stress Scales-21: Bifactor Statistical Indices in Support of the Total and Depression scores. *Psihologija*, *54*(2), 155-172. https://doi.org/10.2298/PSI191227025M

Pesa, J., Syre, T., & Jones, E. (2000). Psychosocial differences associated with body weight among female adolescents: the importance of body image. *The Journal of Adolescent Health*, *26*(5), 330-337. https://doi.org/10.1016/S1054-139X(99)00118-4

Peat, C. M., Peyerl, N. L., & Muehlenkamp, J. J. (2008). Body image and eating disorders in older adults: a review. *The Journal of General Psychology*, *135*(4), 343-358. https://doi.org/10.3200/GENP.135.4.343-358

Popov, S., & Sokić, J. (2022). Psychometric Characteristics of a Serbian Translation of Unconditional Self-Acceptance Questionnaire and Development of a Short Form. *Psihologija, 55*(1), 107–122. https://doi.org/10.2298/PSI200820005P

Pritchard, M., & Cramblitt, B. (2014). Media influence on drive for thinness and drive for muscularity. *Sex Roles*, 71, 208–218. https://doi.org/10.1007/s11199-014-0397-1

R Core Team (2022). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https:// www.R-proje ct. org/

Revelle, W. (2018). *psych: Procedures for Psychological, Psychometric, and Personality Research*. Northwestern University, Evanston, Illinois. https://CRAN.R-project.org/package=psych

Rosseel, Y. (2012). lavaan: An R Package for Structural Equation Modeling. *Journal of Statistical Software, 48*(2), 1–36. https://doi.org/10.18637/jss.v048.i02

Smolak, L., & Cash, T. F. (2011). Future challenges for body image science, practice, and prevention. In T. F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice, and prevention* (pp. 471–478). The Guilford Press.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics* (5th ed.). Allyn and Bacon.

Tylka, T. L. & Hill, M. S. (2004). Objectification theory as it relates to disordered eating among college women. *Sex Roles, 51*(11-12), 719-730. https://doi.org/10.1007/s11199-004-0721-2

Tylka, T. L., & Wood-Barcalow, N. L. (2015). What is and what is not positive body image? Conceptual foundations and construct definition. Body Image, 14, 118–129. https://doi.org/10.1016/j.bodyim.2015.04.001

Tiwari, G. K. (2014). Body image satisfaction enhances self-esteem. Vaichariki IV(4), 7-11.

Vally, Z., D'Souza, C. G., Habeeb, H., & Bensumaidea, B. M. (2019). The factor structure and psychometric properties of an Arabic-translated version of the Body Appreciation Scale-2. *Perspectives in Psychiatric Care*, *55*(3), 373-377. https://doi.org/10.1111/ppc.12312

van Zyl, L. E., & ten Klooster, P. M. (2022). Exploratory structural equation modeling: Practical guidelines and tutorial with a convenient online tool for Mplus. *Frontiers in Psychiatry*, *12*, 795672. https://doi.org/10.3389/fpsyt.2021.795672

Vartanian, L. R. (2009). When the body defines the self: Self-concept clarity, internalization, and body image. *Journal of Social and Clinical Psychology, 28*(1), 94–126. https://doi.org/10.1521/jscp.2009.28.1.94

Vartanian, L. R., & Dey, S. (2013). Self-concept clarity, thin-ideal internalization, and appearance-related social comparison as predictors of body dissatisfaction. *Body Image, 10*(4), 495–500. https://doi.org/10.1016/j.bodyim.2013.05.004

Wang, S. B., Haynos, A. F., Wall, M. M., Chen, C., Eisenberg, M. E., & Neumark-Sztainer, D. (2019). Fifteen-year prevalence, trajectories, and predictors of body dissatisfaction from adolescence to middle adulthood. *Clinical Psychological Science*, *7*(6), 1403-1415. https://doi.org/10.1177/2167702619859331

Watson, D., & Clark, L. A. (1994). *The PANAS-X: Manual for the positive and negative affect schedule-expanded form.* Unpublished manuscript.

Wei, B., Klimek, P., Pennesi, J. L., & Blashill, A. J. (2021). Perceptual and attitudinal body image, disordered eating, and muscle-building behavior in college men. *Psychology of Men & Masculinities*, 22, 156–165. https://doi.org/10.1037/men0000290

Supplementary materials

Appendix A

Serbian translation of the Embodied image scale

Pažljivo pročitajte sledeće tvrdnje i procenite u kojoj meri se odnose na Vas (zokružite broj).

Brojevi na skali znače sledeće:

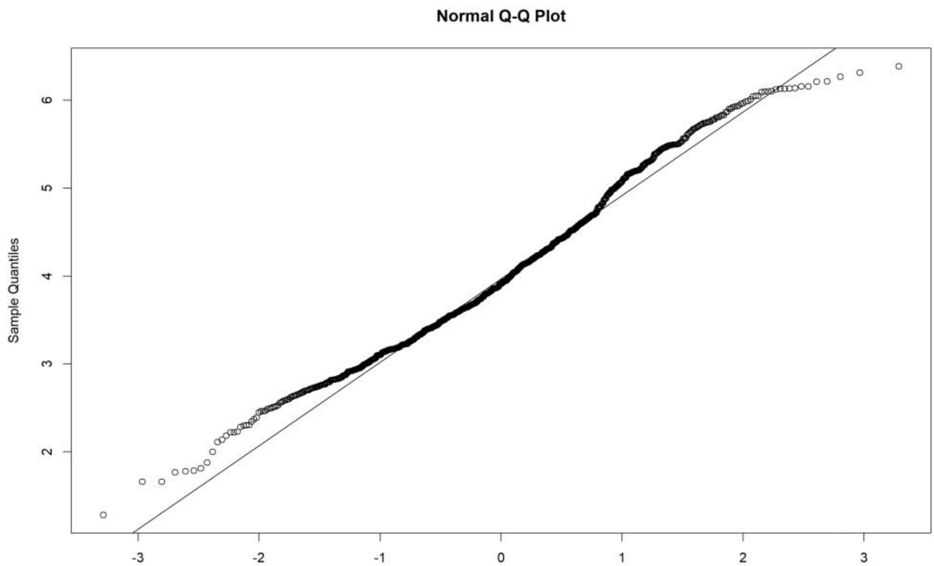
1 – uopšte se ne odnosi na mene (uopšte nije tačno)

5 – veoma se odnosi na mene (veoma tačno)

1	Koliko se dobro osećam u vezi sa svojim telom zavisi dosta od toga kako izgledam.	1	2	3	4	5
2	Često sam fizički aktivan/na (npr. sport, planinarenje, vežbanje).	1	2	3	4	5
3	Koliko se dobro osećam u vezi sa svojim telom zavisi dosta od toga da li me drugi procenjuju kao privlačnog/u.	1	2	3	4	5
4	Uvek pokušavam da postavim sebi izazov tokom fizičkog vežbanja.	1	2	3	4	5
5	Osećam se veoma dobro u vezi sa svojim izgledom.	1	2	3	4	5
6	Učestvujem u fizičkim aktivnostima kad god mogu (npr. sport, planinarenje, vežbanje).	1	2	3	4	5
7	Jedan od najbitnijih razloga zašto bi ljudi trebalo da vode računa o svom telu je da bi izgledali dobro.	1	2	3	4	5
8	Generalno, veoma sam zadovoljan/a svojim fizičkim sposobnostima.	1	2	3	4	5
9	Oblačim određene stvari da bih izgledao/la što atraktivnije mogu.	1	2	3	4	5
10	Koliko se dobro osećam u vezi sa svojim telom veoma zavisi od toga šta moje telo može fizički da uradi.	1	2	3	4	5
11	Uvek se trudim da izgledam najbolje što mogu.	1	2	3	4	5
12	Osećam se veoma dobro u vezi toga za šta sam fizički sposoban/a.	1	2	3	4	5
13	Veoma sam zadovoljan/a izgledom svog tela.	1	2	3	4	5
14	Jedan od najbitnijih razloga zašto bi ljudi trebalo da brinu o svom telu je da bi mogli da budu fizički aktivni.	1	2	3	4	5
15	Generalno, zadovoljan/a sam svojim izgledom.	1	2	3	4	5
16	Veoma sam zadovoljan/a svojim postignućem u fizičkim aktivnostima.	1	2	3	4	5
17	Jedan od najbitnijih razloga zašto bi ljudi trebalo da vode računa o svom telu je da bi se osećali dobro u vezi svojih fizičkih sposobnosti (snage, spremnosti, izdržljivosti).	1	2	3	4	5

Appendix B

Normal Q-Q plot after removing 44 multivariate outliers



Appendix C

Results of testing multicolinearity among the Embodied Image Scale items

item	*R*	R^2	VIF
1	0.531	0.282	1.393
2	0.808	0.653	2.881
3	0.568	0.323	1.477
4	0.666	0.443	1.796
5	0.845	0.713	3.488
6	0.807	0.651	2.868
7	0.502	0.252	1.338
8	0.799	0.638	2.766
9	0.585	0.342	1.520
10	0.559	0.312	1.454
11	0.537	0.289	1.406
12	0.77	0.592	2.452
13	0.886	0.786	4.664
14	0.648	0.42	1.724
15	0.875	0.765	4.253
16	0.815	0.665	2.984
17	0.631	0.398	1.662

Note. VIF – Variance inflation factor

Appendix D

Multi-group confirmatory factor analysis model - residual invariance model