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Brief research report

Validation of the Weight Concerns Scale Applied to Brazilian University Students

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ABSTRACT

The aim of this study was to evaluate the validity and reliability of the Portuguese version of the Weight Concerns Scale (WCS) when applied to Brazilian university students. The scale was completed by 1084 university students from Brazilian public education institutions. A confirmatory factor analysis was conducted. The stability of the model in independent samples was assessed through multigroup analysis, and the invariance was estimated. Convergent, concurrent, divergent, and criterion validities as well as internal consistency were estimated. Results indicated that the one-factor model presented an adequate fit to the sample and values of convergent validity. The concurrent validity with the Body Shape Questionnaire and divergent validity with the Maslach Burnout Inventory for Students were adequate. Internal consistency was adequate, and the factorial structure was invariant in independent subsamples. The results present a simple and short instrument capable of precisely and accurately assessing concerns with weight among Brazilian university students.

Introduction

Body image is defined as the particular perception that individuals have, either conscious or unconscious, about the appearance, size, and shape of their body. It is a multidimensional construct resulting from biological, physiological, psychological, and social circumstances (Gleeson & Frith, 2006). The construct of the body image develops as a function of experiences and meanings that occur throughout life (Sarwer & Cash, 2008), and thus, body image construction is a dynamic process.

Perceptual, attitudinal, cognitive, and behavioral factors influence body image characterization. Therefore, the construct of body image has been estimated based on the evaluation of specific characteristics (Roy & Payette, 2012). Despite the preoccupation with weight, weight is not solely involved in the construction of body image, but it may have a strong influence in the construction process, and therefore, considering this factor is a potentially interesting strategy (Keel & Forney, 2013). Dissatisfaction with body weight may influence quality of life through changes that are affected by the representation of identity reflected in an individual's body image, which may then contribute to the development and/or maintenance of disorders related to body image (Stephan, Fouquereau, & Fernandez, 2008).

The desire to change shape or weight is common to both sexes. However, according to Sepulveda, Whitney, Hankins, and Treasure (2008), women are most affected by this concern and are most vulnerable in adolescence and/or early adulthood. This phase coincides with entry into college education, which, in turn, can lead to states of anxiety and stress that are primarily related to gaining autonomy/independence and to the adaptation process to new groups and the new life context (Beyers & Goossens, 2003). Additionally, Bucchianeri, Arikian, Hannan, Eisenberg, and Neumark-Sztainer (2013) and Girz et al. (2013) reported weight gain among students after enrolling in university, which may contribute to the increased concern of these women with their body image, specifically with their weight. Thus, the transition from being a teenager to the university environment appears to be an important factor in assessing the risk associated with body weight concern and eating behavior changes.

In a study of adolescent girls, Killen et al. (1994), reported body weight concern as an early manifestation related with the development of eating disorders. Aiming at assessing this concern, the authors proposed an instrument called the Weight Concerns Scale (WCS). Using the presence/absence of eating disorders as criteria, the authors observed that the total WCS score presented a

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sensitivity of .86 and diagnostic specificity of .63. However, the construct validity of the WCS was not investigated.

The fact that body weight concern is a latent variable (i.e., it is not directly measurable) reflects the need to choose instruments with adequate psychometric characteristics. Accordingly, it is important to perform analysis of the validity and reliability of the instrument before employing it in order to ensure the quality of the results (Campos, Bonafé, Dovigo, & Maroco, 2013; Campos & Maroco, 2012; Maroco, 2014). Moreover, the selection of an instrument must consider its adequacy for the study population (Derenne, Baker, Delinsky, & Becker, 2010). The WCS is only available in the literature in its English version, its only application has been in an American context, its psychometric characteristics have not been adequately evaluated regarding the factorial, convergent, and concurrent validity with similar scales, and there are no Portuguese versions of this scale. Hence, this study was conducted to present an adapted version of WCS in Portuguese and to estimate its validity and reliability when applied to Brazilian college students.

Method

Participants

This cross-sectional self-report study used a non-probabilistic sampling design. A total of 1084 female college students, enrolled in two public colleges (Faculty of Pharmaceutical Sciences – FCFAr and Faculty of Humanities and Sciences – FCL) of the Universidade Estadual Paulista, Araraquara, São Paulo, Brazil, participated in this study (course area: 40.7% Health Sciences and 59.3% Human and Social Sciences). Participants had a mean age of 20.59 ($SD = 2.32$) years. As for economic class 85.6% belonged to A and B classes (USD 1328.00–5740.00) estimated by proposal of Brazilian Association of Research Companies (ABEP, 2008).

Participants' nutritional status was estimated using body mass index (BMI), which was calculated based on the weight and height measurements reported by participants. The nutritional status classification was made according to the proposal made by the World Health Organization (Campos et al., 2013; WHO, 2000). Among all participants, 6.9% were underweight, 75.4% normal weight, 13.1% overweight, and 4.6% obese.

Instruments

Body weight concern was estimated using the WCS. The WCS was proposed by Killen et al. (1994) to assess body weight concern as a risk factor for eating disorders only in women. It is one-factor scale consisting of five questions rated on a 7-point Likert-type response scale (see Appendix).

To assess concurrent validity, the Body Shape Questionnaire (BSQ) (Cooper, Taylor, Cooper, & Fairburn, 1987; Da Silva, Dias, Maroco, & Campos, 2014; Di Pietro & Silveira, 2009) was employed, as it assesses a similar construct to that of the WCS. To assess divergent validity, we used the Maslach Burnout Inventory for Students (MBI-SS; Campos & Maroco, 2012; Carloto & Camara, 2006; Schaufeli, Martinez, Pinto, Salanova, & Bakker, 2002) due to the conceptual discrepancy of this instrument in relation to the WCS. The MBI-SS is a three-factor scale (Emotional Exhaustion, Cynicism, and Professional Effectiveness).

Procedures

The participants filled in the questionnaires during class, and participation was voluntary. To ensure participants' anonymity, the questionnaires were identified with a numerical code. This study was approved by the Faculty of Pharmaceutical Sciences' Research Ethics Committee – UNESP (protocol CEP/FCF/CAr.16/2010).

Psychometric Analysis

Psychometric characteristics of the WCS were evaluated through face, content, and construct validity, as well as reliability. The instrument's translation into Portuguese was performed by three bilingual and independent translators working in the health area who had Portuguese as their mother tongue and knowledge of the cultural context of the instrument's country of origin (Marcolino & Iacoponi, 2001). The three versions were compared by the researchers, and a final version was developed in Portuguese, which was then back-translated by two native English translators with knowledge of Portuguese and of the Brazilian culture who were not informed that it was a back-translation procedure.

Then, the scale was subjected to a face validation process, which was conducted by a multidisciplinary team consisting of Nutrition, Psychology, and Portuguese professionals. The Portuguese version of the WCS was elaborated in line with the orthographic agreement reached between the Portuguese-speaking countries (see Appendix).

To assess the content validity of the WCS 17, experts in Nutrition and Psychology analyzed each item of the scale regarding its essentiality to assess body weight concern. The content validity ratio (CVR) was calculated, and to determine the significance of each item, the proposal made by Wilson, Pan, and Schumsky (2012) was used ($CVR_{17;.05} = .47$).

The psychometric sensitivity of the items was assessed with skewness and kurtosis and was considered adequate if below 3 and 7, respectively (Maroco, 2014). The construct validity was estimated by factorial and convergent validity. The factorial validity was analyzed using a confirmatory factor analysis (CFA). The factor loadings were used as local indices of goodness of fit (λ) as well as the ratio of chi-square to degrees of freedom (χ^2/df), the comparative fit index (CFI), normed fit index (NFI), and root mean square error of approximation (RMSEA) as overall fit indices (Maroco, 2014). The model's fit was considered adequate when $\lambda \geq .50$, $\chi^2/df \leq 2.0$, CFI $\geq .90$, NFI $\geq .92$, and RMSEA $\leq .08$ (Byrne, 2001; Hair, Black, Babin, Anderson, & Tatham, 2005; Maroco, 2014).

To verify the stability of the model in independent samples, a multigroup analysis was conducted. Initially, the sample was randomly divided into two parts (6:4; Test: $n = 655$; Validation: $n = 429$). Subsequently, the invariance of the models was tested by separating participants according to their nutritional status and course area.

The factorial stability (invariance) was estimated by the difference between CFI (ΔCFI) for the model's factor loading (λ), covariances (Cov), and residuals (Res) (Cheung & Rensvold, 2002; Maroco, 2014). Convergent validity was estimated by the average variance extracted (AVE) and composite reliability (CR). AVE $\geq .50$ and CR $\geq .70$ were considered adequate (Hair et al., 2005). Concurrent and divergent validities were estimated using Pearson's correlation analysis (r).

To evaluate body weight concern according to nutritional status, we conducted an analysis of variance (ANOVA) followed by Tukey's post hoc test ($\alpha = .05$). To calculate the mean score, two different strategies were used. The first followed the original proposal by Killen et al. (1994), and the second estimated a global score considering the covariance matrix obtained for the model of WCS fitted to the sample, which generated weights (W) to be assigned to each item (Maroco, 2014).

$$W = BS^{-1}$$

where W is the weighted regression matrix, S the covariance matrix between manifest variables, and B is the covariance matrix between the latent and manifest variables.