R E S E A R C H   R E P O R T

Factor Structure of the Bulimia Test-Revised in College Women from Four Ethnic Groups

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The factor structure of the Bulimia Test—Revised (BULIT-R) was investigated using confirmatory factor analysis (CFA) and exploratory factor analysis (EFA). The sample consisted of 2,671 female college students (African American, Asian American, Caucasian American, and Latino American). Reliability coefficients were excellent across groups. African Americans scored significantly lower on the BULIT-R than Caucasian Americans. Across groups, CFA and EFA results suggest a six-factor solution is most appropriate. Consistent across groups were factors representing bingeing, body image, purging, and extreme weight loss behaviors, while few differences were observed across groups. These findings suggest that the measure is reliable and valid for use with diverse ethnic groups. Future research should focus on culturally salient psychological correlates of disordered eating in diverse ethnic groups.
Keywords: Bulimia, eating disorders, ethnicity, validation, psychometrics

Bulimia nervosa is an eating disorder that is chiefly characterized by binge eating coupled with feelings of loss of control while eating, using inappropriate methods (such as self-induced vomiting, dieting, and excessive exercise) to prevent weight gain, and extreme concern about body weight and shape (*DSM–IV*; American Psychiatric Association, 1994). In the general population, the lifetime incidence rates of bulimia are estimated to be from 1 to 3% in women (Garfinkel et al., 1995; Kendler et al., 1991; Rand & Kuldau, 1992). Recent research has estimated the rates of bulimia to be between 2 and 12% of the college population (e.g., Coric & Murstein, 1993; Heatherton, Nichols, Mahamedi, & Keel, 1995), making American college women the segment of the population that is at the highest risk for developing bulimia nervosa.

While bulimia nervosa has been typically thought of as a disorder that affects mostly Caucasian American upper-class women and while the prevalence of bulimia is highest among Caucasian American women (Kosak-Abrams, Allen, & Gray, 1993), within the last two decades it has been recognized as a disorder that affects women in other ethnic populations as well (Rosen et al., 1998; Smith, 1995; Smith & Krejci, 1991; Streigel-Moore & Smolak, 2000; Tsai & Gray, 2000). Larger acceptable body sizes and different standards of beauty have been traditionally viewed as protective factors against eating disorders within the cultures of ethnic minority women (Root, 1990). However, Root (1990) suggests that the assumptions that certain ethnic groups are protected from eating disorders is actually a detrimental stereotype that limits research and fails to acknowledge within-group differences among ethnic minority women. Researchers have suggested that there is a need for more studies that include or focus on women of color in order to clarify the experience of eating disorders in women from diverse ethnic groups (Dolan, 1991; Root, 1990).

A first step when conducting cross-cultural research is determining whether measures used to assess constructs have been validated on the groups to be studied. It is difficult to generalize the reliability and validity findings on a measure when different ethnic or linguistic groups were not included in its standardization (Padilla & Medina, 1996). For this reason, it is important to cross-validate a measure in groups that were not represented in the validation sample. In some situations, attempts to cross-validate a measure can reveal that ethnicity or variables related to ethnicity influence the expression of the measured construct.

In the area of eating disorders, one widely used measure for assessing bulimic symptoms is the Bulimia Test—Revised (BULIT-R; Thelen, Farmer, Wonderlich, & Smith, 1991). The development and validation of the measure was completed in four stages using bulimic samples ($N = 21 – 24$) and nonclinical college student samples ($N = 100 – 1,739$). Research has shown that the BULIT-R is a reliable and valid predictor of bulimia nervosa when given to participants who meet the criteria of bulimia nervosa in the *DSM–IV* (Thelen, Mintz, & Vander Wal, 1996). In addition, the BULIT-R has been found to be a reliable and valid continuous measure of bulimic symptoms in both clinical and nonclinical populations (Thelen et al., 1991; Brelsford, Hummel, & Barrios, 1992; Thelen et al., 1996) and has been widely used in research as a screening measure for these symptoms (e.g., Gleaves & Eberenz, 1995; Janzen, Kelly, & Saklofske, 1993; Steinberg & Shaw, 1998).

Although most of the early research on the reliability and validity of the BULIT-R either included samples of solely Caucasian American women or did not include information on the ethnicity of the sample (Thelen et al., 1991), investigators have recently begun to examine the reliability and validity of the measure in diverse ethnic groups. Researchers have found the BULIT-R to have good to excellent internal consistency in African American, Mexican American, and Korean American women (Joiner & Kashubeck, 1996; Lester & Petrie, 1995, 1998b; Rye, Lyle, Galer-Unti, & Black,

1999). In the study by Joiner and Kashubeck, Cronbach's alpha (a measure of internal consistency) was .92 for a sample of 120 Mexican American adolescent females. In addition, Lester and Petrie (1995) found that Cronbach's alpha was .94 for their sample of 142 Mexican American college women. A study investigating the correlates of bulimic symptoms in African American college women found an internal consistency reliability of .90 for their sample (Lester & Petrie, 1998b). In a study investigating the reliability and validity of the English and a translated Korean version of the BULIT-R, investigators found a Cronbach's alpha of .97 for the English version of the BULIT-R in their sample of 145 bilingual Korean women (approximately 28 from the United States and 117 from Seoul, >South Korea; Rye et al., 1999). Thelen et al. (1991) found a test–retest reliability coefficient of .95 for their sample of Caucasian women.

These studies also found evidence supporting the criterion validity of the BULIT-R in diverse ethnic groups, in that the measure correlated in expected directions with measures of body satisfaction, beliefs about attractiveness, and binge eating (Joiner & Kashubeck, 1996; Lester & Petrie, 1998b; Rye et al., 1999; Thelen et al., 1991). Lester and Petrie (1995) found that the BULIT-R had a small negative correlation with a measure of body satisfaction, the Body Parts Satisfaction Scale, indicating that subjects endorsing more bulimic symptoms reported less body satisfaction. The BULIT-R scores of the Mexican American women in the sample had a moderate positive correlation with a scale of attitudes regarding physical beauty, the Beliefs about Attractiveness Questionnaire (BAQ; Mintz & Betz, 1988). Thus, women who had more bulimic symptoms also indicated a stronger endorsement of United States sociocultural values regarding attractiveness and thinness. Thelen et al. (1991) found a strong correlation of .85 between the BULIT-R and the Binge Scale in a Caucasian sample, suggesting that women who endorsed more problematic eating also endorsed more symptoms of bulimia. Lester and Petrie (1998b) found that among African American college women, body mass, body dissatisfaction, and low self-esteem predicted 29% of the total variance of scores on the BULIT-R.

Less attention has been paid to the construct validity of the BULIT-R in diverse ethnic groups. The authors of the BULIT-R (Thelen et al., 1991) based its development on the premise that bulimia is a single dimension and therefore created only a total score for the measure by summing scores on individual items. However, they were interested in examining the factor structure of the BULIT-R in order to assess the presence of separate content areas that represent the multiple criteria required for diagnosis. In the introductory article for the BULIT-R (Thelen et al., 1991), the authors report that exploratory factor analysis revealed a five-factor structure. Based on the content of the items, these factors were named (1) Bingeing/Control/Body Image, (2) Radical Measures/Fasting, (3) Exercise, (4) Vomiting/Laxatives, and (5) Diuretics. The only other study to date that has examined the factor structure of the BULIT-R in any group, including Caucasians, was conducted on an Australian adolescent sample of girls and boys (Vincent, McCabe, & Ricciardelli, 1999). This study found four factors (bingeing, control, normative weight loss behaviors, extreme weight loss behaviors) that were similar across the two gender groups.

Since Thelen et al.'s study (1991), no published studies have been conducted on the construct validity of the BULIT-R in adult women using a factor analytic approach. Additionally, there have been no studies that have attempted to confirm the invariance of the five-factor structure of the BULIT-R among Caucasian American women or among women from other ethnic groups. The focus of this study was to examine the psychometric properties of the BULIT-R in four ethnically diverse groups of college women (African American, Asian American, Caucasian American, and Latino American), including an examination of the measure's factorial invariance using confir-

matory factor analysis and follow-up examinations of the measure's factor structure using exploratory factor analyses. Thus, this study attempts to answer the question of whether the BULIT-R is a reliable and valid screening measure for use with women from diverse ethnic groups.

Method

Participants

Participants were 2,671 female college students at San Diego State University who responded to a battery of questionnaires for course credit. This nonclinical sample consisted of undergraduate students in introductory psychology courses. Although the academic standing of the women in the sample ranged from first year to senior, most were in their first or second year of college: 69% first year, 19% sophomore, 9% junior, and 3% senior.

In order to categorize ethnicity for the participants in this study, students were presented with a multiple-choice question that asked them to identify their ethnic group. They were allowed to choose one answer and were provided with the following response options: African American; Native American; Caucasian American; Asian American; Latino/Hispanic; Pacific Islander; Other.

Ethnic group membership of the study sample was 192 African Americans (7.20%), 1,463 Caucasian Americans (54.76%), 384 Asian Americans (14.38%), and 632 Latino Americans (23.65%). At San Diego State University, the specific ethnic groups that make up the broad category of Asian American are Chinese, Japanese, Vietnamese, Korean, Filipino, and Laotian. The specific ethnic groups that make up the broad category of Latino American are Mexican, Puerto Rican, Cuban, as well as groups from South and Central America. African American and Afro-Caribbean are the primary ethnic groups that comprise the African American student body at SDSU. The Caucasian American sample is composed of students who identify as Caucasian, Anglo, White, European (e.g., Italian, German, Irish), and other groups.

Some students did not respond to the ethnicity question ($N = 127$). Additionally, the number of respondents choosing Native American ($N = 17$), or Pacific Islander ($N = 85$) were too few to analyze and we were unable to determine the specific ethnic group of those who chose Other ($N = 185$) as their ethnic group. Therefore, these groups were excluded from subsequent analyses.

Mean age for groups was 20.23 years ($SD = 8.99$) for African Americans, 19.94 years ($SD = 8.22$) for Caucasian Americans, 19.78 years ($SD = 7.36$) for Asian Americans, and 19.82 years ($SD = 7.54$) for Latino Americans. A one-way Analysis of Variance (ANOVA) with age as the dependent variable and ethnicity as the independent variable revealed no significant group differences in age across the four ethnic groups.

Socioeconomic status (SES) was measured in a subset of the sample (5.92%; $N = 158$) via responses to a question on total annual family income. Response options included 1) under 10,000; 2) 10,000 to 20,000; 3) 20,000 to 30,000; 4) 30,000 to 40,000; 5) 40,000 to 50,000; and 6) over 50,000. Mean scores on this question were 4.31 (30K to 40K) for African Americans ($SD = 1.55$), 5.29 (40K to 50K) for Caucasian Americans ($SD = 1.38$), 4.60 (30K to 40K) for Asian Americans ($SD = 1.13$), and 3.92 (20K to 30K) for Latino Americans ($SD = 1.71$). A one-way ANOVA of SES by ethnic group found significant differences, $F(3, 154) = 8.56$, $p < .01$. Follow-up analysis, using Tukey alpha protection, revealed that Caucasian Americans had higher incomes on average than Latino Americans, $p < .01$. The number of participants completing the annual family income question was so small that SES was not included in further analyses.

The participants in this study, although more ethnically diverse, are similar to the

validation group used to create the BULIT-R in that they are both samples of college women. Additionally, the percentages of students comprising the ethnic groups in this study are similar to those of the general student body at San Diego State University: 4.5% African Americans, 45% White, 10.6% Asian/Filipino, and 19.7% Mexican American/Hispanic (SDSU Office of Analytic Studies, 2003a; 2003b; 2003c; 2003d; 2003e). The general student body percentages were calculated using a denominator that included more ethnic groups than those used in our study; therefore, the general student body percentages appear similar (but numerically smaller) than those in our sample. In addition, the ethnic composition of SDSU students is similar to that of California State University students in general (California State University, 2003), but slightly different (i.e., at SDSU more Latino/Hispanic and Asian students, less White and Black students) from the general college student population in the United States (National Center for Education Statistics, 2003).

In the general SDSU student body, 2.9% of students (723 out of 25,182) classified themselves as international students (SDSU Office of Analytic Studies, 2003a; 2003b; 2003c; 2003d; 2003e). Data on the international student status or the immigration status of the participants in this study were not collected.

Measure

Bulimia Test—Revised (*BULIT*-R; Thelen et al., 1991). The BULIT-R is a 36-item, multiple-choice measure that assesses level of bulimic symptoms. Twenty-eight of the items on the BULIT-R are used to calculate a total score and there are no subscale scores on the measure. All items are presented in a five-point, forced choice, Likert-type format. Items are scored from 1 to 5 and a total score is obtained by summing across the 28 items. Total scores on the BULIT-R range from 28 to 140 with increasing scores reflect-

ing higher levels of bulimic symptoms. The score of 104 is used as a clinical cut-off point, with those scoring above this point categorized as more likely to be given the diagnosis of bulimia in a clinical interview than those scoring below this point.

Procedures

DATA COLLECTION. The BULIT-R was administered during the spring and fall semesters of 1996, spring and fall semesters of 1997, fall semester of 2000, and the spring semester of 2001. The measure was included in a packet of questionnaires that took approximately one hour to complete. Packets were administered during introductory psychology courses and groups of approximately 30 students completed the packets during each testing session. There was a significant cohort effect, with women in the fall of 1996 ($M = 52.65$; $SD = 19.41$) and spring of 1997 ($M = 52.68$; $SD = 19.30$) scoring lower than women in the spring of 2001 ($M = 56.84$; $SD = 21.17$), $F(5, 2665) = 2.79$, $p = .02$. No other significant differences were found among the cohorts.

ANALYSES. To investigate factorial invariance of the BULIT-R in four ethnic groups, a confirmatory factor analysis (CFA) was performed for each group using the structural equation modeling (SEM) software AMOS version 3.61. The Maximum Likelihood estimation method was used in the CFA and several goodness of fit statistics were calculated and examined to evaluate the appropriateness of the 5-factor model for the four ethnic groups. These included the chi-square statistic, chi-square/degree of freedom ratio, goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA). A chi-square value associated with a *p* value greater than .05 is optimal and suggests that the model is a good fit for the data (Bollen,

1989). For GFI, AGFI, CFI, and TLI values range from 0 to 1.00, with values greater than .90 suggesting a well-fitting model for the first three indices and a value greater than .95 suggesting good fit for the last index respectively (Hu & Bentler, 1999). For RMSEA, values less than .05 suggest good fit (Hu & Bentler, 1999; Cudeck & Browne, 1992).

MISSING DATA. SEM requires that there are no missing data in order to complete its analysis. While there are no formal instructions by the authors of the BULIT-R on what percentage of missing data of the measure is acceptable and can be estimated, Cohen and Cohen (1983) suggest that between 5% and 10% of missing data on a measure is acceptable (and can be estimated), as long as the data are not missing for systematic reasons (e.g., absence of data is related to a subject's true status on the measure). In the current study, individuals with more than 8% of missing data on the BULIT-R (3 out of 36 questions) were dropped from further analysis ($n = 383$, 13%). Of those individuals that remained, missing values were dealt with by estimating and inserting a value in the blank cell that was based on their own mean score on all other items answered on the measure ($n = 83$, 3%).

There was no significant difference in age, $t(2402) = .00$, $p > .05$, or percentage belonging to each cohort year, $\chi^2(3) = 6.90$, $p > .05$, between those who had data imputed versus those who did not. There was a significant difference in ethnicity between those who had data imputed and those who did not, $\chi^2(3) = 6.90$, $p > .05$, with all 83 cases of imputed data belonging to the African American (13.2%), Asian American (41.0%), and Latino American (45.8%) groups and none belonging to the Caucasian American groups.

There was no significant difference in age, $t(2507) = .00$, $p > .05$, between those who were dropped from further analyses versus those who were not. There was a significant difference in ethnicity, $\chi^2(3) = 15.22$, $p < .05$, and percentage belonging to each cohort year, $\chi^2(3) = 14.29$, $p < .05$, between those who were dropped and those who were not. Follow up analyses revealed that a larger percentage of Asian Americans (10.70%) were dropped from further analyses than Caucasian Americans (5.40%), $\chi^2(1) = 14.81$, $p < .05$, or Latino Americans (6.90%), $\chi^2(1) = 4.63$, $p < .05$. A larger percentage of the 1996 cohort (8.30%) was dropped from further analyses than from the 2000 cohort (5.00%), $\chi^2(1) = 6.30$, $p < .05$, or 2001 cohort (3.10%), $\chi^2(1) = 10.30$, $p < .05$. Additionally, a larger percentage of the 1997 cohort (7.10%) was dropped than from the 2001 cohort, $\chi^2(1) = 6.53$, $p < .05$.

Results

Reliability Estimates

Cronbach's alpha was calculated for the 36 BULIT-R items for each of the four ethnic groups. The values for the groups were African American (.92); Asian American (.93); Caucasian Americans (.95); Latino American (.93).

Ethnic Group Differences on the BULIT-R

A one-way ANOVA with BULIT-R score as the dependent variable and ethnic group as the independent variable was significant, $F(3, 2667) = 5.02$, $p < .005$. Follow-up pairwise comparisons using Tukey alpha protection revealed that African Americans ($M = 50.08$, $SD = 17.72$) scored significantly lower than Caucasian Americans ($M = 54.64$, $SD = 20.68$), $p < .05$. No other groups significantly differed on BULIT-R scores. Latino Americans' mean score was 52.54 ($SD = 18.59$) and Asian Americans' mean score was 51.80 ($SD = 18.31$).

Percent Above BULIT-R Cutoff Score

For all four ethnic groups, the percentage scoring above the 104-point cut-off score was

less than 3% (African American: $n = 4$, 2.1%; Caucasian American: $n = 31$, 2.1%; Asian American: $n = 4$, 1%; Latino American: $n = 6$, .9%). The ethnic groups did not significantly differ on percentage scoring above the cut-off, $\chi^2 (3) = 4.87$, $p = .18$.

Characteristics of Excluded Participants

Two groups were dropped from the reliability, group differences, and validity analyses because of missing ethnicity data ($N = 127$) and self-categorization as "other" ($N = 185$). The BULIT-R scores for these groups are 49.70 for the missing ethnicity group ($SD = 18.05$) and 52.91 for the group that self-categorized as "other" ($SD = 20.31$).

Confirmatory Factor Analysis

The factor structure tested in the present study's CFA was drawn from Thelen et al.'s (1991) article that introduced the BULIT-R. The five factors depicted in Figure 1 are 1) bingeing/control/body image (labeled: B_C_BI in the figure), 2) radical measures/fasting (RM_F), 3) exercise (EX), 4) vomiting/laxatives (V_L), and 5) diuretics (DI). The 36 items on the BULIT-R are represented by the boxes labeled "b1" through "b36."

As seen in Table 1, the chi-square statistic was significant ($p < .001$) across the four groups, suggesting that the five-factor solution is not a good fit for the data. An examination of the values for the goodness-of-fit indices also suggests that the 5-factor solution does not hold well across groups. GFI values ranged from .63 to .74; AGFI values were from .58 to .70; and CFI values ranged from .70 to .77. All of these values are below the .90 cut-off of acceptability for these three indices. Additionally, TLI values ranged from .68 to .76, which fall below the .95 cut-off value for the TLI index. The RMSEA values for the four groups ranged from .07 to .09, which are above the optimal cut-off point of .05 for the RMSEA index.

Exploratory Factor Analyses

After examining the goodness-of-fit statistics and concluding the specified model was not a good fit for the data, follow-up EFAs were used to examine the factor structure of the BULIT-R in each of the four ethnic groups. Principal components analysis with oblique (promax) rotation was run for the 36 BULIT-R items for each ethnic group. Across the four groups, the analyses yielded between six and nine factors with eigenvalues greater than 1.0. Inspection of scree plots, the amount of variance explained by the factors, and incremental change in eigenvalue with each additional factor beyond six suggested that the six-factor solution was most appropriate across the four groups. Within each group, six factors explained approximately 60% of the variance in BULIT-R scores (African Americans: 59%; Asian Americans: 56%; Caucasian Americans: 61%; Latino Americans: 57%). Therefore, a second principal components analysis with oblique rotation was run for the 36 BULIT-R items for each ethnic group, with the number of factors constrained to six. See Table 2 for a summary of factor labels, and number of items loading on each factor. Tables 3 through 6 contain information on the highest loading values of the BULIT-R items for each of the six factors across the four ethnic groups.

Discussion

Overall, there were a number of similarities in findings across ethnic groups. Internal consistency coefficients for the BULIT-R were relatively similar and very high across the four groups. Cronbach's alpha values ranged between .92 and .95 for the four subsamples in the study. The results are consistent with previous research (Joiner & Kashubeck, 1996; Lester & Petrie, 1995, 1998a; Lester & Petrie, 1998b; Thelen et al., 1991) and suggest that the BULIT-R has excellent reliability in diverse ethnic groups.
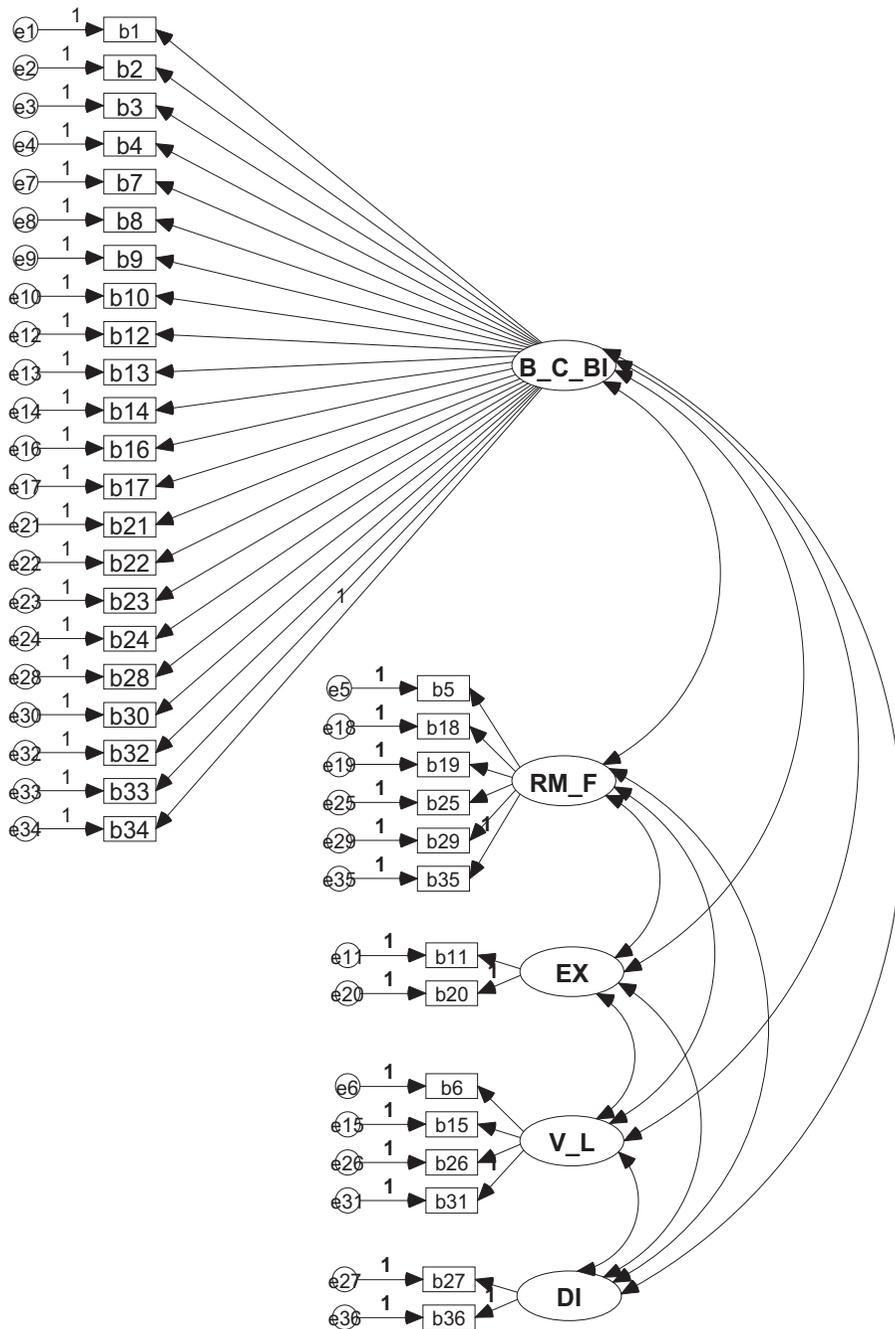
Figure 1. Hypothesized CFA model of factorial structure for the Bulimia Test Revised.

The percentage of scores that fell above the 104-point cut-off (ranging from .9–2.6%) did not significantly differ across groups and the data on prevalence in the current sample are consistent with previous prevalence findings (Coric & Murstein, 1993; Heatherton, Nichols, Mahamedi, & Keel, 1995).

The findings indicate that the five-factor structure (Bingeing/Control/Body Image; Radical Measures/Fasting; Exercise; Vomit-

TABLE 1 Summary of the Fit Indices for the Hypothesized Five Factor Model

Model	χ^2	df	χ^2/df	GFI	AGFI	CFI	TLI	RMSEA
African American	1550.053***	584	2.654	.638	.588	.704	.680	.093
Asian American	1917.156***	584	3.283	.744	.708	.779	.761	.077
Caucasian American	7154.612***	584	12.251	.685	.641	.774	.756	.088
Latino American	2929.118***	584	4.981	.721	.682	.776	.758	.079

Note. GFI = goodness-of-fit index; AGFI = adjusted goodness-of-fit index; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation.

*** $p < .001$.

ing/Laxatives; Diuretics) originally presented by the authors of the BULIT-R did not hold for any of the four ethnic groups represented in the current study, despite the inclusion of a Caucasian American group that matched the age and ethnicity of the sample used by Thelen et al. (1991). Instead, a six-factor solution was the most appropriate for all four groups, and the six factors accounted for a similar proportion of the variance in scores (56–61%). Perhaps not surprisingly, the factor structure for Caucasian Americans in this sample most closely parallels the factor structure found in the original BULIT-R article. Factors representing components such as body image, bingeing, and extreme weight loss behaviors emerged for all groups. In addition, distinct purging behaviors, such as laxative use, vomiting, and diuretics use, emerged as factors for each of the four groups.

Interesting group differences emerged, such as a separate speed/amount of eating factor for African Americans and Asian Americans, but not for Caucasian Americans or Latino Americans. The questions that comprised the speed/amount of eating factor did not include the words "binge," "bingeing," or "binge eat" (e.g., There are times when I rapidly eat a very large amount of food; Most people would be amazed if they knew how much food I can eat in one sitting; When consuming a large quantity of food, at what rate of speed do you usually eat?). However, the questions that made up the bingeing factor did contain these words (e.g., Would you presently call yourself a "binge-eater"?; How long have you been binge eating [eating uncontrollably to the point of stuffing yourself]?; When engaged in an eating binge, I tend to eat foods that are high in carbohydrates [sweets and starches].). Thus, these findings of a factor for items containing binge words and a separate factor for items referring to binge eating without using the word binge suggests that some groups may perceive a distinction between what they formally consider to be binge eating and eating large amounts of food in a short period of time.

Other differences included a separate control factor emerging for Latino Americans and a lack of control factor or clustering of control items for Asian Americans. For African Americans, the control items loaded on the Body Image/Control factor, and for Caucasian Americans, the items loaded on the Bingeing/Control factor. Items representing four purging behaviors loaded onto four distinct factors (Laxatives, Vomiting, Diuretics, and Exercise) for Caucasian Americans. In contrast, these four purging behaviors loaded onto two or three factors for African Americans (Vomiting/Laxatives, Diuretics), Asian Americans (Vomiting/Laxatives; Diuretics; Exercise), and Latino Americans (Laxatives/Diuretics; Vomiting; Exercise). For African Americans alone, no exercise factor emerged. Unfortunately, there are not enough studies on the expression of disordered eating in ethnically diverse samples to explain the etiology of these differences.

TABLE 2 Summary of Factor Labels

Factor	African American	Asian American	Caucasian American	Latino American
Factor I	Body image/control (8)	Body image/extreme weight loss behaviors (11)	Bingeing/control (16)	Body image/extreme weight loss behaviors (11)
Factor II	Extreme weight loss behaviors (9)	Bingeing (8)	Body image/extreme weight loss behaviors (12)	Bingeing (12)
Factor III	Bingeing (7)	Speed/amount of eating (8)	Vomiting (2)	Control (5)
Factor IV	Vomiting/laxatives (4)	Vomiting/laxatives (4)	Exercise (2)	Laxatives/diuretics (4)
Factor V	Speed/amount of eating (4)	Diuretics (3)	Diuretics (2)	Vomiting (2)
Factor VI	Diuretics (4)	Exercise (2)	Laxatives (2)	Exercise (2)

Note. Number of items with highest loading on factor is given in parentheses.

However, the potential clinical implications of these findings are intriguing. Given that the items related to perceived control over eating for Asian Americans did not cluster together as they did for other groups, this could suggest that Asian American women may not endorse symptoms necessary to meet the *DSM–IV* definition of a binge (i.e., eating large amount of food in discrete period, *coupled with feeling of lack of control over eating*). For African Americans, whose data did not produce a separate exercise factor, the implication could be that excessive exercise is not a pathological compensatory weight-control behavior used in this group. However, it is possible that this lack of excessive exercise would not affect the diagnosis of bulimia, as there are a number of behaviors listed in the compensatory behavior criterion of the *DSM–IV* definition of bulimia.

In order to be certain of the clinical implications of these inconsistencies in the clustering of items across the four ethnic groups, more research is needed on the effect of ethnicity on the experience of bulimic attitudes and behaviors. This will assist in determining whether these findings represent meaningful differences in these constructs. However, the practical implications of these findings as they pertain to the validity of the measure are minimal. Since the total scale score is used to evaluate the level of bulimic symptomatology and subscale scores are not used (factor-analytically derived or otherwise), minor differences on how items cluster should not lead to differential validity of total scores as a function of ethnicity.

If in the future researchers were interested in looking at components of the construct of bulimia across ethnic groups by creating and using BULIT-R factor scores, they would first need to examine the reliability of the factor scores in various groups. Additional future directions for research using this measure could include investigations into the psychological correlates of disordered eating in diverse ethnic groups.

TABLE 3 Highest Factor Loadings for African Americans for the BULIT-R

		Factor					
Item	*Topic of item*	*I*	*II*	*III*	*IV*	*V*	*VI*
Factor I: Body image/control							
1	Eating patterns	.81					
3	Control	.75					
4	Body image	.55					
16	Eating a lot	.53					
22	Control	.73					
24	Body image	.71					
33	Control	.73					
35	Body image	.53					
Factor II: Extreme weight loss behaviors							
5	Extreme measures		.76				
7	Body image		.62				
11	Exercise		.79				
12	Body image		.57				
13	Fear of eating		.38				
14	Fear of fat/weight gain		.61				
19	Fasting		.63				
25	Extreme measures		.64				
29	Fasting		.70				
Factor III: Bingeing							
2	Bingeing			.85			
9	Bingeing			.81			
18	Extreme measures			.52			
21	Bingeing			.75			
23	Compulsive eating			.50			
32	Bingeing/body image			.54			
34	Bingeing			.81			
Factor IV: Vomiting/laxatives							
6	Laxatives				.85		
15	Vomiting				.86		
26	Vomiting				.63		
31	Laxatives				.57		
Factor V: Speed/amount of eating							
8	Bingeing/speed					.58	
10	Bingeing/amount					.77	
17	Eating patterns					.35	
30	Bingeing/speed					.60	
Factor VI: Diuretics							
20	Exercise						.56
27	Diuretics						.82
28	Control						.46
36	Diuretics						.88

One possible focus for future research is the link between individualism-collectivism in diverse ethnic groups and disordered eating as measured by the BULIT-R. Collectivism refers to a person's connection to and self-definition deriving from membership in a group (such as family, community, town, culture, etc.), while individualism refers to an individual's independence from such groups (Hofstede, 1997; Triandis, 1988). People who are highly collectivistic may prioritize the needs of the group (or collective) above their own, while the opposite behavior may be seen in people who are highly

TABLE 4 Highest Factor Loadings for Asian Americans for the BULIT-R

		Factor					
Item	Topic of item	I	II	III	IV	V	VI
Factor I: Body image/extreme weight loss behavior							
1	Eating patterns	.65					
3	Control	.39					
4	Body image	.77					
5	Extreme measures	.45					
7	Body image	.81					
12	Body image	.69					
14	Fear of fat/weight gain	.90					
19	Fasting	.59					
24	Body image	.69					
25	Extreme measures	.64					
29	Fasting	.63					
Factor II: Bingeing							
2	Bingeing		.80				
9	Bingeing		.96				
18	Extreme measures		.70				
21	Bingeing		.73				
22	Control		.40				
32	Bingeing/body image		.63				
34	Bingeing		.70				
35	Body image		.26				
Factor III: Speed/amount of eating							
8	Bingeing/speed			.57			
10	Bingeing/amount			.82			
13	Fear of eating			.26			
16	Eating a lot			.51			
17	Eating patterns			.62			
23	Compulsive eating			.37			
28	Control			.31			
30	Speed of eating			.43			
Factor IV: Vomiting/laxatives							
6	Laxatives				.75		
15	Vomiting				.64		
26	Vomiting				.71		
31	Laxatives				.69		
Factor V: Diuretics							
27	Diuretics					.81	
33	Control					.41	
36	Diuretics					.82	
Factor VI: Exercise							
11	Exercise						.80
20	Exercise						.69

individualistic. Individualism-Collectivism (IC) is a term that refers to a cultural continuum, with Individualism falling on one side of the continuum and Collectivism falling on the other side.

Asian, African, and Latino cultures have been identified in the literature as being collectivistic, while English, American, Australian, and other western cultures have been identified as individualist cultures (Greenfield & Cockling, 1994). This variance in emphasis on the self may explain some of the ethnic differences in disordered eating among women: collectivistic women

TABLE 5 Highest Factor Loadings for Caucasian Americans for the BULIT-R

Item	Topic of item	I	II	III	IV	V	VI
Factor I: Bingeing/control							
2	Bingeing	.74					
3	Control	.52					
8	Bingeing/speed	.82					
9	Bingeing	.79					
10	Bingeing/amount	.81					
13	Fear of eating	.40					
16	Eating a lot	.77					
18	Extreme measures	.43					
21	Bingeing	.73					
22	Control	.55					
23	Compulsive eating	.84					
28	Control	.44					
30	Speed of eating	.62					
32	Bingeing/body image	.58					
33	Control	.56					
34	Bingeing	.85					
Factor II: Body image/extreme weight loss behaviors							
1	Eating patterns		.72				
4	Body image		.87				
5	Extreme measures		.61				
7	Body image		.78				
12	Body image		.72				
14	Fear of fat/weight gain		.95				
17	Eating patterns		.38				
19	Fasting		.81				
24	Body image		.83				
25	Extreme measures		.74				
29	Fasting		.77				
35	Body image		.46				
Factor III: Vomiting							
15	Vomiting			.84			
26	Vomiting			.87			
Factor IV: Exercise							
11	Exercise				.83		
20	Exercise				.80		
Factor V: Diuretics							
27	Diuretics					.83	
36	Diuretics					.86	
Factor VI: Laxatives							
6	Laxatives						.93
31	Laxatives						.79

may focus less on their own body (and by extension their own eating behaviors related to their appearance) or may be more likely to use the body size of their specific ethnic group as a reference point for an attractive body (instead of the ideal, e.g., popular in individualistic cultures) and, as a result, may have less body dissatisfaction and, as a correlate, less disordered eating than their individualistic peers.

A second variable that has yet to be fully understood in relation to eating disorders is socioeconomic status (SES). Results of studies to date have been inconsistent. While

TABLE 6 Highest Factor Loadings for Latino/Hispanic Americans for the BULIT-R

		Factor					
Item	Topic of item	I	II	III	IV	V	VI
Factor I: Body image/extreme weight loss behaviors							
4	Body image	.64					
5	Extreme measures	.74					
7	Body image	.71					
12	Body image	.60					
13	Fear of eating	.31					
14	Fear of fat/weight gain	.80					
19	Fasting	.77					
24	Body image	.69					
25	Extreme measures	.79					
29	Fasting	.73					
35	Body image	.26					
Factor II: Bingeing							
2	Bingeing		.75				
8	Bingeing/speed		.70				
9	Bingeing		.83				
10	Bingeing/amount		.54				
16	Eating a lot		.48				
17	Eating patterns		.25				
18	Extreme measures		.56				
21	Bingeing		.79				
23	Compulsive eating		.63				
30	Speed of eating		.38				
32	Bingeing/body image		.67				
34	Bingeing		.83				
Factor III: Control							
1	Eating patterns			.57			
3	Control			.60			
22	Control			.78			
28	Control			.40			
33	Control			.58			
Factor IV: Laxatives/Diuretics							
6	Laxatives				.66		
27	Diuretics				.79		
31	Laxatives				.71		
36	Diuretics				.70		
Factor V: Vomiting							
15	Vomiting					.81	
26	Vomiting					.91	
Factor VI: Exercise							
11	Exercise						.84
20	Exercise						.80

some studies have found that anorexia nervosa, but not bulimia nervosa, is more common among higher SES groups (Kendler et al., 1991; Walters & Kendler, 1995), other studies have found no relationship between SES and eating disorders (Atlas, Smith, Hohlstein, McCarthy, & Kroll, 2002; Edwards-Hewitt & Gray, 1993; Johnson, Rohan, & Kirk, 2002; Molloy & Herzberger, 1998). In contrast, one study found a decrease in eating disorders (specifically bulimia nervosa) and disturbed body image as SES increases (Striegel-Moore et al., 2000). Recent reviews of the literature have attempted to

integrate these disparate findings and have concluded that more research is necessary to fully understand the impact of SES on eating pathology (Gard & Freeman, 1996; Wildes, Emery, & Simons, 2001). Gard and Freeman (1996) have posited that the findings thus far might support an inverse relationship between bulimia nervosa and SES, with women in lower SES groups engaging in more bingeing and purging behaviors. The implication of this suggestion for the current study is that women who are in the lower SES brackets would endorse higher rates of bulimia. Unfortunately, the percentage of women with complete SES and BULIT-R data in this sample was so small (5.92%) that it precluded the treatment of SES as a covariate in further analyses.

Overall, the bulk of the findings support the BULIT-R as appropriate for use in women across these four ethnicities. Of the sample of 2,671 women recruited for the study, 1,208 (approximately 45%) were women of color. The large proportion of ethnically diverse women in the sample gives credence to the findings of good reliability and validity in all the groups studied. The finding of higher scores for Caucasian Americans compared to African Americans suggest that the Caucasian Americans in this sample were experiencing more bulimic attitudes and behaviors. This finding indicates that more Caucasian American women may be diagnosed as bulimic than African American women and is consistent with other findings in the literature of lower levels of disordered eating reported by African Americans when compared to Caucasian Americans (Celio, Zabinski, & Wilfley, 2002). Asian Americans and Latino Americans did not differ from either Caucasian Americans or African Americans on the BULIT-R. These findings are also consistent with literature that indicates Mexican Americans and Asian Americans are similar to Caucasian Americans in the amount of disordered eating behaviors endorsed on self-report measures (Crago, Shisslak, & Estes, 1996; Wildes, Emery, & Simons, 2001).

To summarize the current study, the BULIT-R has excellent reliability in college women from four ethnic groups and there is support for its validity in these groups. Internal consistency coefficients were consistently very high across groups. The factor structure, although not identical, is largely similar across groups and explains an equivalent amount of the variance in all groups. The instrument measures topics of bingeing, body image, extreme measures for weight loss, and specific purging behaviors across all four ethnic groups in this study. These findings indicate that the measure assesses the construct of disordered eating in a consistent way and that, across diverse ethnic groups, the BULIT-R assesses the presence of separate content areas representing multiple criteria for the diagnosis of bulimia nervosa.

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Correction to Fernandez, Malacme, Wilfley, and McQuaid (2006)

In the article "Factor Structure of the Bulimia Test-Revised in College Women from Four Ethnic Groups" by Senaida Fernandez, Vanessa L. Malacme, Denise E. Wilfley, and John McQuaid (*Cultural Diversity & Ethnic Minority Psychology*, 2006, Vol. 12, No. 3, pp. 403–419), the coauthor's name should be spelled as follows:

Vanessa L. Malcarne