VALIDATION OF THE SPANISH VERSION OF THE PHYSICAL APPEARANCE COMPARISON SCALE-REVISED (PACS-R): PSYCHOMETRIC PROPERTIES IN A MIXED-GENDER COMMUNITY SAMPLE

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Abstract

The objectives of this study were to examine the validity and reliability of the Spanish version of the Physical Appearance Comparison Scale-Revised (PACS-R) and to assess its ability to predict body dissatisfaction and disordered eating in a community sample in Spain. A total of 1405 participants (83.6% women; aged 14-64) completed the Spanish PACS-R along with measures of body image, eating disturbances, appearance-related sociocultural influences, self-esteem, and social comparison. Exploratory and confirmatory factor analyses supported the original one-dimensional factor structure for the 11-item Spanish version of the PACS-R. Women had significantly higher PACS-R scores than men. Internal consistency of the measure was excellent, and results showed good test-retest reliability and convergent validity in men and women. Regression analyses demonstrated the utility of the scale in predicting body dissatisfaction and disordered eating in both genders. Results suggest that the Spanish PACS-R has excellent psychometric properties, therefore it might be a useful tool to measure appearance comparisons among Spanish speaking populations.
KEY WORDS: *PACS-R, appearance comparison, body image, measurement, Spanish validation, psychometric properties.*

Resumen

Los objetivos de este estudio fueron examinar la validez y la fiabilidad de la versión española de la "Escala de comparación de la apariencia física-revisada" (*Physical Appearance Comparison Scale-Revised*; PACS-R) y evaluar su capacidad predictiva de la insatisfacción corporal y las alteraciones alimentarias en una muestra comunitaria española. 1405 participantes (83,6% mujeres; de entre 14 y 64 años) completaron la PACS-R y también medidas de imagen corporal, alteraciones alimentarias, influencias socioculturales relacionadas con la apariencia física, autoestima y comparación social. Los análisis factoriales exploratorio y confirmatorio apoyaron la estructura unidimensional original para la versión española de 11 ítems de la PACS-R. Las mujeres mostraron puntuaciones significativamente más elevadas que los hombres. Se halló una consistencia interna

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excelente, buena fiabilidad test-retest y buena validez convergente. Los análisis de regresión demostraron la utilidad de la escala para predecir la insatisfacción corporal y las alteraciones alimentarias tanto en hombres como en mujeres. Las excelentes propiedades psicométricas de la PACS-R la convierten en una herramienta útil para medir las comparaciones de la apariencia física en personas de habla española.

PALABRAS CLAVE: *PACS-R, comparación de la apariencia, imagen corporal, medida, validación española, propiedades psicométricas*.

Introduction

Festinger's social comparison theory posits that people tend to search out standards to which they can compare themselves as a means to determine their own progress and standing in life (Festinger, 1954). It has been suggested that this theoretical framework might be useful to understand not only comparisons related to abilities and opinions, but also physical appearance comparisons, as there is a large drive to compare oneself to group norms in the case of body image (Strahan et al., 2006; Taniguchi & Ebesu Hubbard, 2019). Taking into consideration that Western societies promote beauty ideals that are unrealistic and unattainable for a great part of the population, people are likely to experience body dissatisfaction when they compare their bodies to the standards of physical attractiveness (Wasilenko et al., 2007).

According to the tripartite influence model (Thompson, Heinberg, et al., 1999), appearance comparisons and internalization of appearance ideals act as mediating variables for the relationship between sociocultural pressures, body dissatisfaction and eating disturbances. Several studies have indicated the role of appearance social comparison as a cognitive process that mediates the relationship between sociocultural factors and body dissatisfaction (Strahan et al., 2006; van den Berg & Thompson, 2007; Want, 2009), and the tendency to engage in appearance comparisons has been consistently associated with a negative body image (Fardouly et al., 2015b; Keery et al., 2004; Myers & Crowther, 2009) and eating disorders (Alcaraz-Ibáñez, 2017; Thompson, Coovert, et al., 1999). Even though the aetiology of eating disorders is complex and multiple models have been suggested (Moreno-Encinas et al., 2021), appearance comparisons might play a key role in the development of eating disturbances.

Furthermore, research has demonstrated significant relationships between appearance comparisons and a number of psychosocial variables, such as negative affect, low self-esteem, self-objectification, body surveillance, body shame, drive for thinness and internalization of thin ideals (Davison & McCabe, 2005; Engel et al., 2013; Fardouly et al., 2015a; Ridolfi et al., 2011; Tiggemann & Miller, 2010; Tylka & Sabik, 2010).

While the association between appearance comparison tendency and body dissatisfaction has been consistently demonstrated in women, the findings are less consistent in men. For example, Halliwell & Harvey (2006) found that there was a significant correlation between peer comparison tendency and body dissatisfaction

both in males and females, but Humphreys & Paxton (2004) reported that the association was not significant among boys. Furthermore, the literature suggests that females tend to focus on their weight when they compare themselves, while males' comparisons are often related to muscularity (Fisher et al., 2002). Also, men seem to engage in fewer appearance comparisons compared to women, and the effect of these comparisons might be less associated with negative feelings about their body (Carlson Jones, 2004; Davison & McCabe, 2005, 2006; Myers & Crowther, 2009). It has been suggested that inconsistent findings among men could be due to the measures used, as most of the commonly used body dissatisfaction and disordered eating measures have been developed and validated in female samples. Therefore, differences across genders might be influenced by instrument bias (Darcy & Lin, 2012).

Given the importance of appearance comparisons in the context of body image and eating disturbances, it is essential to have a measure to adequately assess one's tendency to engage in physical appearance comparisons. In this sense, some scales have been developed. For example, the Body Comparison Scale (BCS; Thompson, Heinberg, et al., 1999) measures the frequency in which a person compares specific body sites to those of other individuals, and the Upward Physical Appearance Comparison Scale (UPCS) and Downward Appearance Comparison Scale (DACS) assess one's tendency to engage in upward and downward comparisons, respectively (O'Brien et al., 2009). Similarly, the Body, Eating, and Exercise Comparison Orientation Measure (BEECOM; Fitzsimmons-Craft et al., 2012) measures different comparison dimensions that tend to be associated with eating pathology. Finally, the Physical Appearance Comparison Scale (PACS; Thompson et al., 1991) is a 5-item scale that has been reported to be the most commonly used validated measure of appearance comparison (Myers & Crowther, 2009). It was revised by Schaefer & Thompson (2014), who created the Physical Appearance Comparison Scale-Revised (PACS-R) to address the limitations of the original version, and validated the measurement in a sample of female college students. Recently, Schaefer and Thompson (2018) developed an expanded version of the PACS-R that contains 27 items (PACS-3).

To our knowledge, only two Spanish adaptations of a physical appearance comparison instrument have been published. The first one was recently conducted by Alcaraz-Ibáñez et al. (2020), who adapted the PACS-R to be used in a Spanish adolescent sample. In this process, and in order to adapt the questionnaire to their target population, some vocabulary changes were conducted prior to the translation process (Alcaraz-Ibáñez et al., 2020). The second one was recently conducted by Senín-Calderón et al. (2020), who validated the PACS-R and the PACS-3 in a sample of young individuals from the south of Spain that were users of the social network Instagram. However, there is a lack of evidence of the adequacy of scales measuring physical appearance comparison in wider age ranges in Spanish population.

The main objective of the present study was to validate the PACS-R in a Spanish mixed-gender community sample. The specific aims were: a) to test its internal structure, b) to analyse its reliability in terms of internal consistency and test-retest,

c) to assess its convergent validity with regard to body dissatisfaction, eating disturbances, appearance-related sociocultural pressures, social comparison tendency and self-esteem, and d) to test its predictive utility by examining the measure's ability to predict scores on theorized outcome variables (i.e., body dissatisfaction and eating disturbances), over and above measures of sociocultural influence and body mass index (BMI). We hypothesized that the internal structure of PACS-R in its Spanish version would show a single-factor structure and would have adequate indices on internal consistency and stability. We also theorised that the PACS-R would be positively correlated with measures of body dissatisfaction, eating pathology, social comparison tendency, internalization of appearance ideals, and appearance-related sociocultural pressures, and that it would be negatively correlated with measures of self-esteem and self-assessed attractiveness. Finally, we hypothesized that the questionnaire would be able to adequately predict body dissatisfaction and disordered eating.

Method

Participants

A total of 2,439 participants from a community sample participated in the present study. Participants that did not live in Spain, those who presented uncompleted data, and those who were older than 65 years old or younger than 14 years old (*n*= 1,034) were excluded from the analyses, yielding the final sample of 1405 participants.

1,175 participants were women (83.6%), 220 were men (15.7%), and 10 identified themselves as nonbinary (0.7%). Participants ranged in age from 14 to 64, with a mean age of 26.49 years (*SD*= 11.52). Mean sample BMI was 22.93 kg/m^2 (*SD*= 4.43). Regarding the educational level, most of the participants had completed secondary (48.3%) and higher (42%) education. Furthermore, 44.5% of the sample did not have any income, 19.8% had an average income below the minimum wage (MW), 23.7% had an average income that ranged between 1 and 2 times the MW, and 12% had an income of 3 times or more the MW. Finally, 51.7% of the sample reported to be single, 31.5 % were in a stable partnership, 14.5% were married or in a civil partnership, and 2.3% were separated, divorced or widowed.

Instruments

a) *Ad hoc Sociodemographic Questionnaire*. Participants self-reported their age, gender, place of residence, educational level, average income, civil status, height and weight. Height and weight measures were used to calculate BMI.
b) *Physical Appearance Comparison Scale-Revised* (PACS-R; Schaefer & Thompson, 2014). The PACS-R is an 11-item questionnaire that measures the tendency to compare one's physical appearance to others in a broad array of social settings. Responses are rated on a 5-point Likert-type scale ranging from "Never" to

"Always". Higher scores indicate higher levels of general appearance comparison. Psychometric evaluations of the original English version of the PACS-R indicate that the questionnaire has a single factor structure, and excellent internal consistency (Cronbach's alpha of .97) and convergent validity with measures of body satisfaction, eating pathology, sociocultural influences on appearance, and self-esteem in college females (Schaefer & Thompson, 2014). For the present study, the PACS-R was backtranslated into Spanish according to Beaton et al. (2000). First, the PACS-R was translated into Spanish by a psychologist highly proficient in English. In order to ensure the "experiential" and "conceptual" equivalence of words as indicated by Beaton et al. (2020), special attention was paid to the word 'gym' (Item 11), as the sample included underage individuals. Since 14-year-old individuals are allowed to go to the gym in Spain and it is common for them to do so, the term 'gym' was kept in the Spanish translation. Second, a back translation in English was performed by a second independent translator to ensure item contents reflected those of the original English version. One of the authors of the original PACS-R English version reviewed the back-translation and reported it to be accurate.

c) *Multidimensional Body-Self Relations Questionnaire* (MBSRQ; Cash, 1990) adapted to Spanish by Botella et al. (2009). The Self-assessed Physical Attractiveness (SPA) subscale of the Spanish version of the MBSRQ was used. It contains 3 items that measure the perceived attractiveness of one's body or appearance. Higher scores indicate higher self-assessed attractiveness. The MBSRQ has been shown to be a four-factor reliable and valid measure of body image in Spanish samples, with a Cronbach's alpha of .89 for the whole questionnaire and .84 for the SPA subscale (Botella et al., 2009).

d) *Sociocultural Attitudes Towards Appearance Questionnaire* (SATAQ-4; Schaefer et al. 2015), adapted to Spanish by Llorente et al. (2015). The SATAQ-4 is a 22-item questionnaire that measures the degree of endorsement of western cultural standards of appearance. Responses are rated on a 5-point scale from "Completely disagree" to "Completely agree". Higher scores indicate greater appearance-related sociocultural influence. Both the original and the Spanish version of the SATAQ-4 have five subscales: thin-ideal internalization, athletic-ideal internalization, family pressure, peer pressure, and media pressure to attain the ideal appearance. The five subscales were used in this study. The SATAQ-4 has exhibited good psychometric properties in Spanish samples, with Cronbach's alphas ranging between .88 and .97 among the scales (Llorente et al., 2015).

e) *Rosenberg Self-Esteem Scale* (RSES; Rosenberg, 1965), and adapted to Spanish by Martín-Albo et al. (2007). The RSES is a widely used 10-item questionnaire that assesses global self-esteem and general feelings of self-worth with a 4-point Likert scale, ranging from "Strongly disagree" to "Strongly agree". Higher scores indicate higher self-esteem. The scale has been shown to have a one-factor structure and satisfactory levels of internal consistency (Cronbach's alpha of .85) in Spanish samples (Martín-Albo et al., 2007).

f) *Iowa-Netherlands Comparison Orientation Measure* (INCOM; Gibbons & Buunk, 1999), adapted to Spanish by Buunk et al. (2005). The INCOM assesses individual differences in social comparison orientation. The measure consists of 11 items that are rated on a 5-point Likert scale ranging from "I disagree strongly" to "I agree strongly", and higher scores indicate higher levels of social comparison. Both the original and the Spanish version have a two-factor structure (one scale related to ability-related comparisons, and the other one related to comparisons based on opinions), and the measure has good psychometric properties (Cronbach's alpha of .80) in Spanish samples (Buunk et al., 2005).

g) *Eating Disorders Inventory-3* (EDI-3; Garner, 2004), adapted to Spanish by Elosua et al. (2010). The Drive for Thinness (DT) and Body Dissatisfaction (BD) subscales were applied. The DT subscale comprises 7 items that assess the desire to be thinner, concern with dieting, preoccupation with weight and fear of weight gain. The BD subscale consists of 10 items that assess discontentment with the overall shape and with the size of those regions of the body of extraordinary concern to those with eating disorders. Responses of both subscales are rated on a 6-point Likert scale, ranging from "Never" to "Always". Both scales have an adequate internal consistency: DT has been reported to have alpha values of .92 and .64 in Spanish women and men respectively, and BD's alpha values were .90 and .67 in Spanish women and men (Elosua et al., 2010).

h) *Eating Attitudes Test-26* (EAT-26; Garner et al., 1982), adapted to Spanish by Castro et al. (1991). The EAT-26 is a 26-item self-report questionnaire that measures disordered eating behaviour and attitudes. Items are presented in a 6-point Likert scale ranging from "Never" to "Always", and higher scores indicate higher levels of eating disturbances. It has three subscales: dieting, bulimia and food preoccupation, and oral control. The questionnaire has been reported to have adequate psychometric properties, and the alpha reliability coefficient in a Spanish sample was .93 (Castro et al., 1991).

Procedure

The study was approved by the University of Barcelona's Bioethics Commission. Parental consent was not requested, as the Spanish law states that it is only required for individuals under 14 years old for this type of studies (Organic Law 3/2018 for Data Protection and guarantee of Digital Rights, articles 6 and 7).

Participants were recruited through various social media platforms (Twitter, Instagram and Facebook). Respondents to study advertisements clicked on a web link that took them to an online secure internet-based website. All participants gave their informed consent before completing questionnaire measures. Participants had the option to provide their email address and a code to be contacted one month later to fulfil the questionnaires again in order to conduct a retest. Participants did not receive compensation for their participation.

Data analyses

Descriptive and exploratory analyses and comparisons of means were performed using SPSS Version 20.0 statistical software, and AMOS 23.0 software (IBM, USA) was used for the confirmatory factor analysis (CFA).

A cross-validation was conducted. Participants were randomly assigned to two groups: sample 1 (*n*= 703) and sample 2 (*n*= 702). Means comparisons using Student's t tests revealed no statistically significant differences between the two samples in terms of age or BMI. The chi-square test showed no statistical differences in the proportion of men and women in the two samples.

First, Kaiser-Meyer-Olkin (KMO) and Barlett's tests were used to determine if the data were appropriate for factor analysis. Kaiser (1974) indicated that KMO values in the .80-.90 range or higher are "ideal", and values greater than .70 are adequate or "middling". An exploratory factor analysis (EFA) using principal axis factoring and Promax oblique rotation was conducted to data obtained from sample 1. The following strategies were used in order to determine the number of underlying factors: eigenvalues equal to or greater than 1.0 (Guttman, 1954; Kaiser, 1960), examination of the scree plot (Cattell, 1966), and Horn's parallel analysis (Horn, 1965; Zwick & Velicer, 1986). The items' factor loadings were calculated, and they were deemed to be acceptable if they reached .30 (Floyd & Widaman, 1995).

Second, the factor structure of the questionnaire was confirmed with a CFA that was applied to sample 2. Prior to conducting the CFA, the multivariate normality assumption was tested by calculating Mardia's estimate for multivariate kurtosis (Mardia, 1970). Values above 5.0 for Mardia's normalised estimate are indicative of non-normal data (Bentler, 2005). Since the data were found to be multivariate non-normal, the unweighted least square (ULS) estimation method was applied, and the following goodness-of-fit indices were obtained: goodness-of-fit index (GFI), normed fit index (NFI), comparative fit index (CFI), standardised root mean square residual (SRMR) and root mean square error of approximation (RMSEA). The cut-off values to determine a good model fit were the following ones: equal or higher than .95 for CFI (Hu & Bentler, 1999), equal or higher than .90 for GFI and NFI (Jackson et al., 2009), and equal or lower than .05 for SRMR (Hu & Bentler, 1999). For the RMSEA, values of .05 and lower are considered to represent good fit, values from .05 to .08 represent acceptable fit, and values from .08 to .10 represent marginal fit (Browne & Cudeck, 1993).

Third, a reliability analysis was conducted in samples 1 and 2 for men and women separately, by means of Cronbach's alpha and McDonald's omega. Item discrimination was assessed via the corrected item-total correlations, applying the criteria of Nunnally and Bernstein (1994). The average PACS-R score was calculated separately for men and women of the whole sample, and an independent-samples *t*-test was conducted to determine whether there were significant differences in the PACS-R score between genders. It should be noted that nonbinary participants (*n*= 10) were not included in the analyses that were performed separately for men and women or that assessed differences between genders, due to the small sample size

of individuals who reported identifying themselves as nonbinary. The effect size was assessed by Hedges' g and 95% confidence interval, and it was interpreted according to Cohen's criteria (Cohen, 1988). Moreover, the one-month test-retest reliability of the PACS-R scores was examined in a subset of the overall sample ($n=$ 165; 80% women) via intraclass correlation coefficients. Correlations of .70 or higher indicate good test-retest reliability (Crocker & Algina, 2008).

Fourth, Pearson's correlations were used in men and women from the whole sample separately to assess the relationships between the PACS-R and other theoretically related variables.

Finally, using the tripartite influence model as a theoretical framework, hierarchical multiple regression analyses were performed within men and women samples separately to evaluate the PACS-R as a predictor of theorized outcome variables (body dissatisfaction and eating disturbances), controlling for internalization of the thin and muscular ideals, appearance-related pressures and BMI. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, homoscedasticity and multicollinearity. Multicollinearity was deemed to be a concern if the variance inflation factor (VIF) coefficient was greater than 10 or tolerance values were less than .10 (Belsley et al., 1980; Hair et al., 2010).

Results

Internal structure

An EFA was performed to data from sample 1 ($n=$ 703). KMO and Barlett's tests indicated the adequacy of data for factor analysis, KMO= .960, χ^2 (55, $n=$ 703)= 8741.934; $p<$ .001. Based on the number of eigenvalues that were greater than or equal to 1.0, the examination of the scree plot, and the results from the parallel analysis, a one-factor solution emerged.

Communalities ranged between .516 and .838, and the percentage of explained variance was 73.26%. The corresponding factor loadings of these items were acceptable, since they reached .30 in all cases, as shown in Table 1.

A CFA was then performed with sample 2 ($n=$ 702) to test the one-factor structure previously obtained. The assessment of multivariate normality indicated that the data did not fit multivariate normality, as Mardia's estimate for multivariate kurtosis was 50.785.

The CFA using all 11 items indicated good model fit according to goodness of fit indices and SRMR, χ^2 ($df=$ 44, $n=$ 702)= 142.606, CFI= .998, GFI= .998, NFI= .998, SRMR= .033, and marginal fit according to the RMSEA (RMSEA= .057). Standardised regression weights ranged from .693 to .929.

Table 1
Factor loadings of the PACS-R questionnaire in a mixed-gender sample

Item	Communalities	Factor loadings
1. Cuando estoy en público, comparo mi apariencia física con la apariencia de los demás [When I'm out in public, I compare my physical appearance to the appearance of others]	.674	.821
2. Cuando conozco a una persona nueva (de mi mismo sexo), comparo el tamaño de mi cuerpo con el tamaño de su cuerpo [When I meet a new person (same sex), I compare my body size to his/her body size]	.765	.874
3. Cuando estoy en el trabajo o en el colegio, comparo mi forma del cuerpo con la forma del cuerpo de los demás [When I'm at work or school, I compare my body shape to the body shape of others]	.802	.896
4. Cuando estoy en público, comparo mi grasa corporal con la grasa corporal de los demás [When I'm out in public, I compare my body fat to the body fat of others]	.808	.899
5. Cuando estoy comprando ropa, comparo mi peso con el peso de los demás [When I'm shopping for clothes, I compare my weight to the weight of others]	.709	.842
6. Cuando estoy en una fiesta, comparo la forma de mi cuerpo con la forma del cuerpo de los demás [When I'm at a party, I compare my body shape to the body shape of others]	.745	.863
7. Cuando estoy con un grupo de amigos/as, comparo mi peso con el de los demás [When I'm with a group of friends, I compare my weight to the weight of others]	.769	.877
8. Cuando estoy en público, comparo el tamaño de mi cuerpo con el tamaño del cuerpo de los demás [When I'm out in public, I compare my body size to the body size of others]	.838	.915
9. Cuando estoy con un grupo de amigos/as, comparo el tamaño de mi cuerpo con el tamaño del cuerpo de los demás [When I'm with a group of friends, I compare my body size to the body size of others]	.815	.903
10. Cuando estoy comiendo en un restaurante, comparo mi grasa corporal con la grasa corporal de los demás [When I'm eating in a restaurant, I compare my body fat to the body fat of others]	.618	.786
11. Cuando estoy en el gimnasio, comparo mi apariencia física con la apariencia de los demás [When I'm at the gym, I compare my physical appearance to the appearance of others]	.516	.718
PACS-R Total		8.315

Internal consistency

Internal consistency of PACS-R was excellent. In sample 1, Cronbach's alpha for the scale was .956 among men and .967 among women. In sample 2, Cronbach's alpha was .958 among men and .965 among women. McDonald's omega was .958 for men and .968 for women in sample 1, and .960 for men and .966 for women in sample 2. All items in the PACS-R exhibited corrected item-total correlations of .71 or higher in sample 1, and .68 or higher in sample 2 (table 2).

Item means ranged from 0.89 to 2.03 in sample 1, and from 0.80 to 2.03 in sample 2 (Table 2). The average PACS-R score in the whole sample was 1.13 (*SD*= 0.98) for men and 1.58 (*SD*= 1.16) for women. The *t*-test revealed that there was a significant difference in scores for men and women, *t* (343.32)= -6.04, *p*< .001. The magnitude of the differences in the means was small (Hedges' g= .40).

Table 2
Item descriptive statistics and corrected item-total correlations for PACS-R in a mixed-gender sample

Item	*M* (*SD*)		Item-total correlation	
	Sample 1	Sample 2	Sample 1	Sample 2
1	2.03 (1.20)	2.03 (1.21)	.807	.799
2	1.73 (1.36)	1.75 (1.37)	.858	.847
3	1.73 (1.36)	1.71 (1.32)	.878	.877
4	1.39 (1.38)	1.31 (1.33)	.882	.862
5	1.20 (1.38)	1.18 (1.33)	.828	.816
6	1.68 (1.39)	1.60 (1.36)	.848	.838
7	1.39 (1.33)	1.32 (1.33)	.860	.847
8	1.47 (1.32)	1.49 (1.35)	.898	.909
9	1.48 (1.33)	1.46 (1.34)	.885	.874
10	0.89 (1.24)	0.80 (1.18)	.775	.765
11	1.76 (1.41)	1.82 (1.39)	.707	.681

Test-retest reliability

The test-retest reliability for the PACS-R was good, with an intraclass correlation coefficient of *r*= .892 (*p*< .001). The average PACS-R scores of the subset of the sample that completed the questionnaire twice (*n*= 165) were 1.54 (*SD*= 1.12) at first administration of the questionnaire, and 1.52 (*SD*= 1.12) at second administration.

Convergent validity

A correlation analysis showed significant associations between the PACS-R scores and the examined variables in the hypothesized directions in both genders (Table 3). As expected, the PACS-R was significantly positively correlated with

measures of body dissatisfaction, drive for thinness, disordered eating behaviours, social comparison tendency, internalization of appearance ideals, and appearance-related pressures from family, peers, and the media. The PACS-R was significantly negatively correlated with measures of perceived physical attractiveness and self-esteem. The only relationship that was not statistically significant was the correlation between the PACS-R and the oral control subscale of the EAT-26 in men. Correlations between the PACS-R and convergent measures were generally stronger within the women sample compared to the men sample.

Table 3
Correlations and descriptive statistics for all study variables

Questionnaire/Subscale	*M* (*SD*)	Correlation with PACS-R
MBSRQ		
Self-assessed physical attractiveness	3.15 (0.99) / 2.98 (1.02)	- .47*** / - .60***
SATAQ-4		
Internalization: Thin	2.55 (1.02) / 2.83 (1.13)	.60*** / .69***
Internalization: Muscular	2.61 (0.95) / 2.24 (0.92)	.41*** / .40***
Pressures: Family	1.99 (1.07) / 2.06 (1.07)	.44*** / .31***
Pressures: Peers	1.62 (0.81) / 1.59 (0.84)	.41*** / .38***
Pressures: Media	2.49 (1.38) / 3.17 (1.39)	.54*** / .46***
INCOM total	35.49 (9.15) / 37.18 (8.61)	.51*** / .54***
RSES total	31.93 (6.33) / 28.48 (6.75)	- .43*** / - .58***
EDI-3		
Drive for thinness	6.05 (6.21) / 9.13 (8.04)	.65*** / .68***
Body dissatisfaction	9.48 (8.74) / 13.78 (9.63)	.61*** / .64***
EAT-26		
Total score	5.73 (6.35) / 9.08 (11.80)	.56*** / .60***
Dieting	3.55 (4.35) / 5.40 (7.33)	.58*** / .63***
Bulimia and food preoccupation	1.02 (1.77) / 1.65 (2.98)	.45*** / .53***
Oral control	1.16 (1.90) / 2.03 (3.18)	.13 / .28***

Notes: Means and correlation coefficients appear before the backlash for men and after for women. MBSRQ= Multidimensional Body-Self Relations Questionnaire; SATAQ-4= Sociocultural Attitudes Towards Appearance Questionnaire-4; INCOM= Iowa-Netherlands Comparison Orientation Measure; RSES= Rosenberg Self-Esteem Scale; EDI-3= Eating Disorders Inventory-3; EAT-26= Eating Attitudes Test-26; PACS-R= Physical Appearance Comparison Scale-Revised. ***$p<$ .001.

Finally, the correlation between the PACS-R and BMI was found to be statistically significant both in men and women, although the correlation coefficients were low (men: $r=$ .14, $p<$ .05; women: $r=$ .08, $p<$ .01).

Multiple regression analyses

Results from the hierarchical multiple regression analyses using the women and men samples can be found in tables 4 and 5 respectively. Multicollinearity was judged to not be a problem in any of the samples (women sample: tolerance$\geq$ 0.39,

VIF≤ 2.59; men sample: tolerance≥ 0.40, VIF≤ 2.50), and the other preliminary analyses ensured no violation of the assumptions of normality, linearity and homoscedasticity.

Table 4
Hierarchical regression analysis predicting body dissatisfaction and disordered eating in women

Variables	Step 1			Step 2		
	R^2	Δ F	β	R^2	Δ F	β
CV: Body dissatisfaction	0.51	201.43***		0.58	178.22***	
SATAQ4-TI			0.56***			0.36***
SATAQ4-MI			- 0.09**			- 0.10***
SATAQ4-FP			0.10***			0.09**
SATAQ4-PP			0.09**			0.04
SATAQ4-MP			0.05*			0.01
BMI			0.27***			0.27***
PACS-R						0.37***
CV: Disordered eating	0.42	120.34***		0.45	68.01***	
SATAQ4-TI			0.30***			0.20***
SATAQ4-MI			0.06*			0.04
SATAQ4-FP			0.01			0.01
SATAQ4-PP			0.09**			0.07*
SATAQ4-MP			- 0.006			- 0.05
BMI			- 0.15***			- 0.12***
EDI3-BD			0.37***			0.27***
PACS-R						0.28***

Notes: CV= criterion variable; SATAQ4= Sociocultural Attitudes Towards Appearance Questionaire-4; SATAQ4-TI= Thin Ideal Internalization subscale; SATAQ4-MI= Muscular Ideal Internalization subscale; SATAQ4-FP= Family Pressures subscale; SATAQ4-PP= Peer Pressures subscale; SATAQ4-MP= Media Pressures subscale; BMI= body mass index; PACS-R= Physical Appearance Comparison Scale-R; EDI3-BD= Body Dissatisfaction subscale of the Eating Disorders Inventory-3. *$p<$ .05; **$p<$ .01; ***$p<$ .001.

Regarding the women sample, results from step 2 in the analyses indicated that the PACS-R was a significant predictor of body dissatisfaction (β= 0.37, $p<$ .001) and disordered eating (β= 0.28, $p<$ .001). After controlling for internalization of appearance ideals, appearance pressures and BMI, the PACS-R accounted for 6.5% of the variance in body dissatisfaction, and the total variance explained by the model as a whole was 57.5%, $F(7, 1162)=$ 224.42, $p<$ .001. The PACS-R also accounted for 3.2% of the variance in disordered eating after controlling for internalization of appearance ideals, appearance pressures, BMI and body dissatisfaction, and the total variance explained by the whole model was 45.2%, $F(8, 1161)=$ 119.87, $p<$ .001. The PACS-R was the strongest predictor of body dissatisfaction and disordered eating, as it was observed when the standardized regression coefficients in step 2 of the regression analyses were compared.

Table 5
Hierarchical regression analysis predicting body dissatisfaction and disordered eating in men

Variables	Step 1			Step 2		
	R^2	Δ F	β	R^2	Δ F	β
CV: Body dissatisfaction	0.52	37.71***		0.59	38.74***	
SATAQ4-TI			0.35***			0.23***
SATAQ4-MI			- 0.16**			- 0.23***
SATAQ4-FP			0.26***			0.18**
SATAQ4-PP			0.10			0.09
SATAQ4-MP			0.18**			0.04
BMI			0.16**			0.18***
PACS-R						0.40***
CV: Disordered eating	0.39	18.83***		0.42	13.95***	
SATAQ4-TI			0.39***			0.33***
SATAQ4-MI			0.14*			0.07
SATAQ4-FP			0.05			0.03
SATAQ4-PP			0.01			0.02
SATAQ4-MP			- 0.002			- 0.09
BMI			- 0.04			- 0.01
EDI3-BD			0.22**			0.10
PACS-R						0.31***

Notes: CV= criterion variable; SATAQ4= Sociocultural Attitudes Towards Appearance Questionaire-4; SATAQ4-TI= Thin Ideal Internalization subscale; SATAQ4-MI= Muscular Ideal Internalization subscale; SATAQ4-FP= Family Pressures subscale; SATAQ4-PP= Peer Pressures subscale; SATAQ4-MP= Media Pressures subscale; BMI= body mass index; PACS-R= Physical Appearance Comparison Scale-R; EDI3-BD= Body Dissatisfaction subscale of the Eating Disorders Inventory-3. *$p<$ .05; **$p<$ .01; ***$p<$ .001.

In the men sample, the PACS-R was also a significant predictor of body dissatisfaction (β= 0.40, $p<$ .001) and disordered eating (β= 0.31, $p<$ .001) in step 2. The PACS-R accounted for 7.5% of the variance in body dissatisfaction after controlling for internalization of appearance ideals, appearance pressures and BMI, and the total variance explained by the model as a whole was 59.1%, $F(7, 211)=$ 43.61, $p<$ .001. Similarly, the PACS-R accounted for 3.8% of the variance in disordered eating after controlling for internalization of appearance ideals, appearance pressures, BMI and body dissatisfaction, and the total variance explained by the model was 42.3%, $F(8, 210)=$ 19.23, $p<$ .001. The PACS-R was the strongest predictor of body dissatisfaction and the second strongest predictor of disordered eating.

Discussion

The primary objective of this study was to validate the PACS-R in a mixed-gender Spanish community sample. In order to assess its psychometric properties, we first evaluated the underlying latent structure through principal axis factoring and Promax oblique rotation EFA with a first split-half of the sample, which was later assessed through CFA with the second half of the sample. The analyses indicated that a one factor solution was the best fit for the data, replicating the original single-factor structure described by the original authors (Schaefer & Thompson, 2014).

The study's results support the reliability and validity of the Spanish version of the PACS-R in women and men. Internal consistency and test-retest reliability were excellent in both subsamples. Furthermore, Spanish PACS-R scores had good patterns of convergent validity in both genders: as hypothesized, appearance comparison tendency was significantly associated with self-assessed physical attractiveness, internalization of appearance ideals, appearance-related sociocultural pressures, social comparison tendency, self-esteem, drive for thinness, body dissatisfaction and disordered eating in the expected directions. The relationship between appearance comparison and oral control was however different according to gender. While we found the expected positive association in women, the association in men did not reach significance. The oral control subscale includes items that relate to self-control of eating and the perceived pressure from others to gain weight (Garner et al., 1982). Differences found between men and women could suggest that physical appearance comparison is directly related to restrictive eating among women, whereas it is not necessarily focused on eating control to achieve a thin ideal among men. Correlations were generally weaker among men, consistent with previous literature suggesting a significant but smaller impact of appearance comparisons among males (Carlson Jones, 2004; Davison & McCabe, 2005). However, this was not the case for internalisation of the muscular ideal and perceived pressures to attain the beauty ideal, where the correlations were stronger for men. This might be related to the fact that muscularity-oriented comparisons seem to play a key role in men's body image (Fatt et al., 2019; Lavender et al., 2017), even though future research could examine the reasons for the stronger associations between appearance comparison and perceived pressures to attain the ideal appearance in men.

Regression analyses indicated that the physical appearance comparison measured through PACS-R significantly predicts body dissatisfaction and disordered eating when controlling for other theorized predictors, both in men and women. Hence, we replicated the adequate predictive ability described by the original authors (Schaefer & Thompson, 2014).

Regarding gender differences, our results revealed that men engage in fewer appearance comparisons than women, which is consistent with previous literature (e.g. Davison & McCabe, 2006). Our findings also indicated that the Spanish PACS-R is able to assess physical appearance comparisons in both men and women. Interestingly, the results from the regression analyses revealed that beta-regression

coefficients in the men subsample were higher compared to the ones observed in the women subsample. The higher a beta-coefficient is, the higher is the contribution of the covariate (PACS-R score in this case) to the mean predicted value of the criterion variables (body dissatisfaction and disordered eating). Hence, even though female validated measures were used, PACS-R scores might predict to a higher extent body dissatisfaction and disordered eating in men than in women, which seem to contradict the literature stating that physical comparisons in men are less associated with negative feelings about their body. Further research could shed light on this. Moreover, future studies should delve into the differences in physical appearance comparisons between genders, as men's body image concerns could be related to muscularity, which makes the body-related pressures more complex.

Furthermore, it should be noted that our sample included participants from a wide range of ages. While the original version of the PACS-R and its expanded version (PACS-3) included samples of undergraduate students, our study's participants' ages ranged between 14 and 64. This might have practical implications, suggesting that the Spanish PACS-R is a useful tool not only for adolescents but also for older populations.

This study has several limitations, basically related to the sampling procedure. First, it has to be noted that women constituted the majority of the sample (83.6%), which might have had an impact on the results found in the present study. In this regard, results have been presented according to gender, but it is a limitation that needs to be taken into consideration. Second, as participants' recruitment was conducted online, the sample of the present study is not representative of the Spanish population. Third, even though this research reported the prevalence of participants who did not identify within the gender binary system as recommended by Cameron and Stinson (2019), these participants were not included in the statistical analyses that were conducted separately for men and women, as previously mentioned.

Further research should examine the psychometric properties of the tool in both clinical samples and more diverse populations, in order to test its psychometric properties in other Spanish-speaking samples, countries, and ethnic groups.

In conclusion, this research indicates that the translated version of the PACS-R might be a useful tool to assess physical appearance comparison tendency in Spanish populations in both men and women and across a wide range of ages. The scale provides clinicians and researchers with a valid and reliable instrument to assess appearance comparisons, and it has the ability to predict body dissatisfaction and disordered eating, which are widely recognised as important risk factors for developing an eating disorder.

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Appendix

Spanish translation of the PACS-R

La gente a veces compara su apariencia física con la de los demás. Esto puede significar una comparación del peso, del tamaño del cuerpo, de la forma del cuerpo, de la grasa del cuerpo o de la apariencia en general. Por favor, pensando en cómo te comparas con los demás generalmente, utiliza la siguiente escala para puntuar con qué frecuencia realizas este tipo de comparaciones.

Nunca	Pocas veces	A veces	A menudo	Siempre
0	1	2	3	4

1. Cuando estoy en público, comparo mi apariencia física con la apariencia de los demás	0	1	2	3	4
2. Cuando conozco a una persona nueva (de mi mismo sexo), comparo el tamaño de mi cuerpo con el tamaño de su cuerpo	0	1	2	3	4
3. Cuando estoy en el trabajo o en el colegio, comparo mi forma del cuerpo con la forma del cuerpo de los demás	0	1	2	3	4
4. Cuando estoy en público, comparo mi grasa corporal con la grasa corporal de los demás	0	1	2	3	4
5. Cuando estoy comprando ropa, comparo mi peso con el peso de los demás	0	1	2	3	4
6. Cuando estoy en una fiesta, comparo la forma de mi cuerpo con la forma del cuerpo de los demás	0	1	2	3	4
7. Cuando estoy con un grupo de amigos/as, comparo mi peso con el de los demás	0	1	2	3	4
8. Cuando estoy en público, comparo el tamaño de mi cuerpo con el tamaño del cuerpo de los demás	0	1	2	3	4
9. Cuando estoy con un grupo de amigos/as, comparo el tamaño de mi cuerpo con el tamaño del cuerpo de los demás	0	1	2	3	4
10. Cuando estoy comiendo en un restaurante, comparo mi grasa corporal con la grasa corporal de los demás	0	1	2	3	4
11. Cuando estoy en el gimnasio, comparo mi apariencia física con la apariencia de los demás	0	1	2	3	4