SEÇÃO: ARTIGO

Brazilian version of the Appearance Schemas Inventory-Revised (ASI-R): Translation and validation with adults

Versão brasileira do Appearance Schemas Inventory-Revised (ASI-R): tradução e validação com adultos

Versión brasileña del Appearance Schemas Inventory-Revised (ASI-R): traducción y validación con adultos

Maria Fernanda Laus[1]
orcid.org/0000-0002-4947-1642
ferlaus@gmail.com

Lucas Duarte Manhas Ferreira Vales[2]
orcid.org/0000-0003-1626-8688
lucasduartemanhas@gmail.com

Natasha Gomes Oliveira[3]
orcid.org/0000-0002-6614-8935
natasha.gomes.oliveira@gmail.com

Telma Maria Braga Costa[4]
orcid.org/0000-0002-6154-5667
tbraga@unaerp.br

Sebastião Sousa Almeida[5]
orcid.org/0000-0002-1551-9062
sebasalm@usp.br

Abstract: The present study investigated the psychometric properties of the Brazilian adaptation of the Appearance Schemas Inventory-Revised (ASI-R) with adults. We translated the ASI-R, and determined its psychometric properties among two community samples, totaling 843 participants (402 men and 441 women), aged from 18 to 67 years. Six hundred and six participants were recruited online (SurveyMonkey Database), and the remaining were personally recruited from universities, technical schools, and libraries. Exploratory and confirmatory factor analysis indicated that the 13-items Brazilian ASI-R had the same factor structure as the original ASI-R: Self-evaluative and Motivational investment. Internal consistency ranged from .83 to .89, and test-retest reliability indices ranged from .74 to .77. Concurrent and convergent validity was demonstrated by the significant correlations between the ASI-R subscales and body satisfaction, internalization of beauty ideals, disordered eating, and self-esteem. Availability of a Brazilian Portuguese translation of the ASI-R should help to promote greater understanding of body image investment in the Brazilian context.

Keywords: body image, translation, validation, appearance schemas inventory

Resumo: O presente estudo investigou as propriedades psicométricas da adaptação brasileira do *Appearance Schemas Inventory-Revised* (ASI-R) com adultos. Traduzimos o ASI-R e determinamos suas propriedades psicométricas em duas amostras da comunidade, totalizando 843 participantes (402 homens e 441 mulheres), com idades entre 18 e 67 anos. Seiscentos e seis participantes foram recrutados online (banco de dados do SurveyMonkey) e o restante foi recrutado pessoalmente em universidades, escolas técnicas e bibliotecas. As análises fatoriais exploratória e confirmatória indicaram que a versão brasileira do ASI-R, composta por 13 itens, mantém a mesma estrutura fatorial do ASI-R original: investimento autoavaliativo e motivacional. A consistência interna variou de 0,83 a 0,89, e os índices de confiabilidade teste-reteste variaram de 0,74 a 0,77. A validade concorrente e convergente foi demonstrada pelas correlações significativas entre as subescalas do ASI-R e satisfação corporal, internalização de ideais de beleza, comer transtornado e autoestima. A disponibilidade de uma tradução para o português do Brasil do ASI-R deve ajudar a promover uma maior compreensão do investimento na aparência no contexto brasileiro.

Palavras-chave: imagem corporal, tradução, validação, appearance schemas inventory

Resumen: El presente estudio investigó las propiedades psicométricas de la adaptación brasileña del *Appearance Schemas Inventory-Revised* (ASI-R) con adultos. Tradujimos el ASI-R y determinamos sus propiedades psicométricas

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[1]   Universidade de Ribeirão Preto (UNAERP), Ribeirão Preto, SP, Brasil.
[2]   Universidade Paulista (UNIP), Ribeirão Preto, SP, Brasil.
[3]   Tribunal de Justiça do Estado de São Paulo (TJSP), São Paulo, SP, Brasil.
[4]   Universidade de Ribeirão Preto (UNAERP), Ribeirão Preto, SP, Brasil.
[5]   Universidade de São Paulo (USP), Ribeirão Preto, SP, Brasil.

entre dos muestras comunitarias, totalizando 843 participantes (402 hombres y 441 mujeres), con edades de 18 a 67 años. Se reclutó en línea a seiscientos seis participantes (base de datos de SurveyMonkey) y el resto se reclutó personalmente en universidades, escuelas técnicas y bibliotecas. El análisis factorial exploratorio y confirmatorio indicó que el ASI-R brasileño de 13 ítems tenía la misma estructura factorial que el ASI-R original: importancia autoevaluativa e importancia motivacional. La consistencia interna varió de .83 a .89, y los índices de confiabilidad de prueba-reprueba variaron de .74 a .77. La validez concurrente y convergente se demostró por las correlaciones significativas entre las subescalas ASI-R y la satisfacción corporal, la internalización de los ideales de belleza, los trastornos alimentarios y la autoestima. La disponibilidad de una traducción al portugués brasileño del ASI-R debería ayudar a promover una mayor comprensión de la inversión en imagen corporal en el contexto brasileño.

Palabras-clave: imagen corporal, traducción, validación, appearance schemas inventory

Body image is a multifaceted construct that includes a perceptual and an attitudinal dimension. The first one corresponds to the way the individual sees or perceives his/her own body. The second dimension is generally classified into two main components (Cash, 2012): (1) body image evaluation, which refers to one's satisfaction/dissatisfaction with the overall weight, shape, or some specific part of the body; and (2) body image investment, which refers to the psychological importance that individuals place on their appearance. The latter involves cognitive (thoughts and beliefs about the body, and psychological investment in appearance), behavioral (avoidance of situations that induce concerns with body image), and emotional (feelings related to physical appearance) aspects related to the importance of the body for self-evaluation (Cash, 2011).

Most studies worldwide have used body satisfaction as the sole measure of assessment, but other attitudinal components are often overlooked (Smolak & Cash, 2011). This is unfortunate, because a person who is dissatisfied with his/her body and places great importance on his/her appearance will be much more affected (cognitively, emotionally, and behaviorally) than an individual who is also dissatisfied but places little importance on his/her appearance (Cash, 2012). In fact, Cash raised the idea that appearance varies in terms of importance, that is, looking a

certain way does not have the same importance for everyone. Indeed, body image investment can largely influence individuals' perceptions of and reactions to interpersonal relationships (Cash, 2005), and its measurement gave rise to a new area of research that widened our understanding of body image beyond the ubiquitous construct of satisfaction (Jarry et al., 2019).

Given the importance of studying body image investment, Cash and Labarge (1996) developed the Appearance Schemas Inventory (ASI), and later revised the ASI into the ASI-R (Cash et al., 2004) - the Appearance Schemas Inventory-Revised (ASI-R). The revised version included new items, focused on the importance of one's own appearance in his/her life from six domains: historical salience, attentional and cognitive salience, salience of one's sense of self, behavioral salience, affective salience, and interpersonal salience.

The ASI-R is able to assess beliefs or assumptions about the importance, meaning, and influence of appearance in an individual's life, through 20 items that assess Self-evaluative investment (SES), which reflects the extent to which beliefs about appearance influence the social and personal life of an individual, and Motivational investment (MS), which is related to the level of concern about people's appearance, and how individuals adopt behaviors to control it (Cash et al., 2004).

A recent review of the literature conducted by Jarry et al. (2019), including 102 studies using the ASI or ASI-R, consistently showed that higher appearance investment is related to poorer psychological and behavioral outcomes, and this was evident for a wide array of populations, both clinical and non-clinical. Importantly, results of studies that distinguished Self-evaluative and Motivational investment revealed quite a consistent pattern of association between the two scales, and a wide range of other variables, by which SES was associated with a larger number of negative outcomes than was MS.

Appearance investment measured with the ASI-R has been linked to a number of negative health-related outcomes, such as negative body image, dietary restraint, exercise dependence,

depression and sensitivity to rejection, lower self-esteem, leanness orientation, media-ideal internalization, muscularity behaviors, greater fluctuation in satisfaction, and negative effects on quality of life and psychosocial functioning in men and women (Cash et al., 2004; Chang et al., 2014; Goulet et al., 2017; Harnish et al., 2019; Hart et al., 2008; Jung & Lee, 2006; Kling et al., 2016; Lamarche & Gammage, 2012; Ozimok et al., 2015; Toosi, 2016). These findings evidence that appearance investment might be an important concept to be studied, in order to better understand the construct of body image.

The ASI-R was validated with adults from Portugal (Nazaré, Moreira & Canavarro, 2010), Germany (Grocholewski et al., 2011), Japan (Eriko et al., 2012), Greece (Argyrides & Kkeli, 2013), and Mexico (Silva et al., 2016), and consistently presented a bidimensional structure. All versions presented satisfactory internal consistency indices, and adequate convergent validity.

In Brazil, there is no validated measure to assess investment in appearance; therefore, we think the ASI-R could be of great contribution to Brazilian researchers. Thus, the aim of the present study was to translate the ASI-R into Brazilian Portuguese and validate the measure with Brazilian men and women. More specifically, the study (1) translated the ASI-R into Brazilian Portuguese, and investigated its semantic equivalence and content validity; (2) investigated the factor structure of the instrument using Exploratory and Confirmatory Factor Analysis; (3) estimated its internal consistency and test-retest reliability; and (4) estimated the concurrent and convergent validity of the Brazilian ASI-R.

Methods

Participants

Main sample. Factor structure, internal consistency and test-retest reliability were investigated with an online sample of 298 men (age: M = 34.49 years, SD = 12.03) and 308 women (age: M = 34.01 years, SD = 11.44), totaling 606 individuals. The mean body mass index (BMI) (computed using self-reported height and weight) for male participants was 26.24 kg/m² (*SD* = 5.59), whereas that of women was 25.09 kg/m² (*SD* = 6.29). Participants' weight status was computed using standard BMI cut-offs (Centers for Disease Control and Prevention [CDC], 2020) as follows: underweight (4.0% of men and 5.8% of women), normal weight (45.0% of men and 52.6% of women), overweight (30.2% of men and 26.9% of women) and obese (20.8% of men and 14.6% of women). The majority of participants were white (men = 68.1%, women = 68.2%; black or "brown" = 28.1% of men, 28.3% of women). In terms of highest educational status, 46.3% of men and 44.5% of women were educated to a secondary level, whereas 48.0% of men and 49.0% of women had a graduate level. No additional demographic information was gathered.

Retest sample. Test-retest data from 210 participants (90 men and 120 women) were collected after three weeks. The mean body mass index (BMI) (computed using self-reported height and weight) for male participants was 26.20 kg/m² (*SD* = 5.91), whereas that of women was 25.10 kg/m² (*SD* = 6.47). Participants' weight status was computed using standard BMI cut-offs (CDC, 2020) as follows: underweight (4.4% of men and 6.7% of women), normal weight (46.7% of men and 51.7% of women), overweight (27.8% of men and 27.5% of women) and obese (21.1% of men and 14.2% of women). The majority of participants were white (men = 67.8%, women = 75.0%; black or "brown" = 28.9% of men, 18.3% of women). In terms of highest educational status, 48.9% of men and 46.7% of women were educated to a secondary level, whereas 43.3% of men and 48.3% of women had a graduate level. No additional demographic information was gathered.

Convergent validity sample. Participants were 104 men (age: *M* = 22.66 years, *SD* = 4.95) and 133 women (age *M* = 20.38, *SD* = 2.27), recruited from a regional campus. The mean body mass index (BMI) for male participants was 24.99 kg/m² (*SD* = 4.00), whereas that of women was 22.10 kg/m² (*SD* = 3.86). Participants' weight status was computed using standard BMI cut-offs (CDC, 2020) as follows: underweight (1.0% of men and 9.0% of women), normal weight (51.9% of men and 74.4%

of women), overweight (37.5% of men and 14.3% of women), and obese (9.7% of men and 2.3% of women). The majority of participants were white (men = 76.0%, women = 85.0%; black or "brown" = 23.1% of men, 14.3% of women). No additional demographic information was gathered.

Measures

Demographic information. Participants self--reported their age, height, weight, race/ethnicity, and highest educational level.

Appearance Schemas Inventory-Revised (ASI-R). [Cash et al., 2004; Cash, 2003]. The instrument has 20 items and evaluates dysfunctional investment that an individual may have with his or her physical appearance. Its items are divided into two factors: (1) Self-evaluative investment factor (SES) (e.g., When I meet people for the first time, I wonder what they think about how I look) and (2) Motivational investment factor (MS) (e.g., I try to be as physically attractive as I can be). Items are scored over a Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The final score corresponds to the average of the items. Higher scores indicate higher levels of investment.

Multidimensional Body-Self Relations Questionnaire-Appearance Scales (MBSRQ-AS). The MBSRQ-AS (Brown et al., 1990; Cash, 2000; Brazilian Portuguese translation: Laus et al., 2019) has five subscales: (1) Appearance Evaluation, which refers to the feelings of physical attractiveness, and satisfaction with one's looks (e.g., I like my looks just the way they are), (2) Appearance Orientation, which refers to the extent of investment in one's appearance (e. g., Before going out, I usually spend a lot of time getting ready), (3) Body Areas Satisfaction Scale, which refers to satisfaction with distinct aspects of one's appearance (e.g., muscle tone, hair), (4) Overweight Preoccupation, which refers to fat anxiety, weight vigilance, dieting, and, eating restraint (e. g., I have tried to lose weight by fasting or going on crash diets), and (5) Self-Classified Weight, which refers to how one perceives and labels one's own weight [e.g., I think I am… (response

options: very underweight, underweight, normal weight, overweight and very overweight)]. The questionnaire is self-administered, and all of the items are evaluated using a 5-point Likert scale. Most items measure agreement (1 = definitely disagree to 5 = definitely agree), satisfaction (1 = very dissatisfied to 5 = very satisfied) or frequency (1 = never to 5 = very often). The Self-Classified Weight Scale has five specific response options (1 = very underweight to 5 = very overweight). While the original version of the MBSRQ-AS included 34 items, the Brazilian Portuguese version has 28 items distributed along the same five factors as the original. In the present study, McDonald's values were, for men and women respectively: .78 and .79 for Appearance evaluation, .83 and .80 for Appearance orientation, .85 and .84 for Body areas satisfaction, .72 and .62 for Overweight preoccupation, and .88 and .80 for Self-Classified weight.

Sociocultural Attitudes Toward Appearance Questionnaire-3 (SATAQ-3). (Thompson et al., 2004; Brazilian Portuguese translation: Amaral et al., 2013). The instrument has 30 items, and measures four aspects of appearance-related media influences. This study used the nine-item General Internalization subscale, which evaluates the degree to which individuals have internalized media messages showing unrealistic body ideals as their personal standard (e.g., I compare my body with that of the people on TV). Items are scored over a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The final score corresponds to the sum of the items. Higher scores indicate greater internalization of socially established standards. The scale showed good internal consistency in the present study (men: = .93, women: = .89).

Eating Attitudes Test (EAT-26). (Garner et al., 1982; Brazilian Portuguese translation: Nunes et al., 1994). The instrument has 26 items distributed across three factors and assesses symptoms and concerns characteristic of eating-disordered populations (e.g., I avoid eating when I am hungry). Items are scored over a Likert scale ranging from 0 (a few times, almost never, and never) to 3 (always). The final score corresponds to the sum of the items, requiring inversion of one

of the questions. Higher scores indicate greater evidence of inappropriate eating behavior. The scale showed good internal consistency in the present study (men: ω = .77, women: ω = .77).

Rosenberg Self-Esteem Scale (Rosenberg, 1965; Brazilian Portuguese translation: Hutz & Zanon, 2011). The scale has 10 items, and evaluates self-worth (e.g., I feel that I have a number of good qualities). Items are scored over a Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree). Five items are reverse-coded. The final score corresponds to the average of the items. Higher scores indicate higher self-esteem. The scale showed good internal consistency in the present study (men: ω = .88, women: ω = .87).

Scale translation. After authorization by the author of the original scale, the Brazilian Portuguese version of the ASI-R was prepared following the six-step guidelines for test adaptation, recommended by Borsa, Damásio, and Bandeira (2012) for use in the Brazilian context. In the first step, five independent translations were conducted by three experts in body image, a specialist in psychological instrumentation, and a professional translator. In a second step, a synthesis of the forward translations was prepared through discussions among the researchers and translators. In a third step, the Brazilian Portuguese version of the ASI-R was pre-tested for clarity and comprehension of items, response format, and instructions with 31 adults who matched the characteristics of the target sample. In six focus groups, these participants completed the ASI-R, and discussed the degree of relevance, representativeness, clarity, and comprehensiveness. Based on the discussions, the research team then made minor amendments to the Brazilian Portuguese version of the ASI-R. In a fourth step, content validity was evaluated by presenting the Brazilian ASI-R to a committee that was composed of six experts in body image and eating disorders. After accepting and signing an informed consent form, the experts were provided a letter that contained a description of the questionnaire, conceptual definitions, the dimensions involved in it, and a characterization of each of the five subscales. The judges were requested to read the instrument, identify to which subscale each item pertained (i.e., Self-evaluative investment or Motivational investment) and to provide their opinions and suggestions on the questionnaire. In a fifth step, back-translations were performed by two independent translators, whose first language was English, and who were blind to the original questionnaire. Even with some changes in the layout of the test, response scale, and some of the items made during the translation process, the author of the original instrument stated that the back-translated version was equivalent to the English language version in meaning. The final version of the instrument is available from the authors.

Procedures

The present study was derived from a larger study on the transcultural adaptation and psychometric characteristics of two body image assessment instruments for Brazilian adults, and ethics approval was obtained from the relevant Institutional Review Board (Protocol n. 12804913.0.0000.5407).

Potential participants were recruited from the *SurveyMonkey Contribute* member site and were pre-screened based on their sex and age (older than 18 years). The exclusion criteria used for potential subjects were being younger than 18 years, having any medical condition that may directly or indirectly influence physical appearance (e.g., AIDS, cancer, rheumatic or autoimmune diseases, severe burns) and/or seeking or having had weight loss surgery. The ASI-R is intended for use with individuals older than 18 years (Cash, 2003) with no upper age limit. Therefore, the Brazilian version was tested in adults older than 18 years, respecting the intention of the original measure. Participants did not receive any direct compensation from the researchers, but SurveyMonkey made a US$0.50 donation to the charity of their choice, along with a chance to win US$100. A standard template email notification was used to inform potential respondents that they had a new survey to take. Those who said yes to any of the conditions used as exclusion criteria were

routed to a "Thank you" page and they were then directed to SurveyMonkey home site. Participants who were eligible to complete the study were provided with a link to the survey, where they first read the informed consent online, provided their consent (or not), and then moved on to the questionnaires. To evaluate test-retest reliability, SurveyMonkey randomly invited 210 participants from the first sample, who answered only the ASI-R again, within a 3-week interval.

To evaluate concurrent and convergent validity, participants were opportunistically recruited from various university campus locations by two trained research assistants. Interested participants were provided with information about the study, and those who agreed to participate gave written informed consent. The exclusion criteria for potential subjects were the same as discussed above. All testing was conducted in a laboratory setting, where participants completed paper-and-pencil, anonymous questionnaires. All participants took part on voluntary basis and were not remunerated for participation.

Analytic Strategy

Overall strategy. Data were screened for missing values, and to assess distributional properties. A descriptive analysis (mean, standard deviation, frequencies) was performed. First, to test whether the factor model proposed by Cash et al. (2004a) suited our data, a CFA was conducted. The results were not satisfactory, therefore we followed Swami and Barron's (2019) recommendation of using an EFA-to-CFA analytic strategy. To ensure adequate sample sizes in both steps, the total sample was split using a computer-generated semi-random seed, resulting in a first split-half for EFA (total n = 203, women n = 101, men n = 102), and a second split-half for CFA (total n = 401, women n = 187, men n = 214).

Exploratory factor analysis. Data from the first split-half were subjected to Exploratory Factor Analyses (EFA) with Principal Axis Factor Analysis (PAF) followed by Promax rotation (κ = 4), because both factors were theoretically correlated (Cash et al., 2004), using SPSS 23.0. The Kaiser-Meyer-Olkin

measure of sampling adequacy, and the Bartlett's test of sphericity were performed to verify that the items of the Brazilian ASI-R had adequate common variance for factor analysis (Tabachnick & Fidell, 2007). The number of factors to be extracted was determined by factor eigenvalues above 1.0, and Parallel Analysis – Principal Axis Factoring (PA-PAF) with raw data permutation. Factors were retained whenever the eigenvalues from the original data for a given factor exceeded the eigenvalues corresponding to the 95th percentile of the distribution of random data eigenvalues (O'Connor, 2000). In addition, the criteria for factor loadings suggested by Howard (2016) were used: satisfactory variables should (a) load onto their primary factor above .40, (b) load onto alternative factors below .30, and (c) demonstrate a difference of .20 between their primary and alternative factor loadings.

Confirmatory factor analysis. Data from the second split-half were subjected to Confirmatory Factor Analysis (CFA), using maximum likelihood estimation. This analysis was carried out using Jeffreys' Amazing Statistics Program (JASP) version 0.12.2 (JASP Team, 2020). To assess goodness-of-fit, we used the normed model chi-square (χ^2/df; values < 3.0 are considered indicative of good fit, and up to 5.0 are considered adequate; Hu & Bentler, 1999). Model fit was assessed using the comparative fit index (CFI; values close to or > .90 indicate satisfactory fit; Awang, 2012), root mean square error of approximation (RMSEA), and its 90% CI (values close to .06 are considered to be indicative of good fit and values of about .07-.08 indicative of adequate fit; Steiger, 2007), the standardized root mean square residual (SRMR; values < .09 are considered to be indicative of good fit; Hu & Bentler, 1999), and the Tucker-Lewis index (TLI; values > .90 indicate satisfactory fit; Awang, 2012).

Reliability. Internal consistency was evaluated using McDonald's ω coefficient. Intraclass correlation tests (ICC) were carried out to assess test-retest reliability.

Concurrent and convergent validity. Pearson's correlation was performed between total ASI-R and its two factors, and other measures of

body image and personality and psychosocial functioning - constructs known to be associated with body image.

Results

Preliminary Analysis

First, to test whether the factor model proposed by Cash et al. (2004a) suited our data, a CFA was conducted. However, the results were unsatisfactory [χ^2 = 580.71 (DF = 132), GFI = .921, NFI = 0.870, CFI = .895, TLI = .849, and RMSEA = .075], which led us to switch to an exploratory approach.

Exploratory Factor Analysis

The significance of Bartlett's test of sphericity [χ^2(190) = 1549.00, p < .001], and the size of the Kaiser–Meyer–Olkin measure of sampling adequacy (KMO = .86) revealed that the items of the Brazilian ASI-R had adequate common variance for factor analysis. The eigenvalue criterion indicated it was possible to extract four factors, but Parallel Analysis suggested a two-factor solution. Subsequent analyses were conducted, setting the number of factors to be extracted to 3 and 2, however, all of them resulted in one factor defined only by negative items (1, 4, 5, 9, 11, 12). Brown (2015) argues

that these items can change the factor structure in the EFA and produce additional factors that are not substantially significant. We, therefore, decided to exclude all six reverse-scored items, and to perform another EFA.

The eigenvalue criterion indicated that it was possible to extract three factors, whereas the Parallel Analysis Test suggested that two factors should be maintained. Subsequent analyses were conducted, setting the number of factors to be extracted to 3; however, the third factor contained only two items (19 and 20), which should be avoided (Yong & Pearce, 2013). After setting the number of factors to 2, item 20 did not load on any factor, and item 19 cross loaded.

Guided by theory (Cash et al., 2004), we decided to perform a new EFA determining the number of factors to be extracted as 2 and excluding items 19 and 20. The two-factor solution explained 48% of the variance after extraction. The first factor corresponded to the Self-evaluative investment factor (6 items) and explained 39.27% of the variance. The second factor corresponded to the Motivational investment factor (6 items) and explained 8.59% of the variance. Rotated factor loadings (from the factor pattern matrix) are depicted in Table 1.

Table 1 – Item-factor loadings for each item of the Brazilian ASI-R

	Mean (SD)	Self-evaluative investment	Motivational investment
Item 2	3.36 (1.24)	**.57**	.12
Item 3	3.42 (1.18)	.06	**.60**
Item 6	3.79 (1.16)	-.08	**.74**
Item 7	3.28 (1.29)	**.50**	.30
Item 8	3.85 (1.15)	.13	**.47**
Item 10	3.15 (1.23)	-.04	**.64**
Item 13	3.15 (1.39)	**.74**	-.07
Item 14	3.21 (1.31)	**.78**	-.03
Item 15	3.10 (1.30)	**.63**	.10
Item 16	3.31 (1.45)	**.81**	-.12
Item 17	3.72 (1.18)	-.04	**.77**
Item 18	3.59 (1.25)	.04	**.73**

Extraction method: *Principal Axis Factoring*.
Rotation method: Promax with Kaiser Normalization.

Confirmatory Factor Analysis

In the second split-half subsample, we examined the fit of a 12-items two-factor model of ASI-R scores. Findings from Confirmatory Factor Analysis (CFA) indicated that items 2, 7, 13, 14, 15, and 16 were significant and loaded onto the latent Self-evaluative investment factor, and items 3, 6, 8, 10, 17, and 18 were significant and loaded onto the latent Motivational investment factor. Our results demonstrated that the model was adequately fitting (CFI = .932, SRMR = .044, TLI = .915, RMSEA = .077 [90% CI = .065 – .090]), $\chi^2(53)$ = 179.09, p < .001. This analysis confirmed the bidimensional factor structure of the ASI-R revealed in exploratory factor analyses.

Reliability

Internal consistency was satisfactory for both subscales. McDonald's coefficient value was .85 for Self-evaluative investment, .83 for Motivational investment, and .89 for the total ASI-R. Our results also demonstrated good test-retest reliability: r_{icc} = .74; p < .001 for Self-evaluative investment; r_{icc} = .77; p < .001 for Motivational investment; r_{icc} = .77;

p < .001 for total ASI-R. Pearson correlations were calculated among the composite ASI-R and its two factors. The total ASI-R correlated significantly with the Self-evaluative investment, r = .91 (p < .001), and with the Motivational investment, r = .88 (p < .001). The correlation between Self-evaluative and Motivational factors was also significant r = .60 (p < .001).

Concurrent and convergent validity

The positive correlations between the investment in appearance measured by ASI-R and the Appearance Orientation subscale from the MBSRQ-AS, which evaluate the same component of body image, are highlighted. The negative correlation between Self-evaluative investment and body satisfaction was also expected, as well as the positive relationship between both subscales of the ASI-R and Overweight Preoccupation (Table 2). As expected, the two ASI-R subscales were correlated positively with the Internalization of beauty ideals and the disordered eating, and the Self-evaluative investment and the total ASI-R correlated negatively with the self-esteem.

Table 2 – Correlations between the ASI-R scales and measures of body image and psychosocial functioning for men and women

	Self-evaluative investment	Motivational investment	ASI-R Total
Appearance Orientation	0.50**	0.64**	0.60**
Body Areas Satisfaction	-0.33**	0.04	-0.17
Appearance Evaluation	-0.37**	0.10	-0.16*
Overweight Preoccupation	0.39**	0.36**	0.40**
Self-Classified Weight	0.15*	0.05	0.12
General Internalization	0.51**	0.34**	0.47**
Disordered eating	0.32**	0.31**	0.32**
Self-Esteem	-0.30**	0.13	-0.13*

*p < .05; ** p < .001 (2-tailed).

Discussion

Our aim in the present study was to examine the psychometric properties of a Brazilian Portuguese translation of the ASI-R with a sample of Brazilian adults. In terms of the factor structure of ASI-R scores, our results are consistent with

the original scale (Cash et al., 2004) and previous studies worldwide (Argyrides & Kkeli, 2013; Eriko et al., 2012; Grocholewski et al., 2011; Nazaré et al., 2010), which have suggested that scores on this instrument are bidimensional. Indeed, we

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were able to extract two factors using both EFA and CFA.

Despite this consistency, a few issues concerning the ASI-R factor structure in the present study should be highlighted. First, all the reverse items (1, 4, 5, 8, 9, 11 and 12) had to be excluded. As pointed out by Roszkowski and Soven (2010) items written negatively are particularly problematic in translations of English to other languages. Many researchers, with the intention of avoiding response biases, include items formulated inversely during the construction of an instrument. However, reverse items negatively affect the internal consistency of a measure, and can generate artificial factors with no theoretical significance, produced by a type of error associated with the wording of the items (Johnson et al., 2004; Sliter & Zickar, 2014).

Second, items 19 and 20 loaded on a third factor. Both items were originally from the Self-evaluative factor, but item 19 is conceptually from a domain that reflects how appearance influences one's sense of self ("My appearance is responsible for much of what's happened to me in my life"), while item 20 corresponds to a behavioral domain ("By controlling my appearance, I can control many of the social and emotional events in my life"). After considering that factors having less than three variables are generally viewed as undesirable (Yong & Pearce, 2013), and that both items conceptually belong to different domains, we decided to set the number of factors to 2, as in the original instrument. This decision led to the exclusion of both items, because item 20 did not load on any factor and item 19 cross loaded onto both factors.

Even though the Greek and Portuguese ASI-R retained all items, Argyrides & Kkeli (2013) and Nazaré et al. (2010), items 19 and 20 were also excluded from the Mexican ASI-R (Silva et al., 2016). Information from the Japanese (Eriko et al., 2012) and the German ASI-R (Grocholewski et al., 2011) are not available.

In our study, the internal consistency and test-retest reliability were considered satisfactory for the two subscales and the total score, exceeding the minimum value recommended by Swami and Barron (2019). Both ASI-R factors presented values close to those reported for the original scale (Cash, 2003) and other versions around the world (Argyrides & Kkeli, 2013; Grocholewski et al., 2011; Nazaré et al., 2010). Although the correlations between the two factors were significant, the emergence of a bidimensional structure in all studies demonstrates that they provide different information and should be treated as distinct factors. According to the researcher who developed the questionnaire (Cash, 2005; Cash et al., 2004), the Self-evaluative factor is considered a more dysfunctional form of investment, usually associated with negative aspects of biopsychosocial functioning. The Motivational factor can only reflect an individual's pride in one's own body, and the care and desire to maintain an attractive appearance.

Concurrent and convergent validity was demonstrated by the significant correlations between the ASI-R subscales and several measures of body image and psychosocial functioning. As expected, the Appearance Orientation subscale from the MBSRQ-AS was positively correlated to ASI-R, especially the Motivational factor. According to Cash (2003), both assess the cognitive-behavioral investment in appearance, and are less dysfunctional than the Self-evaluative salience. Body satisfaction, measured by the MBSRQ-AS subscales, also showed a negative association with the Self-evaluative factor, as previously found in other studies (e.g., Argyrides & Kkeli, 2013; Laus et al., 2018). This correlation was also expected and confirms the findings of Cash et al. (2004) that individuals with greater schematic investment in appearance report significantly more dissatisfaction with body image. Finally, the two subscales of the ASI-R correlated positively with the Overweight Preoccupation subscale (Argyrides & Kkeli, 2013; Laus et al., 2018), attesting that the investment in appearance is related to eating attitudes such as weight concerns (Cash et al., 2004).

In addition, both subscales were positively correlated to SATAQ-3 and the Eating Attitude

Test, confirming that men and women who attach great importance to appearance generally report greater internalization of media ideals, and greater evidence of inappropriate eating behavior (Cash et al., 2004). Moreover, only the Self-evaluative investment correlated negatively with self-esteem, attesting that this type of investment is, in fact, more dysfunctional (Cash, 2003).

The results from the present study may bring important contributions to the Brazilian population and researchers. As attested by Jarry and colleagues (2019), the evaluation of aspects related with appearance investment allows us to understand better who is more susceptible to the various forces impinging on body satisfaction. Moreover, the ASI-R is able to identify those for whom appearance is important and who are, therefore, the most affected by a dysfunctional body image investment. It is important to mention that the results from the present study support the belief that the elimination of a few items did not cause substantial loss of content validity in the final adapted scale.

On one hand, our study has several strengths. It is the first study to adapt the ASI-R into Brazilian Portuguese, and to provide evidence of the psychometric quality of the adapted test. We used a large sample composed of men and women from 18 to 65 years, recruited from different settings (e.g., community, universities), personally and via internet, instead of mainly female college students. Importantly, some studies have demonstrated that the mean scores for self-report surveys using paper-and-pencil and internet data collection methods are generally equivalent (Weigold, et al., 2018), validating the results of the study. We also evaluated the readability and comprehension of the items, and conducted a retest, proving the temporal stability of the Brazilian ASI-R. We presented evidence of construct validity, reliability, and convergent validity with individuals from the community and college students. Our goal was to provide data supporting the use of the measure in samples that represent a variety of adults.

On the other hand, the study has its limitations.

White individuals mainly composed our sample. Another study attempting to replicate our findings with more diverse racial/ethnic groups may provide further support to the current results. The use of self-reported instruments and measures of weight and height are also limitations of the study, as well as the differences in educational level and Body Mass Index across the samples. Generalization of the study is limited, because the selection of participants was done via SurveyMonkey community and may not represent the general population. Finally, given the relevance of body image in eating disorders, future studies should analyze its psychometric properties in a clinical sample.

Conclusions

The Brazilian ASI-R presented the same factor structure as the original instrument after the exclusion of some items. Reliability indices were found to be satisfactory. The present study also provides evidence for the convergent validity of the Brazilian ASI-R. Availability of a Brazilian Portuguese translation of the ASI-R should help to promote greater understanding of body image investment in the Brazilian context.

Acknowledgements

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Maria Fernanda Laus

Doutora em Psicobiologia pela Universidade de São Paulo (USP), em Ribeirão Preto, SP, Brasil; mestre em Psicologia pela mesma instituição; com pós-doutorado em Psicologia pela Universidade de São Paulo (USP) e University of Wisconsin-Milwaukee, nos EUA. Professora do Curso de Nutrição da Universidade de Ribeirão Preto (UNAERP) e orientadora plena nos Programas de Pós-graduação em Psicobiologia (FFCLRP/USP) e Nutrição e Metabolismo (FMRP/USP).

Lucas Duarte Manhas Ferreira do Vales

Doutor em Psicobiologia pela Universidade de São Paulo (USP), em Ribeirão Preto, SP, Brasil; com pós-doutorado em Psicologia pela mesma instituição. Professor da Universidade Paulista (UNIP), Campus Ribeirão Preto, SP, Brasil. Psicólogo Social pela Prefeitura Municipal de Jaguariúna, em Jaguariúna, SP, Brasil. Psicólogo Clínico.

Natasha Gomes Oliveira

Mestre em Psicobiologia pela Universidade de São Paulo (USP), em Ribeirão Preto, SP, Brasil. Psicóloga do Tribunal de Justiça do Estado de São Paulo (TJSP), em São Paulo, SP, Brasil.

Telma Maria Braga Costa

Doutora e mestre em Psicobiologia pela Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto da Universidade de São Paulo (USP), em Ribeirão Preto, SP, Brasil; com pós-doutorado pela Cornell University, nos USA. Professora e Coordenadora do Curso de Nutrição da Universidade de Ribeirão Preto (Unaerp), em Ribeirão Preto, SP, Brasil. Orientadora Plena no Programa de Mestrado e Doutorado em Psicobiologia da Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto - USP. Orientadora Plena no Programa de Mestrado Profissional em Saúde e Educação da Universidade de Ribeirão Preto (Unaerp). Pesquisadora Colaboradora do Laboratório de Nutrição e Comportamento do Departamento de Psicologia da Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto - USP.

Sebastião Sousa Almeida

Doutor e mestre em Farmacologia pela Universidade de São Paulo (USP), em Ribeirão Preto, SP, Brasil; com pós-doutorado em Nutrição e Comportamento pela Boston University School of Medicine, nos EUA. Graduado em Psicologia, Professor Titular do Curso de Psicologia da Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto – USP; orientador pleno no Programa de Pós-graduação em Psicobiologia da Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto – USP.

Endereço para correspondência

Maria Fernanda Laus

Laboratório de Nutrição e Comportamento

Departamento de Psicologia

Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto

Universidade de São Paulo

Av. Bandeirantes, 3900

14040-901

Ribeirão Preto, SP, Brasil