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Measurement of Body Dissatisfaction in College-Enrolled Mexican American Women: A Rasch-Based Examination of the Validity and Reliability of the EDI-III

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Abstract

Measures of body dissatisfaction have not been validated for Mexican American (MA) women, who evaluate their bodies differently than Caucasian women. In this study, the psychometric properties of the EDI-III, Body Dissatisfaction Subscale (BDS) were examined in a sample of college-enrolled MA women using the Rasch Rating Scale Model. Criterion validity was also addressed. BDS evidenced good item fit, person and item reliability, once poorly correlated items were removed. Two qualitatively distinct dimensions of body dissatisfaction were identified: (1) overall body shape and stomach, and (2) the lower body. Validity of the scales was supported. Results suggest: MA women's satisfaction with overall body shape is not synonymous with attitudes toward their lower body.

Keywords

Body dissatisfaction; Eating Disorder Inventory-III; Mexican American women; Rasch analysis

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Contributors

Authors Stein designed the study and wrote the protocol. Authors Riley and Lee conducted the data analysis and lead interpretation of the results. Author Stein and Hoyland-Domenico wrote the first draft of the manuscript and all authors contributed to the writing and editing of the final manuscript and have approved the final manuscript for submission.

Conflict of Interest

All authors declare that they have no conflicts of interest.

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Introduction

Body dissatisfaction (BD) is a psychological factor linked to disordered eating behaviors among Latinas. However, the validity of BD measures in this population is not well documented, and there is evidence that Latina women value and experience their bodies differently than Caucasian women (Chamorro & Flores-Ortiz, 2000; Gordon, et al., 2010). Latina cultures are generally more appreciative of larger, more voluptuous and curvy body types than is mainstream American culture, espousing larger body shape ideals for women, and valuing different specific regions of the body as the beauty ideal (Chamorro & Flores-Ortiz, 2000; Gordon, et al., 2010; Gray, Ford, & Kelly, 1987). These cultural differences in values related to body shape and size may influence the validity of using BD measures with Latinas.

The Body Dissatisfaction Subscale (BDS) of the Eating Disorder Inventory Version III (EDI-III; Garner, 2004) is a commonly used measure of body dissatisfaction in studies of Latinas. However, recent research has shown that the EDI-III is not invariant across young adult White and Latina samples (Belon, et al., 2014). Other researchers examined the structure of EDI-III among college-enrolled Latino women using exploratory factor analysis and found that only 5 of the 10 items loaded on the BDS (Cordero, Julian, & Murray, 2013). Together these results may reflect threats to the validity of BDS in measuring BD in Latina populations due to differences in perceptions about body image across ethnic groups.

Unlike previous studies that employed classical psychometric methods, the present study sought to advance knowledge regarding the dimensionality, reliability and validity of the BDS of the EDI-III in Mexican American (MA) young adult women employing the Rasch measurement model.

Methods

Participants

Data were from a larger study of college enrolled young adult MA women (Stein, Chen, Corte, Keller, & Trabold, 2013). The sample consisted of 482 MA women recruited from US community colleges and universities. Five of the 482 women dropped out before completing baseline data collection, resulting in an analysis sample of 477 women.

Measures

Body Dissatisfaction Measure—The Body Dissatisfaction Subscale is a 10-item subscale within the EDI-III (Garner, 2004) designed to measure dissatisfaction with various areas of one's body. Items on the BDS are presented on a six-point scale ranging from "never" to "always." Garner (2004) recommends converting the original item scores to a five-point scale (never and rarely responses = 0; sometimes - always = 1 through 4). We chose to employ the Rasch model to examine the properties of the original six-point rating scale.

Criterion-Related Validity Measures—Disordered eating behaviors were measured using event and signal triggered ecological momentary assessment methodology (EMA)

over a 14-day period. Procedures outlined by Stein, Chen, et al. (2013) were employed to estimate 14-day EMA measures when fewer than 14-days of recording were available. Fat self-schema, a semantically based cognitive generalization about oneself as overweight (Markus, Hamill & Sentis, 1987) was assessed using two bi-polar weight-related adjectives embedded in 16 self-descriptors. Participants rated adjectives for self-descriptiveness and importance on 11-point scales. Women who rated at least one adjective (fat and overweight ends of the scale) at points 8–11 for self-descriptiveness and importance were considered fat schematic.

Procedures

The Institutional Review Boards of the two universities that served as primary recruitment sites approved the study protocol. Following completion of informed consent, baseline data collection was completed in two face-to-face sessions. The closed-ended self-schema measure was completed in session 1. The EDI-III was administered in session 2, which was followed by an orientation to the EMA methodology completed over the subsequent 14-days.

Statistical Methods

The BDS was evaluated using the Rasch Rating Scale Model (Andrich, 1978; Masters, 1982). We conducted Rasch analyses to assess the following psychometric properties: (1) scale unidimensionality, (2) item ordering and Rasch model fit, and (3) item and person reliability. Unidimensionality was assessed by performing principal components analysis of Rasch residuals (i.e., observed response minus model-based response probability). Criteria for scale unidimensionality included (1) variance explained by the Rasch model > 40 percent, and (2) eigenvalue associated with the first residual component < 2 (Linacre, 2006).

Item fit was assessed using item fit statistics and the correlation between each item and the overall BDS measure. Two item fit statistics (Smith & Suh, 2003; Wright & Stone, 1979) were examined: mean-square infit, reflecting the presence of random responding, and mean-square outfit, reflecting unexpected outlying responses (i.e., endorsing high severity items but not low severity items). Items were flagged as misfitting if either infit or outfit > 1.33 (Wilson, 2005).

Person reliability reflects the degree to which the instrument differentiates persons varying on the latent trait. Ideally, person reliability should be > .80. Item reliability reflects the degree to which the item hierarchy is well estimated, and should be > .9.

To assess criterion validity, we examined Spearman rho correlation between the BDS with eating disorder behaviors and fat self-schema availability.

Results

Participant Characteristics

Mean age of our sample was 19.8 years (SD = 2.4). Approximately 20% of our sample were first generation in the US with the majority of women second generation (50%) or above. Approximately 80% of women were attending a four-year college. Nearly half (46%) of the

sample reported that their parents completed at least an undergraduate degree. Mean body mass index was 25.7 (SD = 6.0).

Rasch Analysis—In initial Rasch analyses of the BDS, two items were found to significantly misfit the Rasch model: *Like shape of my buttocks* (Infit = 1.41, Outfit = 1.42) and *Feel bloated* (Infit = 1.62; Outfit = 1.61). Both items were removed from the BDS in subsequent analyses.

Scale unidimensionality: Principal components analysis of Rasch residuals revealed that the BDS captures a strong primary dimension accounting for 65.4% (eigenvalue = 15.1) of the response variance. However, the first principal component of residuals explained 32.6% of residual variance (eigenvalue = 2.6). Items pertaining to the stomach and overall body shape had positive component loadings whereas items pertaining to hips, thighs and buttocks had negative loadings. These two subdimensions were examined as separate subscales, and are henceforth referred to as the BDS Overall Body Shape and Stomach (BDS-OBSS) scale, the BDS Hips, Thighs and Buttocks (BDS-HTB) subscale, and the total subscale as the BDS (see Table 1). As the first residual component associated with each subscale had an eigenvalue < 2.0, we decided not to further divide the BDS into smaller subscales. The correlation between the two subscales disattenuated for measurement error was 0.69 ($R^2 = 0.47$), providing support that the two subscales measure qualitatively distinct aspects of BDS.

Item ordering and fit: The eight items retained in the instrument fit the Rasch model on the BDS, BDS-OBSS, and BDS-HTB. Item correlations with their respective measures were also high, ranging from 0.65 to 0.78, 0.87 to 0.93, and 0.70 to 0.85 on the BDS, BDS-OBSS and BDS-HTB, respectively.

We also examined the ordering of the items along the BDS continuum. Generally, items pertaining to the stomach were the easiest to endorse (mean calibration = -0.62) whereas items pertaining to the hips (mean calibration = 0.23) and thighs (calibration = 1.45) were the most difficult to endorse. In addition, items referring to body parts as not being the “right size” were easier to endorse (mean calibration = -0.43) compared to items referring to body parts as being “too big” or “too large” (mean calibration = 0.41).

Item and person reliability: Item reliability was excellent and person reliability in the good to very good range, indicating that item calibrations were well estimated and that the BDS and its subscale can reliably distinguish persons with varying levels of body dissatisfaction (see Table 1).

Rating scale functioning: Rasch analysis indicated that the six-point structure was ordered and conformed to Rasch model expectations.

Criterion Validity—We examined the pattern of correlations between the OBSS and HTB subscales and disordered eating behaviors and presence versus absence of a fat self-schema (see Table 2). The OBSS had a significantly stronger positive correlation with the number of purging episodes and availability of a fat self-schema compared to the HTB scale.

Discussion

The purpose of this study was to assess the psychometric properties of the EDI-III BDS among college-enrolled young MA women. We found that an eight-item BDS measures two dimensions of body dissatisfaction: (1) dissatisfaction with one's overall body shape that including stomach size and (2) dissatisfaction with buttock, hips and thighs. The OBSS was more strongly correlated with disordered eating behaviors and fat self-schema than the HTB. These findings suggest that for young adults MA women level of satisfaction or dissatisfaction with overall body shape is not synonymous with attitudes toward their lower body. Consistent with cultural norms that place value on curvaceous female body shape, evaluation of the lower body may be distinct from the evaluation of the overall body.

The heavier and more curvaceous body type has historically been valued by Latinas as the ideal (Franko & George, 2008) and connotes idealized feminine and mothering qualities including "health, inner peace, and success" (Beltran, 2002). Endorsements of body parts as "too large" were more difficult than "right size" also perhaps suggesting conceptions of ideal around larger sizes are less clear. Our study suggest that even in an acculturated sample of MA women, attitudes toward body size and shape continue to reflect culture-specific values and norms that should be addressed in the measurement of body dissatisfaction.

Initial item analyses suggested "I feel bloated after eating a normal meal" (item 47) has a low correlation to the total scale and is likely to be unrelated to the construct of BD in this population. Item statistics further suggest that participant responses for this item were random and unexpected further supporting the view that it is not relevant to the construct. Another item with high infit and outfit statistics was "I like the shape of my buttock" (item 31). In contrast to response to item 47, unexpected responses to this item were all in the same direction with high item ratings relative to the overall level of body dissatisfaction. This finding is consistent with the idea of dissatisfaction with buttocks is distinct from overall body dissatisfaction.

The pattern of correlation coefficients between the fat self-schema, disordered eating behaviors and the OBSS and HTB subscales provide evidence to support the validity of the two subscale structure. Results show that in young adult college-enrolled MA women, dissatisfaction with overall body shape and stomach is associated with a conceptualization of the self as fat, whereas viewing one's hips, thighs and buttock as big is unrelated. These results are consistent with findings of other studies that suggest that MA women conceptualize their body shape differently than other populations of women (Toro, et al., 2006). The fact that OBSS is more strongly associated with disordered eating behaviors is consistent with other studies that link overall body dissatisfaction with these behaviors (Stice & Shaw, 2002).

The strengths of this study include the use of a large sample of MA women as well as the employment of rigorous analysis of the psychometric characteristics of the BDS using modern measurement theory. With respect to the population of MA women, this study has identified important modifications to the BD scale to improve its sensitivity and yield unidimensional and meaningful measures of BD. The study also has some limitations. As

the present study is a secondary analysis of data collected in a previous investigation (Stein, Keller, & Fishstrom, 2013), the data were limited in terms of the sample homogeneity with respect to age range. Confidence in the findings would be strengthened by replications including more diverse samples of women of Mexican origin including a broader age span, varying levels of education, and other indicators of socioeconomic status. In addition, studies that focus individually on other populations of Latinas such as Puerto Rico, Cuba and Latina American countries are needed to better understand cross cultural similarities and differences in nature of body dissatisfaction and the suitability of the BDS of the EDI to measure this important construct.

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Highlights

- Two items of the EDI-III BDS misfit the Rasch model in MA women.
- Rasch analyses support two distinct aspects of body dissatisfaction in MA women.
- The proposed two subscales have good item fit and person & item reliability.

Table 1

Unidimensionality and person and item reliability for the three BDS measures

Scale	PCA					
	Measure			Person		
	Var	EV	1st Residual	Var	EV	Item
BDS	65.4	15.1	32.6	2.6	0.87	1.00
BDS-OBSS	79.1	11.3	56.7	1.7	0.85	0.99
BDS-HTB	71.0	12.2	38.7	1.9	0.81	1.00

Note. BDS = Body Dissatisfaction Subscale; OBSS = Overall Body Shape and Stomach; HTB = Hips, Thighs and Buttocks; Var = variance; EV = Eigenvalue; Rel. = reliability.

Table 2

Spearman rho correlation and Steiger's Z test scores for the OBSS and HTB subscales and disordered eating behaviors and self-schema scores

Baseline behaviors	N	OBSS (6-point)	HTB (6-point)	Difference of correlations ^a
Binge eating episodes	470	0.20 **	0.14 **	z=1.72, p=0.04
Purging episodes	470	0.22 **	0.15 **	
Restricting episodes	470	0.33 **	0.28 **	
Fasting episodes	470	0.22 **	0.28 **	
Sum of z-score disordered eating behaviors (binge, purging, restricting, fasting)	470	0.40 **	0.34 **	z=2.67, p=0.003
Fat/Overweight schema	472	0.13 **	0.02	

Note.

^aSteiger's Z test;

OBSS = Overall Body Shape and Stomach; HTB = Hips, Thighs and Buttocks;

*
p < .05;

**
p < .01