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Brief research report

Weight Bias Internalization Scale: Psychometric properties using alternative weight status classification approaches

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ABSTRACT

The Weight Bias Internalization Scale (WBIS) was developed to facilitate systematic investigation of internalized weight bias, but the English version has not undergone confirmatory factor analysis (CFA). Additionally, it is unclear whether the measure can be used when participants are grouped based on self-perceived versus body mass index (BMI)-based weight status. The present study evaluated the WBIS in a sample of 243 male and female undergraduate students who were overweight/obese as classified by self-perception or BMI. After exclusion of Item 1 due to poor item-to-total correlation, Cronbach's alphas were .92 and .94 for the perception-based and BMI-based groupings, respectively. CFAs using the reduced 10-item scale with addition of modifications for correlated errors resulted in acceptable model fit for the one-factor model in both groupings. Findings suggest psychometric properties of the modified WBIS are acceptable and are similar for overweight/obese participants grouped by either perceived weight status or BMI.

Introduction

Alongside alarm about a global obesity epidemic, interest has arisen in studying weight bias (i.e., prejudiced attitudes and discriminatory practices directed toward overweight and obese individuals), which is found in many cultures (e.g., Puhl et al., 2015) and is one of the few remaining socially acceptable forms of discrimination (Puhl & Brownell, 2001). Weight bias occurs in life domains including work, education, interpersonal relationships, health care, media, and customer service, and it negatively impacts the psychological, behavioral, and physical health of its targets (Papadopoulos & Brennan, 2015; Puhl & Brownell, 2001; Puhl & Heuer, 2009). Research has focused primarily on other-directed stigma. However, internalized weight bias (IWB) (i.e., self-directed weight-based stigma involving internalization of negative weight-related stereotypes and negative self-statements about one's own weight status), has recently drawn attention, with many studies now evaluating the construct on its own or in addition to other-directed stigma (Papadopoulos & Brennan, 2015).

To facilitate systematic investigation of IWB, Durso and Latner (2008) developed the Weight Bias Internalization Scale (WBIS). Studies using the WBIS have established relationships between IWB and negative outcomes including eating disorder pathology, depressive symptomatology, body dissatisfaction, low self-esteem, and reduced perceived health and quality of life (e.g., Carels et al., 2010, 2013; Durso, Latner, & Hayashi, 2012; Durso, Latner, & White, et al., 2012; Latner, Durso, & Mond, 2013; Pearl, White, & Grilo, 2014a, 2014b). However, the vast majority of studies using the WBIS have evaluated the measure only to the extent of calculating Cronbach's alpha, so the measure's psychometric properties and appropriate uses need further evaluation.

The initial WBIS validation study's (Durso & Latner, 2008) sample included 198 adult women ($n = 164$) and men ($n = 34$) whose body mass index (BMI) was in the overweight or obese range (i.e., BMI ≥ 25). The original WBIS contained 19 items, eight of which were dropped due to low item-to-total correlations or low factor loadings, resulting in an 11-item scale. Cronbach's alpha for the final scale was .90. Principal components analysis (PCA) indicated a two-component solution; however, a follow-up analysis with component extraction set at one revealed an acceptable structure, and the authors presented the WBIS as a single-factor measure.

Psychometric evaluation of the WBIS following Durso and Latner's original (2008) study has been limited: Though over 30 studies have used the measure, a confirmatory factor analysis (CFA) has not been conducted on the English version of the WBIS. Evaluation of a measure's factor structure using CFA is an important part of the construct validation process

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(DiStefano & Hess, 2005) and should be repeated when the measure is used in a new context or with different population groups (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 2014).

In the only published CFA of the WBIS, Hilbert et al. (2014) evaluated a German translation of a 10-item version of the measure (Item 1, "As an overweight person, I feel that I am just as competent as anyone," was removed because it demonstrated a negative item-to-total correlation) in 1092 participants whose BMI indicated overweight or obesity. In this sample, which ranged in age from 14 to 89 years ($M = 53.90$) and consisted of 53% men, fit for the one-factor model was marginally acceptable, $\chi^2(35, N = 1092) = 502.94$, $p < .01$ (comparative fit index [CFI] = .92, Tucker-Lewis index [TLI] = .90, root mean square error of approximation [RMSEA] = .11 with a 90% confidence interval of .10 to .12, and standardized root mean square residual [SRMR] = .05). Whether these findings generalize to the English version of the measure is unknown. Three other studies (Burmeister, 2012; Lippa & Sanderson, 2013; Roberto et al., 2012) conducted exploratory factor analysis (EFA) or PCA that also supported a one-factor model but did not follow up with CFA to address the question of model-data fit for the WBIS.

Whether the psychometric properties of the WBIS vary depending on whether BMI or perceived weight status is used to group participants is also unknown. Durso and Latner (2008) administered the WBIS based on perceived weight status but used BMI to determine which cases to analyze: Those who met the BMI threshold for overweight but did not perceive themselves as such were not administered the measure, and those who perceived themselves as overweight or obese but did not meet the BMI threshold for overweight were excluded from analyses. Hilbert et al. (2014) used BMI calculated from self-reported height and weight to determine which cases to analyze; perceived weight status was not assessed. However, some evidence suggests that perceived weight status is equally important as BMI in predicting psychosocial outcomes (Wilson, Tripp, & Boland, 2005); consequently, the psychometric properties of the WBIS for individuals whose overweight/obese status is based on self-perception rather than BMI needs to be explicitly evaluated.

The first aim of the present study was to conduct the first CFA of the English version of the WBIS in a sample of adult men and women whose BMI indicated overweight or obesity. Integrating the original WBIS validation study's positive findings regarding internal consistency, item-to-total correlations, and factor loadings for the one-component model of the final 11-item scale with subsequent indications that Item 1 should be removed, model fit was expected to be borderline for the 11-item scale and to improve with Item 1 removed. The second study aim was to evaluate model fit for the WBIS in a sample whose perceived weight status was overweight/obese. Since perceived weight status is a strong predictor of other psychosocial outcomes, perceived weight status was expected to perform similarly to BMI in analyses of the WBIS's psychometric properties.

Method

Participants

The present data were collected in a larger cross-sectional study of predictors, correlates, and consequences of IWB. Participants were male and female undergraduate students recruited from a large southeastern state university's online participant pool to participate in an anonymous study about appearance-related experiences and attitudes (weight bias was not explicitly mentioned). Because the IWB measure was designed for adults, only students 18 years of age and above could participate. No other inclusion criteria were applied. Participants included in the present analyses had a BMI $\geq 25.0\ kg/m^2$ and/or reported that they perceived themselves as overweight/obese.

After removing six duplicate cases and two cases with missing or erroneous weight and/or height data, 243 participants were included in the present analyses, of whom 82% were women. Participants' mean age was 22.57 years (median: 21; range: 18–54). The majority of participants (77%) were non-Hispanic. The sample was 71% White, 14% Black, 5% biracial or multiple races, and 4% Asian, with the remaining 6% reporting other races. Participants' mean BMI was 28.56 (median: 26.92; range: 18.72–60.73). Most participants (73%) perceived their weight as "overweight" or "very overweight," while 26% perceived themselves to be "average," and 1% categorized themselves as "underweight"; none of the participants classified themselves as "very underweight." Of the 243 cases, 39 (16%) were overweight/obese by perception only, 65 (27%) were overweight/obese by BMI only, and 139 (57%) were overweight/obese under both criteria. Participants who were overweight/obese under both criteria versus by perception or BMI only did not differ significantly on any demographic characteristics; however, the mean WBIS score was higher in participants who met both criteria ($t(241) = 3.69$, $p < .001$).

Procedure

Participants completed questionnaires using the online survey platform SurveyGizmo. The questionnaires and subsequent debriefing took approximately one hour to complete, and course credit was given as compensation. The study was approved by the university's institutional review board, and informed consent was obtained from all participants.

Measures

The IWB measure was situated approximately halfway through the battery of questionnaires, which began with a demographics questionnaire and also contained measures of self-esteem, weight-related quality of life, psychological distress (depression, anxiety, and stress), binge eating, body image, body shame, societal influences on body image, appearance comparison, and stigmatizing situations. Participants completed the final, published 11-item version of the WBIS (Durso & Latner, 2008) by rating their agreement with each statement on a 7-point Likert scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*). Two items are reverse-scored, and the mean of the item responses serves as the participant's score. Demographic information (including self-reported height and weight) was collected, and perceived weight status was evaluated by asking participants to classify themselves as "very underweight," "underweight," "average," "overweight," or "very overweight." Two groupings were formed based on participants' perceived weight status and BMI. Participants who perceived themselves as overweight or very overweight were defined as the perception-based grouping. BMI classifications followed standard cutoffs; participants with a BMI ≥ 25 were defined as the BMI-based grouping.

Statistical Analyses

Using SPSS Version 22, Cronbach's alpha (a measure of internal consistency reliability) and item-to-total correlations were evaluated for each grouping (perception-based and BMI-based). Normality of the items' scores was examined. There were no severe departures from normality: Skewness values ranged from −0.99 to 0.99 in the perception-based grouping and from −0.56