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Factor Structure and Invariance by Sex of the Body Esteem Scale in Mexican Adolescents

Estructura factorial e invarianza por sexo de la escala de estima corporal en adolescentes mexicanos

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Abstract. In this study, we examined the factor structure of the Body Esteem Scale for Adolescents and Adults (BESAA), using the Exploratory Model of Structural Equations, and the invariance by sex, in a sample of Mexican adolescents. The sample included 491 men and 526 women, ranging from 11 to 19 years-old, who completed the Body Esteem Scale for Adolescents and Adults, the Body Esteem Scale, the Beck Depression Inventory, and the Rosenberg's Self-Esteem Scale. The results indicated that our data fit well with the three-factor model, originally proposed by Mendelson et al. for the Body Esteem Scale for Adolescents and Adults. Regarding invariance, in both samples (men and women), the three-factor model had acceptable fit indices. The BESAA correlated positively and significantly with self-esteem and body esteem, in addition, it correlated negatively with the Body Mass Index and with depressive symptoms. The internal consistency of the BESAA was acceptable. This study contributes to the understanding of body esteem in Mexican adolescents, providing evidence of the validity of the BESAA in this population and underlining its usefulness in research on body image in Mexican population.

Key Words:

Resumen. En este estudio examinamos la estructura factorial de la Escala de Estima Corporal para Adolescentes y Adultos (BESAA), usando un modelo de ecuaciones estructurales exploratorio y la invarianza por sexo, en una muestra de adolescentes mexicanos. La muestra incluyó 491 hombres y 526 mujeres, con un rango de 11 a 19 años de edad, quienes completaron la Escala de Estima Corporal para Adolescentes y Adultos, la Escala de Estima Corporal, el inventario de Depresión de Beck y la Escala de Autoestima de Rosenberg. Los resultados indican que nuestros datos ajustan bien al modelo de tres factores, originalmente propuesto por Mendelson et al. para la Escala de Estima Corporal para Adolescentes y Adultos. Respecto a la invarianza, en las dos muestras (hombres y mujeres), el modelo de tres factores tuvo índices de ajuste aceptables. La BESAA correlacionó positiva y significativamente con la autoestima y la estima corporal, además, correlacionó negativamente con el índice de masa corporal y con los síntomas depresivos. La consistencia interna de la BESAA fue aceptable. Este estudio contribuye a la comprensión de la estima corporal en adolescentes mexicanos, proporcionando evidencia de la validez de la BESAA en esta población y subrayando su utilidad en investigaciones sobre la imagen corporal en población mexicana.

Palabras Clave:

Introduction

Body esteem (BE) refers to the evaluation of one's own body or physical appearance (Mendelson et al., 2001). To measure it, Mendelson et al. developed the Body Esteem Scale for Adolescents and Adults (BESAA), which comprises 23 items (13 positive statements and 9 nine with reverse wording), Likert type (0 = never; 4 = always), distributed in three subscales: Appearance (10 items), which captures general feelings about appearance; Weight (8 items), to measure satisfaction with weight; and Attribution (5 items), to identify the perception that others evaluate one's body and appearance. The authors found that all components of the BESAA have excellent internal consistency (.92, .94 and .81, respectively).

The BESAA has been evaluated in children, adolescents and adults of both sexes and from different regions of the world: Europe (Antunes, 2016; Confalonieri et al., 2008; Jónsdóttir et al., 2008; Rousseau et al., 2015; Valls et al., 2008 al., 2011), Asia (Arslan et al., 2020; Garbett et al., 2021; Garbett et al., 2024; Sevi and Gedik, 2019), North America (Cragun et al., 2013; Mendelson et al., 2001), and South America (Andres et al., 2023; Smith et al., 2022).

In support of validity, the BES-AA correlates positively with self-esteem (Confalonieri et al., 2008; Cragun et al., 2013; Mendelson et al., 2001; Sevi & Gedik, 2019; Valls et al., 2011) , with body satisfaction (Confalonieri et al., 2008; Sevi & Gedik, 2019), with perceived social competence (Jónsdóttir et al., 2008), with self-esteem (Garbett et al., 2024), with body appreciation (Andres et al., 2023), and with positive affect (Smith et al., 2022), and negatively with BMI (Cragun et al., 2013; Lunde et al., 2007; Rousseau et al., 2015; Sevi & Gedik, 2019; Valls et al., 2011), investment in appearance (Antunes, 2016), the internalization of beauty ideals (Andrés, et al., 2023), body dissatisfaction (Garbett et al., 2021; Garbett et al., 2024; Smith et al., 2022), depression (Jónsdóttir et al., 2008), victimization (Lunde et al., 2007), eating disorder symptoms (Andrés et al., 2023, Garbett et al., 2021), and restrictive diet (Lunde et al., 2007).

Regarding the factor structure of the BESAA, results are inconsistent. Some authors have identified two (Cragun et al., 2013; Sevi & Gedik, 2019), three (Andres et al., 2023; Arslan et al., 2020; Confalonieri et al., 2008; Garbett et al., 2021; Garbett et al., 2024; Mendelson et al., 2001; Rousseau et al., 2015; Sevi & Gedik, 2019; Smith et al., 2022), and four factors (Valls et al., 2011). The inconsistencies found could be due to: 1) some studies used Principal Component Analysis (PCA) as a factor extraction method with oblique rotation (Antunes, 2016; Arslan, et al., 2020;

Confalonieri et al., 2008; Jónsdóttir et al., 2008) while others used PCA with orthogonal rotation (Valls et al., 201; Rousseau et al., 2015). In both cases, the extraction method (principal components) is problematic, as it does not allow identification of measurement error of the indicators (Lloret-segura et al., 2014; Worthington & Whittaker, 2006). Additionally, orthogonal rotation assumes that factors are independent, contradicting the assumption that factors are intercorrelated (Mendelson et al., 2001); 2) some studies used Factor Analysis, and evaluated construct validity using a two-step strategy (Garbett et al., 2021; Garbett et al., 2024; Sevi & Gedik, 2019): they split the sample in half, conducting Exploratory Factor Analysis (EFA) with one half and Confirmatory Factor Analysis (CFA) with the other. This decision reduces sample size and increases the risk of capitalization on chance; and 3) finally, both EFA and CFA have limitations. In EFA, no restrictions are imposed on items to obtain an initial factorial solution and transformations are allowed (applying different rotation criteria). In CFA, the number of factors and their relationship are fixed, based on theory and previous analyses. Also, items are fixed to one factor and the remaining item loadings are set to zero. CFA restrictions cause theoretically well-consolidated instruments to fail to achieve adequate fit indices when they are modeled (Asparouhov & Muthén, 2009). To address these problems, Marsh et al. (2011) recommended to use Exploratory Structural Equation Modeling (ESEM), which allows estimating loadings of all items on all factors in a single step, thus preventing model fit from decreasing when adding covariances to the model. That is, ESEM identifies factorial structure flexibly while controlling sources of variability that are not part of the construct (Lloret et al., 2014; Marsh et al., 2011). In other words, ESEM models correspond to a confirmatory strategy, with the advantage of providing a more realistic representation of data by allowing, as in EFA, an item to have factor loadings on more than one factor (Asparouhov & Muthén, 2009).

Additionally, invariance by sex has been evaluated in some studies, however, the findings are contradictory: some scholars have found that the scale is invariant by sex (Andres et al., 2024; Garbertt et al., 2021; Garbett et al., 2024), and others that it is not invariant (Smith et al., 2022).

As a contribution to the literature, in this study we examined the factor structure of the BESAA, using the Exploratory Structural Equation Model (Asparouhov & Muthén, 2009), in a sample of Mexican adolescents. Additionally, we estimated invariance by sex.

As in previous studies, we hypothesized that the BESAA would correlate negatively with BMI and depression symptoms, and positively with self-esteem and body esteem. Finally, we hypothesized that with ESEM, the three-factor model, originally proposed by Mendelson et al. (2001) would obtain a good overall fit.

Methods

Participants

The initial sample included 1,055 Mexican adolescents, from three public secondary schools and three high schools, located in the North of the State of Mexico, a low-income area. After removing outliers (n = 38), the sample comprised 1,017 participants (491 men and 526 women), ranging from 11 to 19 years of age (M = 14.17, SD = 1.75). BMI (height/weight^2) was from 12.20 to 38.29 (M = 22.02, SD = 3.98).

Measures

All participants provided anonymous information about their sex and age. In addition, all participants were weighed using an InBody-230-Biospace body analyzer and were measured with a Seca portable stadiometer. Using weight and height, the BMI was obtained.

Body Esteem Scale for Adolescents and Adults

The BESAA (Mendelson et al., 2001) has 23 Likert-type items (0 = *never*; 4 = *always*), 14 positive, and 9 negative statements about the body and appearance. High scores

reflect greater body esteem. The original version of the BESAA includes three subscales: Appearance (general feelings about one's physical appearance; items 1, 6, 7, 9, 11, 13, 15, 17, 21, and 23; α = .94); Weight (satisfaction with one's own weight; items 3, 4, 8, 10, 16, 18, 19 and 22; α =.81), and Attribution (attribution to others of evaluations of the body and physical appearance; items 2, 5, 12, 14 and 20; α = .92), all subscales with adequate internal consistency and temporal stability (three months after the initial test).

Body Esteem Scale

Convergent validity was examined with the Body Esteem Scale (BES; Franzoi & Shields, 1984), which assesses feelings about different parts and functions of the body, with 35 Likert-type items (1 = *I have strong negative feelings*; 5 = *I have strong positive feelings*). High scores represent higher body esteem. In Mexico, two factors were identified (Escoto et al., 2016): Physical Condition and Weight Concern (PHWC-BES), and Physical and Sexual Attractiveness (PSA-BES), for men and women adolescents, with adequate internal consistency (α = .86 to .91), and temporal stability (r = .62 to .68). The BES correlated with self-esteem, BMI, and fat mass. In this study, the internal consistency (ω) of the scale was .93 and .92 for men and .87 and .88 for women, respectively.

Depression

The Beck Depression Inventory (BDI; Beck et al., 1979) has 21 items, with four response alternatives ordered from least to greatest severity. High scores indicate more depression symptoms (0 to 63 points). For each item, the respondent chooses the phrase that best describes their mood during the last week, including the day they completed the inventory. The BDI is a valid and reliable measure for clinical and non-clinical populations of Mexican adolescents (Beltrán et al., 2012). In this study, the internal consistency (ω) of the scale was .97.

Self-Esteem

Rosenberg's Self-Esteem Scale (RSE; 1965) measures feelings of worth and self-respect. The scale includes 10 Likert-type items (0 = *strongly disagree*; 3 = *strongly agree*). Five items are recoded and then added; Higher scores reflect greater self-esteem. The unidimensional structure of the RSE was confirmed for the Mexican population (Bosques, 2015). RSE has adequate internal consistency (a = .73 - .92; Rosenberg, 1965; Schmitt & Allik, 2005) and temporal stability (r = .85 to .89; Rosenberg, 1965); Furthermore, RSE has predictive, construct, convergent and divergent validity (Rosenberg, 1965; Schmitt & Allik, 2005). In the present study, the internal consistency (ω) of the scale was .85.

Procedure

In this study, the scale (Mendelson et al., 2001) was translated and adapted to Spanish. To achieve conceptual equivalence, three bilingual researchers, specialized in the field of body image, translated the BESAA. After reaching consensus, this new version was analyzed by three experts in the field of body image, in terms of semantic, cultural, operational, and conceptual vocabulary equivalence (Herdman et al., 1998). The suggestions of these experts were compiled into a single version, which was in turn translated into English. Then, B. Mendelson (personal communication November 20, 2020) reviewed and approved this version. We pretested the final version on a sample of 50 participants, drawn from the target population, to assess comprehension and readability of the scale (Guillemin et al., 1993). No other changes were made to the scale, following feedback from the target population.

After receiving general information about the study, parental consent and assent were obtained from the participants. Participation in the study was voluntary and without remuneration. In one session, participants were measured and weighed and in another, they completed the measurements, during school hours. The evaluation was carried out in the presence of a researcher, a teacher and two parent representatives. This study was approved by the Research Department of the Autonomous University of the State of Mexico.

Data analysis

Exploratory Structural Equation Model was carried out with the Mplus Version 8.0 software, and different goodness-of-fit indices proposed by Hu and Bentler (1999) were evaluated: a) Chi square-scaled Satorra-Bentler (S-Bχ2), relative to the ratio between degrees of freedom (S-Bχ2/df), values less than 2 are indicative of good model fit; and values between 2 and 3 indicate acceptable fit, including values of 5 for big samples (Xia & Yang, 2019); b) the Standardized Root Mean Square Residual (SRMR), values less than .05 indicate a good fit of the data to the model and values from .05 to .08 indicate an acceptable fit (Xia & Yang, 2019); c) the Root Mean Square Error of Approximation (RMSEA; Finch & West, 1997), for which we use the confidence interval of .08 or lower (Little, 2013); and d) the Comparative Goodness of Fit Indices (CFI) and Tucker-Lewis (TLI), where values close to .95 are indicative of a good fit, while values between .90 and .95 can be considered acceptable (Hair et al., 2019), especially in complex models or with multidimensional factorial structures such as the BESAA.

To examine invariance by sex, we used The Multigroup- Confirmatory Factor Analysis (MG-CFA), which allowed us to evaluate whether response patterns were similar between men and women. Following the sequential approach, we first evaluate the models for men and women separately. Metric invariance (restriction on the equivalence in the loadings of the items on the factors) was evaluated based on the result of configural invariance (unrestricted model). Scalar invariance was based on metric invariance, adding the restriction to the intercepts. Incremental values (Δ) of CFI ≤ 0.01 and RMSEA ≤ 0.015 were considered acceptable (Cheung & Rensvold, 2002).

Using R software, we calculated the Spearman correlation coefficient between the BESAA and BES, BMI, depression, and self-esteem. With the Factor software (Lorenzo-Seva & Ferrando, 2023) we estimated the internal consistency of the scale using McDonald's Omega coefficient; values greater than .80 were considered acceptable (McDonald, 2013).

Finally, comparisons by sex were made using the independent samples t-test.

Results

Preliminary analysis

Mahalanobis distance analysis indicated that 3.6% of cases (n = 38) were atypical (C^2 with p < 0.001), so they were eliminated from further analysis. The Mardia skewness coefficient indicated that the data are normally distributed (35.51, p = 1.00), however the kurtosis coefficient indicated a non-normal multivariate distribution (629.73, p < 0.00001). Large multivariate kurtosis supports the use of robust maximum likelihood statistics. Information on the descriptive statistics of the items is provided in Table 1.

Construct validity

With the entire sample, we carried out Exploratory Structural Equation Model. When inspecting the loadings higher or equal to .40 (Table 2), we identified that the first factor comprised eight items related to aspects of physical appearance (items 3, 6, 7, 11, 13, 15, 17 and 21); The second factor included three items on aspects related to attribution (items 2, 12 and 20) and the third factor grouped four items related to weight (items 4, 8, 10 and 16).

By inspecting the model fit indices (Table 3), we conclude that our data fit well the three-factor model, originally proposed by Mendelson et al. (2001). Although the TLI showed a value slightly lower than the proposed cut-off point, the values for CFI, RMSEA and SRMR were acceptable.

Sex invariance

With the entire sample, we examined the sex invariance of the BESAA. In both samples (men and women), the three-factor model had acceptable fit indices. At each step, the difference between the configural model (unconstrained), and the metric (constraint on loading) and scalar (constraint on intercepts) invariance models were good (Table 3).

Table 1

Item	Mean	Confidence Interval (95%)	Variance	Skewness	Kurtosis
1	2.43	(2.37-2.49)	0.94	-0.12	-0.44
2	2.20	(2.14-2.26)	0.91	-0.06	-0.28
3	3.06	(2.99-3.12)	1.18	-0.99	0.11
4	2.38	(2.30-2.47)	1.78	-0.31	-1.10
5	1.65	(1.57-1.73)	1.72	0.28	-0.98
6	2.76	(2.70-2.83)	1.17	-0.56	-0.50
7	2.36	(2.28-2.43)	1.61	-0.39	-0.82
8	2.58	(2.50-2.66)	1.69	-0.52	-0.86
9	1.37	(1.30-1.45)	1.60	0.43	-0.98
10	2.19	(2.11-2.27)	1.71	-0.16	-1.06
11	3.34	(3.28-3.41)	1.04	-1.61	1.87
12	2.22	(2.16-2.29)	1.01	-0.19	-0.37
13	3.13	(3.06-3.19)	1.17	-1.19	0.67
14	2.82	(2.75-2.88)	1.09	-0.73	0.03
15	2.98	(2.91-3.04)	1.14	-0.82	-0.16
16	2.53	(2.45-2.61)	1.80	-0.46	-0.99
17	3.34	(3.28-3.40)	0.91	-1.45	1.52
18	3.48	(3.42-3.54)	0.91	-1.96	3.27
19	2.90	(2.81-2.99)	1.99	-0.93	-0.59
20	1.62	(1.54-1.70)	1.63	0.20	-1.05
21	2.47	(2.38-2.55)	1.87	-0.45	-1.03
22	2.14	(2.06-2.21)	1.53	-0.07	-0.95
23	2.38	(2.30-2.45)	1.43	-0.30	-0.78

Univariate descriptive for BESAA items

Correlates of body esteem

In women and men, the BESAA correlated positive and significantly with self-esteem (r = .61 and r = .42, respectively; p = .0001) and body esteem (r = .65 and .52, respectively; p = .0001). It also negatively correlated with BMI (r = –.29 and r = –.27, respectively; p = .0001) and with depressive symptoms (r = -.47 and r = -.32, respectively, p = .0001).

Internal consistency

In women and men, the internal consistency of the BESAA (ω = .90 and ω = .88, respectively) and its subscales: Appearance (ω = .87 and ω =.80, respectively), Weight (ω = .84 and ω = .78, respectively) and Attribution (ω = .70 and ω = .70, respectively), was acceptable.

Comparisons by sex

The t-test for independent samples showed statistically significant differences between women and men for Appearance, Weight, and total score (Table 4). On average, men scored significantly higher on Appearance, Weight, and for the BES-AA total score, compared to women; However, no statistically significant differences were observed in Attribution. The magnitude of the difference in the means was in general, large.

Table 2. Factor loadings of the three-factor model

		ESEM		
		Appearance	Attribution	Weight
1	Me gusta cómo me veo en las fotografías.	.367	.428	-.035
2	Otras personas consideran que soy guapo/a.	.165	**.639**	-.003
3	Estoy orgulloso/a de mi cuerpo.	**.631**	.057	.159
4*	Estoy preocupado/a tratando de cambiar mi peso corporal.	.007	-.258	**.619**
5	Pienso que mi apariencia podría ayudarme a conseguir trabajo	-.104	.343	.106
6	Me gusta cómo me veo cuando me miro en el espejo.	**.655**	.301	-.008
7*	Si pudiera cambiaría muchas cosas de mi apariencia.	**.473**	-.086	.107
8	Estoy satisfecho/a con mi peso corporal.	.013	-.068	**.861**
9*	Desearía verme mejor.	.268	-.132	.128
10	Me gusta mucho lo que peso.	-.200	.007	**.964**
11*	Desearía parecerme a alguien más.	**.457**	-.028	-.176
12	A las personas de mi edad les gusta mi apariencia.	.020	**.605**	.229
13*	Mi apariencia me molesta.	**.526**	-.008	.093
14	Soy tan guapo/guapa como la mayoría de las personas.	.351	.344	-.110
15	Estoy bastante feliz por la manera en que me veo.	**.776**	.097	.040
16	Siento que mi peso es adecuado para mi estatura.	.030	.028	**.607**
17*	Me siento avergonzado por cómo me veo.	**.608**	.015	-.030
18*	Pesarme me deprime.	.229	-.157	.364
19*	Mi peso me hace infeliz.	.200	-.197	-.094
20	Mi apariencia me ayuda a tener citas.	-.120	**.586**	.200
21*	Me preocupa mi apariencia.	**.409**	-.200	.083
22	Pienso que tengo un buen cuerpo.	.178	.367	.372
23	Me veo tan guapo/a como me gustaría.	.519	.432	.059

Note: Reversed items are marked with an asterisk; The shaded cells indicate the factor to which the item theoretically belongs; in bold the items with a statistically significant loading are indicated.

Discussion

The main goal of the present study was to examine the factor structure of the Body Esteem Scale for Adolescents and Adults (BESAA) in a sample of Mexican adolescents, using the Exploratory Structural Equation Model (ESEM) approach. Furthermore, we evaluated the invariance by sex of the BESAA in this population. In the following paragraphs, we discuss the most important findings of this study, their implications, and possible directions for future studies.

Exploratory Structural Equation Model

Using ESEM, we identified a three-dimensional structure (Weight, Appearance, and Attribution), as in the original version (Mendelson et al., 2001), with acceptable goodness-of-fit indices. Our data support the original structure, which align with the original theory, and are similar to structures reported in other contexts (e.g., Arslan et al., 2020; Garbett et al., 2021; Sevi & Gedik, 2019), which suggests that the structure of the scale is robust and can be generalizable to different contexts; Furthermore, it supports the suitability of our version for use with Mexican adolescents.

Table 3. Goodness of fit indices for the different models in Sample 1 and Sample 2.

Models	*n*	S-Bχ2	*df*	factor	*p*	RMSEA (CI)	SRMR	CFI	TLI	Δ				
										S-Bχ2	*df*	RMSEA	CFI	TLI
ESEM	1017	437.848	151	1.0498	.00001	.043 (.039- .048)	.025	.964	.939					
MG-CFA	Females (*n* = 526)	273.718	151	1.0421	.00001	.039 (.032- .047)	.025	.974	.956					
	Males (*n* = 491)	324.050	151	1.0322	.00001	.048 (.041- .056)	.033	.948	.911					
	Configural invariance	871.660	374	1.0571	.00001	.051 (.047- .056)	.033	.937	.915					
	Metric invariance	951.544	434	1.0666	.00001	.048 (.044- .053)	.041	.937	.924	-79.884	60	-.003	.00001	.009
	Scalar invariance	1061.893	454	1.0630	.00001	.051 (.047- .055)	.045	.924	.915	-110.349	20	.003	-.013	-.009

Note: ESEM = Exploratory Structural Equation Model; MG-CGA = Multi-Group Confirmatory Factor Analysis; S-Bχ2 = Satorra-Bentler' Chi square; df = degrees freedom; *p* = significance; RMSEA = Root Mean Square Error of Approximation; CI = confidence interval; SRMR = Root Mean Square Residual; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; Δ = incremental value.

Table 4. Means and standard deviations of the BES-AA scores between men and women

Scale/sub-scale	Men *M* (*SD*)	Women *M* (*SD*)	*t*	*p*	*d*	*IC* (95%)
Scale	59.60 (12.95)	57.14 (15.02)	2.80	.005	2.46	0.73-4.18
Appearence	23.86 (5.47)	23.03 (6.59)	2.19	.03	0.83	0.09-1.57
Attribution	5.60 (2.62)	6.09 (2.52)	0.59	.56	0.10	0.22-0.41
Weight	10.07 (3.91)	9.32 (4.45)	2.89	.004	0.76	0.24-1.27

Note: *M* = mean; *SD* = standard deviation; *t* = t test for independent samples; *p* = significance; *d* = effect size; *IC* = confidence interval

This is the first version of the BESAA, which shows a satisfactory fit for adolescents with the ESEM technique. To date, only the French version (Rousseau et al., 2015) had been applied to the adolescent population, but using principal components analysis and without reverse keyed items.

In general, the global fit indices of the model were adequate, although the Tucker-Lewis index (TLI) was slightly lower than the recommended value, which could reflect some specific characteristics of the Mexican sample, that do not completely fit the assumptions of the original model. However, the CFI, RMSEA, and SRMR were within the expected ranges, suggesting that the three-factor model is an appropriate representation of the scale structure for Mexican adolescents. It is possible that the discrepancies observed in the literature, regarding the factor structure (for example, Valls et al., 2011) of the BESAA, can be explained because the use of different methodologies (ACP VS. ESEM), and different sample sizes, which underlines the importance of using appropriate statistical approaches for the validation of psychological scales.

The retention of only 15 items from the original 23, raises important considerations about the psychometric integrity of the instrument. Item reduction could affect the reliability of the instrument, particularly its internal consistency, however, our reliability analyses showed that all three factors maintained adequate levels of internal consistency ($\alpha > .80$ for all factors), suggesting that the retained items, efficiently capture the underlying constructs.

Comparability with previous studies: This reduced version limits direct comparisons with research that used the full scale. Mean scores and correlations with other variables could vary due to the elimination of certain items. We recommend conducting equating studies to establish equivalences between both versions.

It is necessary to examine whether the eliminated items represented specific aspects of the construct that are not now being assessed. Our content analysis indicated that the retained items maintain a balanced representation of the main domains of body esteem.

Regarding the conceptual integrity of the factors, despite the reduction of items, the three original factors remained identifiable and conceptually coherent. This suggests that the fundamental structure of the construct remained intact, although represented in a more parsimonious manner: The Appearance Factor retained the core items related to general satisfaction with physical appearance; the Weight Factor maintained its focus on satisfaction with body weight and shape; and the Attribution Factor preserved the elements related to perceptions of how others evaluate the individual's body.

On the other hand, the elimination of certain items could reflect cultural specificities, where some aspects of body esteem assessed in the original version could be less relevant or manifest differently in our population. This does not necessarily indicate a deficiency in measurement, but rather an appropriate cultural adaptation.

Additionally, some strengths of the reduced version are: a) a shorter scale reduces the burden on participants and facilitates its implementation in studies using multiple instruments; b) the elimination of items with significant cross-loadings has resulted in a clearer factor structure, with better differentiated factors, c) as our analyses demonstrate, this reduced version maintains equivalent measurement properties between men and women, which reinforces its usefulness for research comparing groups by sex.

Sex invariance

A second contribution of this study was that we examined the sex invariance of the BESAA. Invariance involves testing the equivalence of the constructs measured in two or more independent groups, to guarantee that the differences found between them, are not due to psychometric differences in the instrument (Cheung & Rensvold, 2002). Our results indicated that this scale is invariant, both, in its factor structure, and in its loadings and intercepts.

It is notable that the model fit is slightly better for women than for men, although both are still acceptable. This difference could reflect that the BESAA items might more accurately capture female body esteem experiences, possibly due to the greater cultural and social attention towards female body image.

Configural Invariance showed an acceptable fit, confirming that the basic factor structure of the BESAA is similar between men and women. This suggests that the same constructs are being measured in both groups.

The addition of constraints on the factor loadings (metric invariance) does not significantly deteriorate the model fit. In fact, the TLI improves, suggesting that the strength of the relationships between items and latent factors is comparable between men and women.

The Scalar Invariance results showed a slight deterioration in fit, although it is still acceptable according to less stringent criteria. The deterioration could indicate some differences in the intercepts of certain items between men and women.

Particularly, models indicated an adequate fit, suggesting that the BESAA evaluates the same trait, equivalently, in Mexican men and women, so the scale is a valid tool for the evaluation of body esteem in Mexican adolescents, regardless of their sex. Our findings are consistent with those of previous studies (Andres et al., 2024; Garbett et al., 2021).

Correlates of body esteem

As expected, the results of the correlation analysis, indicated that body esteem was positively associated with self-esteem and body esteem; On the contrary, a negative and significant relationship was observed with BMI and depression symptoms. These findings are consistent with previous studies that has shown that people with higher body esteem have lower body mass index (BMI) and fewer symptoms of depression (Cragun et al., 2013; Smith et al., 2022), as well as greater self-esteem (Confalonieri et al., 2008). These correlations support the validity of the BESAA, showing that the scale not only measures the perception of one's own body image, but also consistently is related to other important psychological constructs.

It is interesting to note that the correlations were slightly stronger in women, which could reflect social and cultural pressures that affect women more in terms of physical appearance and weight concerns. These results could be useful for future research that explores gender differences regarding the experience of body image and its psychosocial consequences.

Comparisons between men and women

In comparisons by sex, men reported greater satisfaction with Appearance, Weight, and greater overall body esteem, compared to women. These differences are consistent with the literature, which suggests that, in general, men tend to have greater satisfaction with their bodies and their weight than women (Garbett et al., 2021; Sevi & Gedik, 2019). However, no differences were found on the Attribution subscale, suggesting that, in terms of the perception of how others evaluate the body, both men and women, may experience similar social pressures. These gender differences in body esteem are important as they highlight the need for sex-specific interventions to promote healthy body image in adolescents. The greater body dissatisfaction reported by women could be related to social expectations and beauty ideals that prevail in many cultures, particularly in Latin American contexts (Poo et al., 2022).

Implications and future research

This study contributes to the understanding of body esteem in Mexican adolescents, providing evidence of the validity of the BESAA in this population, and highlighting its usefulness in research on body image in the Mexican population. However, there are some limitations that must be considered. First, the sample is composed of adolescents from a specific region of Mexico, so the results may not be completely generalizable to other cultural and socioeconomic contexts within the country. Furthermore, although a robust ESEM approach was used, future studies could explore the validity and reliability of the BESAA in diverse samples.

Regarding practical implications, the results suggest that the BESAA is a valid tool to assess body esteem in adolescents, and that interventions aimed to improve body image, should consider gender differences in expectations about the body and the weight. Future research could explore interventions that promote body acceptance and reduce social pressure on physical appearance, especially in adolescent girls, to mitigate the negative effects of body dissatisfaction.

Conclusion

The findings of this study, provide strong evidence that the Body Esteem Scale for Adolescents and Adults (BESAA) is a valid and reliable measure to assess body esteem in Mexican adolescents. The scale shown to be invariant by sex, and has a robust factorial structure, which makes it a useful tool for research on body image in this age group. However, more studies are needed to keep on validating this scale in different populations and cultural contexts, and to explore interventions that can improve body esteem and perception in adolescents from diverse cultures.

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