

Psychometric Properties of Eating Disorder Instruments in Black and White Young Women: Internal Consistency, Temporal Stability, and Validity

Anna M. Bardone-Cone and Clarissa A. Boyd
University of Missouri—Columbia

Most of the major instruments in the eating disorder field have documented psychometric support only in predominantly White samples. The current study examined the internal consistency, temporal stability, and convergent and discriminant validity of a variety of eating disorder measures in Black ($n = 97$) and White ($n = 179$) female undergraduates. Internal consistency coefficients were good ($>.76$) for all measures for both groups. Temporal stability across 5 months was also adequate in both groups, but with evidence for dietary restraint and subjective binge eating being less stable in Black women (e.g., for the Restraint subscale of the Three-Factor Eating Questionnaire [TFEQ], $r = .63$ for Black women and $r = .82$ for White women). Scores on the bulimic symptoms and dietary restraint instruments converged and diverged in a theoretically consistent pattern. Findings suggest these eating disorder measures are reliable (internally consistent; temporally stable over 5 months) and that the bulimic symptom measures of the Bulimia Test—Revised, the Bulimia subscale of the Eating Disorder Inventory, and the dietary restraint measures from the Eating Disorder Examination—Questionnaire and TFEQ demonstrate convergent and discriminant validity in Black college women.

Keywords: African American, reliability, stability, validity, eating disorder

Recent findings, in particular among Black girls and women, have called into question the “myth” of White females as the only vulnerable population for eating disorders. Although Black females report less body dissatisfaction than White females (Grabe & Hyde, 2006), as well as lower rates of anorexia nervosa (Striegel-Moore et al., 2003), studies have found comparable rates of binge eating disorder and bulimia nervosa among Black and White women (Mulholland & Mintz, 2001; Smith, Marcus, Lewis, Fitzgibbon, & Schreiner, 1998). Studies of disordered eating behaviors have found that White women are more likely to diet than Black women but are about equally likely to report bulimic symptoms (especially binge eating; Striegel-Moore, Wilfley, Pike, Dohm, & Fairburn, 2000; White & Grilo, 2005). In a recent meta-analysis, O’Neill (2003) reported that although White women were more likely to have anorexic-type eating disturbances, such as elevated dietary restraint, Black and White women did not differ on the bulimic behavior of binge eating.

Interpretation of these findings is constrained by the question of whether measures of disordered eating that have been found reliable and valid among White females are also psychometrically adequate for minority groups (Mulholland & Mintz, 2001; Striegel-Moore & Smolak, 2002). With some exceptions, scant

psychometric evidence is available for Black females. Some examples of research assessing the psychometrics of eating disorder measures in Black female samples include work by Franko et al. (2004), reporting good internal consistency of the Bulimia subscale of the children’s version of the Eating Disorder Inventory (EDI) among Black girls, and work by Fernandez, Malcarne, Wilfley, and McQuaid (2006), reporting reliability and validity of the Bulimia Test—Revised (BULIT-R), which assesses bulimic symptoms, including binge eating, purging, and negative body image, in Black undergraduates.

Atlas, Smith, Hohlstein, McCarthy, and Kroll (2002) further advanced disordered eating research among Black women by examining the psychometric properties of multiple eating disorder measures. They found support for similar factor structures across Black and White college women on two commonly used eating disorder measures: the BULIT and the Three-Factor Eating Questionnaire (TFEQ). They further compared intercorrelations of factors within racial groups, finding striking consistencies across race. While providing important contributions to the literature, a limitation of this work is its cross-sectional design and the use of only one measure to assess bulimic symptoms and only one measure to assess dietary restraint.

The current longitudinal study examined the psychometric properties of some of the most frequently used eating disorder measures in a Black and White female college sample. Internal consistency, temporal stability, and convergent and discriminant validity were evaluated.

Method

Participants were 276 women attending a midwestern university; 97 (35%) described themselves as African American/Black,

Anna M. Bardone-Cone and Clarissa A. Boyd, Department of Psychological Sciences, University of Missouri—Columbia.

This research was supported in part by the McNair Scholars Program at the University of Missouri—Columbia.

Correspondence concerning this article should be addressed to Anna M. Bardone-Cone, Department of Psychological Sciences, University of Missouri, 210 McAlester Hall, Columbia, MO 65211. E-mail: bardonecone@missouri.edu

and 179 (65%) as Caucasian non-Hispanic/White. Efforts were made to oversample Black women, given research interests in this population, and recruitment occurred both through introductory psychology classes and through campuswide recruitment strategies (e.g., flyers, e-mail distribution lists). For Black participants, the mean age was 19.04 years ($SD = 1.59$); for White participants, the mean age was 18.58 years ($SD = 1.06$). For Black participants, mean body mass index (BMI) was 24.18 kg/m² ($SD = 4.66$); for White participants, mean BMI was 22.22 kg/m² ($SD = 2.79$). Highest parental education was used as a proxy for socioeconomic status. On average, the highest education attained by parents of the Black women was 15.80 years ($SD = 2.81$), whereas for White women the mean was 16.42 years ($SD = 2.57$). Given the greater prevalence of negative body image and disordered eating among females than males (Striegel-Moore & Smolak, 2002) and, relatedly, the greater use of these eating disorder measures among women than men, the focus of this study was on women.

At Time 1 (T1), participants completed questionnaires related to disordered eating behaviors and attitudes and body image in the context of a set of questionnaires on personality and health behaviors. At Time 2 (T2), on average 5.24 months ($SD = 0.70$) after T1 for Black women and 5.32 months ($SD = 0.76$) after T1 for White women, participants completed the same set of questionnaires. Questionnaires were administered to groups of 5 to 20 participants by primarily White female experimenters. Of the T1 participants, significantly more White women (156 of 179; 87.2%) than Black women (70 of 97; 72.2%) completed T2, $\chi^2(1, N = 276) = 9.52$, $p = .002$. Completers were compared with noncompleters both in the full sample and within racial group using t tests; these groups

were not significantly different from each other on any of the eating disorder variables. Thus, the completers appear to be representative of the participants who began the study on the study variables, minimizing attrition concerns.

A variety of widely used eating disorder measures with well-established psychometric properties in predominantly White samples were used. (See Table 1 for sample psychometric data on these measures from prior psychometric studies.) The BULIT-R (Thelen, Farmer, Wonderlich, & Smith, 1991) has good construct coverage of bulimic symptoms, addressing binge eating, inappropriate compensatory behaviors, and negative attitudes related to body weight/shape (28 items go toward the scale score; 5-point response format). This measure has been used to aid in diagnosis of bulimia nervosa and to assess bulimic symptom severity in clinical and nonclinical populations (Williamson, Anderson, Jackman, & Jackson, 1995). The Bulimia subscale of the EDI (Garner, Olmsted, & Polivy, 1983) focuses primarily on binge eating (seven items; 6-point response format). Scores were computed using the full 1–6 response format as indicated by research on the validity of the EDI in nonclinical samples (van Strien & Ouwens, 2003). The EDI has been widely used as a screening instrument to detect populations at risk for eating disorders and as an outcome assessment, and the bulimia subscale (EDI–Bulimia) is a stable predictor of binge eating at 1- and 2-year follow-ups (Williamson et al., 1995). The Restraint subscale of the TFEQ (TFEQ–R; Stunkard & Messick, 1985) taps conscious control of eating behavior (21 items; true–false and 4-point response formats). The TFEQ–R is generally considered a measure of “successful dieting” (i.e., actual

Table 1
Sample Psychometric Data From Prior Psychometric Research on the Study Measures

Measure	Psychometric data
BULIT–R	Internal consistency: .95, .92 in White and Black (respectively) female college samples (Fernandez et al., 2006); .92, female college sample (Welch et al., 1993). Test-retest reliability: $r = .95$ (2 months), female college sample (Thelen et al., 1991). Convergent validity: $r = .85$ with Binge Scale (Hawkins & Clement, 1980), female college sample (Thelen et al., 1991); $r = .90$ with bulimic measure BITE (Henderson & Freeman, 1987), female college sample (Welch et al., 1993).
EDI–Bulimia	Internal consistency: .64–.83, female college samples (Garner et al., 1983; Limbert, 2004); .76, .74 in White and Black girls (respectively) from school samples with Children’s version of EDI (Franko et al., 2004). Test-retest reliability: $r = .88$ (1 week), female adult patients with eating disorders (Thiel & Paul, 2006). Convergent and predictive validity: $r = .61$ with presence of binge eating and $r = .64$, .54 with presence of binge eating at 1- and 2-year follow-ups, majority female adult eating disorder patient sample (Norrington, 1990).
TFEQ–R	Internal consistency: .90, majority female, majority White college sample (Allison et al., 1992); .80, female majority college sample (Laessle et al., 1989). Test-retest reliability: $r = .91$ (2 weeks), majority female, majority White college sample (Allison et al., 1992). Convergent validity: $r = .89$ with Dutch Eating Behavior Questionnaire (van Strien et al., 1986), majority female, majority White college sample (Allison et al., 1992); $r = -.46$ with mean daily caloric intake (based on 7-day daily caloric intake reports), female majority college sample (Laessle et al., 1989).
EDE–Q	Internal consistency: .78–.93 for subscales, female, majority White college sample (Luce & Crowther, 1999); .73–.87 for subscales, female adult community sample (Mond et al., 2004). Test-retest reliability: $r = .81$ –.94 (2 weeks) for subscales, female, majority White college sample (Luce & Crowther, 1999); $r = .44$, .24 (mean of 10 months) for occurrence of objective binge eating and subjective binge eating (respectively), female adult community sample (Mond et al., 2004). Convergent and discriminant validity: $r_s = .79$ –.81 and .78–.85 between subscales in EDE–Q and in EDE interview; female, mainly adult community sample and female patients with eating disorders, respectively (Fairburn & Beglin, 1994); binge eating items of EDE–Q discriminated between binge eaters and non-binge eaters; obese adult, majority female patients (Wilson et al., 1993).

Note. BULIT–R = Bulimia Test—Revised; EDI–Bulimia = Bulimia subscale of the Eating Disorder Inventory; TFEQ–R = Restraint subscale of the Three-Factor Eating Questionnaire; EDE–Q = Eating Disorder Examination—Questionnaire. Racial/ethnic composition of the samples used was not reported in the psychometric studies unless noted.

food restriction; Laessle, Tuschl, Kotthaus, & Pirke, 1989) and is one of the most frequently used measures of dietary restraint.

The Eating Disorder Examination—Questionnaire (EDE-Q; Fairburn & Beglin, 1994) is a self-report measure adapted from the Eating Disorder Examination interview (Fairburn & Cooper, 1993) that has been used with increasing frequency in assessing eating disorder symptoms in clinical and community populations (Anderson & Williamson, 2002). It contains 36 questions about bulimic symptoms, dietary restraint, and body image, as experienced over the past 28 days. Responses to this questionnaire yield four subscale scores, conceptually labeled Restraint, Eating Concern, Weight Concern, and Shape Concern. In addition, data collected from the EDE-Q includes the frequency of the following behaviors over the past 28 days: objective binge eating (defined as eating “what other people would regard as an unusually large amount of food given the circumstances” and having a “sense of having lost control over your eating” in that eating episode; i.e., the binge eating component of bulimia nervosa), subjective binge eating (having “had a sense of having lost control and eaten too much” but not having eaten “an unusually large amount of food given the circumstances”), and intense exercise (exercising “hard” as a means of controlling shape/weight).

Results

Descriptive Statistics

Table 2 contains the means and standard deviations for the eating disorder variables for Black and White women at T1; *t* tests revealed that White women were significantly higher on all scale scores and on subjective binge eating frequency but that the groups were similar in their frequencies of objective binge eating and intense exercise. With regard to occurrence of behaviors at T1 (i.e., presence or absence of behavior), comparable percentages of women reported objective binge eating and intense exercise, but significantly more White women than Black women reported any subjective binge eating (see Table 2).

Table 2
Comparisons Between Black and White Women on Study Variables at Time 1

Measure	Black women			White women			<i>t</i>	χ^2
	<i>M</i>	<i>SD</i>	%	<i>M</i>	<i>SD</i>	%		
BULIT-R	43.22	15.66		51.92	19.87		4.00**	
EDI-Bulimia	11.62	5.11		14.41	5.56		4.09**	
TFEQ-R	6.09	5.33		9.60	6.20		4.68**	
EDE-Q Restraint	1.01	1.24		1.63	1.47		3.70**	
EDE-Q Eating Concern	.67	1.09		1.14	1.26		3.25*	
EDE-Q Weight Concern	1.93	1.63		2.47	1.48		2.79*	
EDE-Q Shape Concern	2.15	1.59		2.96	1.50		4.16**	
Objective binge eating	0.95	2.86	16.8	1.30	3.53	22.9	.83	1.39
Subjective binge eating	1.00	2.79	18.3	2.54	5.09	35.8	3.22*	8.94*
Intense exercise	2.89	6.08	32.0	3.92	6.98	38.5	1.22	1.18

Note. BULIT-R = Bulimia Test—Revised; EDI-Bulimia = Bulimia subscale of the Eating Disorder Inventory; TFEQ-R = Restraint subscale of the Three-Factor Eating Questionnaire; EDE-Q = Eating Disorder Examination—Questionnaire. Means are for scale scores except for objective binge eating, subjective binge eating, and intense exercise, where the number of occasions of these behaviors over the past 28 days is reported. For objective binge eating, subjective binge eating, and intense exercise, the percentages shown are the percentages of women in each racial group who reported any occasions of the behavior (e.g., 16.8% of Black women reported having at least one occasion of objective binge eating in the past 28 days), with the respective chi-square values reported in the last column.

* $p < .01$. ** $p < .001$.

Internal Consistency

As shown in Table 3, internal consistency for all T1 scales was adequate for both Black and White women, with all coefficient alphas greater than .80. Furthermore, when comparing alphas across racial groups within assessment measure, the similarities are striking (e.g., for the BULIT-R, alpha was .93 for Black women and .95 for White women). At T2, the alphas were again similar across groups, and all were greater than .76.

Temporal Stability

The temporal stability of continuous scale scores (i.e., BULIT-R, EDI-Bulimia, TFEQ-R, the four subscales of the EDE-Q) was assessed using Pearson product-moment correlations. These stability correlations were uniformly high across the study interval with correlations ranging from .57 to .88, and with all but two correlations greater than .70 (see Table 3). Stability correlations were compared across the two samples using Fisher's *r*-to-*z* transformation. The only significant group difference in stability correlations came from the TFEQ-R ($z = 2.59, p = .009$), although there was a difference that approached significance in temporal stability with the EDE-Q Restraint ($z = 1.66, p = .097$). T1 dietary restraint, using the TFEQ-R and, to a lesser degree, the EDE-Q Restraint, appeared to be better predictors of T2 dietary restraint for White women than for Black women. In the realms of binge eating (EDI-Bulimia), the broader range of bulimic symptoms (BULIT-R), eating concern, and body image (weight and shape concern), T1 levels were similarly highly predictive of T2 levels among Black and White women.

The stability of the frequency of behaviors (number of occasions in the past 28 days of objective binge eating, subjective binge eating, and exercising hard) was assessed using Spearman's rho correlation coefficient. Spearman's rho is an alternative version of Pearson's *r* in which the variables correlated are ranks (Cohen, Cohen, West, & Aiken, 2003). This correlation coefficient was used because the frequency variables were highly skewed and

Table 3
Internal Consistency (IC) and Temporal Stability (TS) of Eating Disorder Measures in Black and White Women

Race	BULIT-R (28)		EDI-B (7)		TFEQ-R (21)		EDE-Q-R (5)		EDE-Q-EC (5)		EDE-Q-WC (5)		EDE-Q-SC (8)	
	IC ^a	TS ^b												
Black	.93	.87	.85	.81	.90	.63	.81	.57	.86	.79	.83	.81	.89	.82
White	.95	.88	.86	.82	.92	.82	.84	.71	.85	.81	.84	.81	.91	.80

Note. BULIT-R = Bulimia Test—Revised; EDI-B = Bulimia subscale of the Eating Disorder Inventory; TFEQ-R = Restraint subscale of the Three-Factor Eating Questionnaire; EDE-Q-R = Restraint subscale of the Eating Disorder Examination—Questionnaire (EDE-Q); EDE-Q-EC = Eating Concern subscale of the EDE-Q; EDE-Q-WC = Weight Concern subscale of the EDE-Q; EDE-Q-SC = Shape Concern subscale of the EDE-Q. The number of items used in the computation of each scale is noted in parentheses. All TS correlations are significant at $p < .001$.

^a Coefficient alphas from Time 1 measures reported ($n_s = 97$ Black women and 179 White women). ^b Pearson product-moment correlation coefficients of measures across approximately 5 months ($n_s = 70$ Black women and 156 White women).

Spearman's rho requires no distributional assumptions (Hollander & Wolfe, 1999). There was significant rank-order stability in all behaviors for White women ($r_s = .56$ for objective binge eating, $r_s = .47$ for subjective binge eating, $r_s = .51$ for intense exercise; all $p_s < .001$), and for objective binge eating ($r_s = .57$, $p < .001$) and intense exercise ($r_s = .36$, $p = .003$) but not subjective binge eating ($r_s = .20$, $p = .106$) for Black women. Using Fisher's r -to- z transformation to compare the stability correlations across the samples, we found that the only significant group difference was for subjective binge eating ($z = 2.03$, $p = .042$), where the rank-order stability of subjective binge eating was significantly greater for White women.

Descriptive information about the stability of and change in the occurrence of behaviors (objective binge eating, subjective binge eating, intense exercise) is presented in Table 4. Base rates in this table reflect the percentages of Black and White women who engaged in the behavior at each time point (base rates for presence) and the percentages of those who did not engage in the behavior at

each time point (base rates for absence). Stability and change data were derived from participants' behavior at T2, taking into account what they were doing (or not doing) at T1. Of note, a general pattern emerged across the samples wherein the stability of the absence of behaviors was higher than the stability of the presence of behaviors, and the rates of desistance of behaviors were higher than the rates of emergence of behaviors. Also, there was a tendency for stability of the presence of the three behaviors to be greater in White women, but the stability of the absence of behaviors (for objective binge eating and intense exercise) to be greater in Black women. Higher rates of emergence of objective binge eating and intense exercise were seen in White women, whereas higher rates of desistance of all three behaviors were seen in Black women.

The stability of the occurrence of behaviors across T1 and T2 was assessed using phi coefficients. The phi coefficient is an alternative version of Pearson r where the variables correlated are dichotomous (Cohen et al., 2003). For White women, the phi

Table 4
Base Rates and Temporal Stability of Occurrence of Behaviors in Black and White Women

Behavior	Base rate				Stability and change			
	Presence at T1 (%)		Presence at T2 (%)		Stability of presence of behavior (%)		Desistance of behavior (%)	
	Black	White	Black	White	Black	White	Black	White
Objective binge eating	16.8	22.9	12.9	18.6	46.2	57.1	53.8	42.9
Subjective binge eating	18.3	35.8	14.3	25.0	28.6	47.5	71.4	52.5
Intense exercise	32.0	38.5	20.6	35.3	40.0	59.3	60.0	40.7
Behavior	Absence at T1 (%)		Absence at T2 (%)		Stability of absence of behavior (%)		Emergence of behavior (%)	
	Black	White	Black	White	Black	White	Black	White
	Black	White	Black	White	Black	White	Black	White
Objective binge eating	83.2	77.1	87.1	81.4	98.2	92.6	1.8	7.4
Subjective binge eating	81.7	64.2	85.7	75.0	88.5	88.7	11.5	11.3
Intense exercise	68.0	61.5	79.4	64.7	87.5	79.4	12.5	20.6

Note. The Eating Disorder Examination—Questionnaire provided data on the presence and absence of these three behaviors (objective binge eating, subjective binge eating, and intense exercise) over the past 28 days at Time 1 (T1) and Time 2 (T2). Absence of a behavior reflects a report of no occasions of the behavior (e.g., zero objective binges); presence reflects a nonzero report for the number of occasions (e.g., at least one objective binge). Stability of presence of behavior refers to the percentage of those engaged in a behavior at T1 who also engaged in the behavior at T2. Desistance of behavior refers to the percentage of those engaged in a behavior at T1 who were not engaged in the behavior at T2. Stability of absence of behavior refers to the percentage of those not engaged in a behavior at T1 who also were not engaged in the behavior at T2. Emergence of behavior refers to the percentage of those not engaged in a behavior at T1 who were engaged in the behavior at T2.

coefficients for the occurrence of behaviors were as follows: $r = .53$ for objective binge eating, $r = .40$ for subjective binge eating, and $r = .39$ for intense exercise (all $ps < .001$). For Black women, $r = .57$ ($p < .001$) for objective binge eating, $r = .19$ ($p = .115$) for subjective binge eating, and $r = .31$ ($p = .011$) for intense exercise. Using Fisher's r -to- z transformation to compare the stability correlations across the samples, we found no significant group differences, although there was a trend for the occurrence of subjective binge eating to be more stable in White women ($z = 1.55$, $p = .121$).

Validity

Convergent and discriminant validity for the measures of bulimic symptoms/binge eating (BULIT-R, EDI-Bulimia) and dietary restraint (TFEQ-R, EDE-Q Restraint) was assessed by correlating these measures from T1, with the expectation that the correlations between measures purportedly assessing the same thing (e.g., dietary restraint) would be larger than the correlations between related but distinct constructs (e.g., dietary restraint and bulimic symptoms). Although bulimic symptoms/binge eating and dietary restraint are related (Wilson, 2002), there should be a pattern of differences in the magnitudes of correlations. For both Black and White women, results demonstrated the predicted patterns of relations (see Table 5), which provides some support for the convergent and discriminant validity of these assessments of bulimic symptoms/binge eating and dietary restraint. In particular, the measures of bulimic symptoms (BULIT-R, EDI-Bulimia) were more highly correlated with each other than they were with the assessments of dietary restraint (TFEQ-R, EDE-Q Restraint) in both Black and White samples. Also, across racial groups, the dietary restraint measures were more highly correlated with each other than with the bulimic symptom measures. The z tests of the differences between these correlations were all significant at $p < .001$.

Discussion

The goal of this study was to provide much needed psychometric data on some of the major eating disorder instruments among

Black women, and to compare these findings with psychometric data from White women. Although not the primary goal of this study, we also compared Black and White women on levels of disordered eating, with findings largely reflecting the literature in terms of differences in dietary restraint and body image (with White women reporting more dietary restraint and worse body image than Black women) and with mixed findings regarding comparisons on binge eating (e.g., evidence for comparable rates of objective binge eating but higher levels on the EDI-Bulimia for White women).

Regarding internal consistency, our results suggest that all of the eating measures administered in this study had adequate reliability within both racial groups (all $> .80$ at T1), and reliability values appeared comparable across the two groups. Regarding temporal stability of the questionnaire measures, there was impressive and comparable stability across the study period for Black and White women. Furthermore, the temporal stability findings were generally comparable to those of other psychometric research on these measures (e.g., BULIT-R stability findings in the current study of $.87-.88$ vs. $.95$ as reported by Thelen et al., 1991, using a 2-month lag time). Of note, lower stability coefficients would be expected with longer time intervals between assessments. The one exception to the comparable stability across groups was dietary restraint, which appeared to be more stable for White women. This differential stability may be due to dietary restraint's being more embedded in the lives of White women than Black women. White young women are more likely to have peers dieting along with them and to find dieting tips and encouragement in fashion magazines featuring predominantly White women, which are factors that could serve to motivate and positively reinforce continued dietary restraint. Such reinforcing factors are less present for Black women and might explain lower stability for dietary restraint as well as higher desistance rates for other behaviors (e.g., intense exercise).

Regarding stability of the frequency or occurrence of behaviors assessed with the EDE-Q (objective binge eating, subjective binge eating, and intense exercise), the overall picture suggests, for White women, high levels of stability on all three behaviors. Significant stability of objective binge eating and intense exercise, but not subjective binge eating, was noted in the Black sample, and when stability coefficients were compared across groups, subjective binge eating appeared to be less stable in Black women. Finally, correlations among two bulimic symptom measures and two dietary restraint measures provided some support for the convergent and discriminant validity of these measures in both the Black and White samples.

These findings converge with limited prior work that has explicitly sought to evaluate the psychometric properties of eating disorder measures in Black samples (e.g., Atlas et al., 2002; Fernandez et al., 2006; Franko et al., 2004). To the authors' knowledge, this is the first psychometric evidence for the EDE-Q in Black women. Of note, the only other study of the temporal stability of the EDE-Q (which used a predominantly White sample) was only recently reported (Mond, Hay, Rodgers, Owen, & Beumont, 2004). Given that the EDE-Q is being used increasingly in nonclinical and clinical samples (Anderson & Williamson, 2002), and given evidence of bulimic pathology among Black women (e.g., White & Grilo, 2005), this novel contribution related to the EDE-Q and Black women is important.

Table 5

Intercorrelations Between Bulimic Symptom Measures and Dietary Restraint Measures at Time 1 for Black and White Women: Convergent and Discriminant Validity

Variable	1	2	3	4
1. BULIT-R	—	.86	.46	.48
2. EDI-Bulimia	.84	—	.37	.40
3. TFEQ-R	.49	.35	—	.79
4. EDE-Q-R	.54	.42	.76	—

Note. Time 1 correlations for Black women are above the diagonal, and Time 1 correlations for White women are below the diagonal. All correlations are significant at $p < .001$. Correlations between similar constructs (reflecting convergent validity) are in shown in boldface. BULIT-R = Bulimia Test—Revised; EDI-Bulimia = Bulimia subscale of the Eating Disorder Inventory; TFEQ-R = Restraint subscale of the Three-Factor Eating Questionnaire; EDE-Q-R = Restraint subscale of the Eating Disorder Examination—Questionnaire.

Although, overall, the findings suggest that the eating disorder measures operate similarly in the two groups, the findings related to subjective binge eating are intriguing. Black women reported lower levels of subjective binge eating (i.e., feeling out of control while eating a small amount of food that subjectively feels large), and this behavior was less temporally stable than for White women. These findings make sense in the context of Black women's also reporting lower levels of dietary restraint (with dietary restraint also being less temporally stable than for White women). It seems that experiencing subjective binge eating would be much more likely, and more stable of an occurrence, among individuals who are consistently high in dietary restraint, because eating even a small amount of food (especially if it is a food one is trying to avoid or restrict) may evoke feelings of loss of control and thus may more likely be perceived, by definition, as a subjective binge. This hypothesized relationship between dietary restraint and subjective binge eating finds some support in prior work finding that dieting predicts the onset of subjective binge eating (Stice, Killen, Hayward, & Taylor, 1998) and in the correlations found in the current work—subjective binge eating (both frequency and occurrence variables) was significantly associated with both dietary restraint measures for Black women ($r_s = .39$ to $.53$, $p < .001$) and White women ($r_s = .33$ to $.41$, $p < .001$).

Strengths of this study include the longitudinal design (permitting examination of temporal stability), the inclusion of Black women in eating disorder research, and the use of an appropriate comparison group (White students attending the same school). Another important strength is the use of multiple, well-established (in White samples), commonly used measures of disordered eating, including scale scores and reports of frequency and occurrence of eating disorder-related behaviors. Furthermore, by using multiple measures of bulimic symptoms and dietary restraint, convergent and discriminant validity could be examined. All prior reports of the psychometric properties of eating disorder measures in Black samples have been cross-sectional with most focusing on only one measure at a time. The most obvious limitation of this study relates to generalizability. College women are a high-risk group for eating disorders and have high rates of subclinical eating disorders (Mulholland & Mintz, 2001; Schwitzer, Rodriguez, Thomas, & Salimi, 2001); thus, examining the psychometrics of measures in a college population is clearly important. However, it is not clear whether the current findings would generalize to samples of Black and White women with a wider range of ages and educational backgrounds. Also, because this is a nonclinical sample (and because individuals were not screened for the presence of eating disorders), generalizability to clinical samples is limited and, of course, generalizability to other racial/ethnic groups and to men is unclear. Although the retention rate was adequate with no evidence of attrition bias, the lower retention rate for Black women is also a limitation. Finally, the absence of reports on the purging behaviors of bulimic symptoms is a limitation.¹

In conclusion, the current study suggests that the BULIT-R, EDI-Bulimia, TFEQ-R, and EDE-Q are reliable and valid for use with Black female undergraduates. Despite mean level differences in most constructs, temporal stability appears high and comparable for body image, objective binge eating, bulimic symptoms globally assessed with the BULIT-R, and intense exercise, but less so for dietary restraint and subjective binge eating, where White women's behaviors were more consistent across the 5-month study.

Future eating disorder research should expand the typical participant pool to include significant numbers of individuals of different racial/ethnic groups with different levels of acculturation and different socioeconomic levels and should examine the psychometric properties of other commonly used eating disorder measures (e.g., Eating Attitudes Test—26; Garner, Olmsted, Bohr, & Garfinkel, 1982) in these more diverse samples.

¹ Data were collected on purging behaviors reported over the past 28 days in this sample, but psychometric analyses were not performed due to low base rates and because none of the Black women who reported any purging at T1 completed T2. Examination of the T1 purging data within racial groups revealed that 2.1% of Black women reported vomiting in the past 28 days compared with 5.6% of White women and that 2.1% of Black women reported laxative use in the past 28 days compared with 1.1% of White women. The findings related to laxative use are in the expected direction given prior research reporting higher rates of laxative use in Black women compared with White women (Cachelin, Veisel, Barzegarnazari, & Striegel-Moore, 2000; Regan & Cachelin, 2006), whereas the findings related to vomiting are in line with some research (White & Grilo, 2005) but not other research (Regan & Cachelin, 2006).

References

- Allison, D. B., Kalinsky, L. B., & Gorman, B. S. (1992). A comparison of the psychometric properties of three measures of dietary restraint. *Psychological Assessment*, 4, 391–398.
- Anderson, D. A., & Williamson, D. A. (2002). Outcome measurement in eating disorders. In W. W. IsHak, T. Burt, & L. I. Sederer (Eds.), *Outcome measurement in psychiatry: A critical review* (pp. 289–301). Washington, DC: American Psychiatric Press.
- Atlas, J. G., Smith, G. T., Hohlstein, L. A., McCarthy, D. M., & Kroll, L. S. (2002). Similarities and differences between Caucasian and African American college women on eating and dieting expectancies, bulimic symptoms, dietary restraint, and disinhibition. *International Journal of Eating Disorders*, 32, 326–334.
- Cachelin, F. M., Veisel, C., Barzegarnazari, E., & Striegel-Moore, R. H. (2000). Disordered eating, acculturation, and treatment-seeking in a community sample of Hispanic, Asian, Black, and White women. *Psychology of Women Quarterly*, 24, 244–253.
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Erlbaum.
- Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire? *International Journal of Eating Disorders*, 16, 363–370.
- Fairburn, C. G., & Cooper, Z. (1993). The eating disorder examination (12th ed.). In C. G. Fairburn & G. T. Wilson (Eds.), *Binge eating: Nature, assessment, and treatment* (pp. 317–332). New York: Guilford Press.
- Fernandez, S., Malcarne, V. L., Wilfley, D. E., & McQuaid, J. (2006). Factor structure of the Bulimia Test—Revised in college women from four ethnic groups. *Cultural Diversity and Ethnic Minority Psychology*, 12, 403–419.
- Franko, D. L., Striegel-Moore, R. H., Barton, B. A., Schumann, B. C., Garner, D. M., Daniels, S. R., et al. (2004). Measuring eating concerns in Black and White adolescent girls. *International Journal of Eating Disorders*, 35, 179–189.
- Garner, D. M., Olmsted, M. P., Bohr, Y., & Garfinkel, P. E. (1982). The Eating Attitudes Test: Psychometric features and clinical correlates. *Psychological Medicine*, 12, 871–878.
- Garner, D. M., Olmsted, M. P., & Polivy, J. (1983). Development and

- validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, 2, 15–34.
- Grabe, S., & Hyde, J. S. (2006). Ethnicity and body dissatisfaction among women in the United States: A meta-analysis. *Psychological Bulletin*, 132, 622–640.
- Hawkins, R. C., & Clement, P. F. (1980). Development and construct validation of a self-report measure of binge eating tendencies. *Addictive Behaviors*, 5, 219–226.
- Henderson, M., & Freeman, C. P. L. (1987). A self-rating scale for bulimia: The "BITE." *British Journal of Psychiatry*, 150, 18–24.
- Hollander, M., & Wolfe, D. A. (1999). *Non-parametric statistical methods* (2nd ed.). New York: Wiley.
- Laessle, R. G., Tuschl, R. J., Kotthaus, B. C., & Pirke, K. M. (1989). A comparison of the validity of three scales for the assessment of dietary restraint. *Journal of Abnormal Psychology*, 98, 504–507.
- Limbert, C. (2004). The Eating Disorder Inventory: A test of the factor structure and internal consistency in a nonclinical sample. *Health Care for Women International*, 25, 165–178.
- Luce, K. H., & Crowther, J. H. (1999). The reliability of the Eating Disorder Examination—Self-report questionnaire version (EDE-Q). *International Journal of Eating Disorders*, 25, 349–351.
- Mond, J. M., Hay, P. J., Rodgers, B., Owen, C., & Beumont, P. J. V. (2004). Temporal stability of the Eating Disorder Examination Questionnaire. *International Journal of Eating Disorders*, 36, 195–203.
- Mulholland, A. M., & Mintz, L. B. (2001). Prevalence of eating disorders among African American women. *Journal of Counseling Psychology*, 48, 111–116.
- Norring, C. E. A. (1990). The Eating Disorder Inventory: Its relation to diagnostic dimensions and follow-up status. *International Journal of Eating Disorders*, 9, 685–694.
- O'Neill, S. K. (2003). African American women and eating disturbances: A meta-analysis. *Journal of Black Psychology*, 29, 3–16.
- Regan, P. C., & Cachelin, F. M. (2006). Binge eating and purging in a multi-ethnic community sample. *International Journal of Eating Disorders*, 39, 523–526.
- Schwitzer, A. M., Rodriguez, L. E., Thomas, C., & Salimi, L. (2001). The Eating Disorders NOS diagnostic profile among college women. *Journal of American College Health*, 49, 157–166.
- Smith, D. E., Marcus, M. D., Lewis, C. E., Fitzgibbon, M., & Schreiner, P. (1998). Prevalence of binge eating disorder, obesity, and depression in a biracial cohort of young adults. *Annals of Behavioral Medicine*, 20, 227–232.
- Stice, E., Killen, J. D., Hayward, C., & Taylor, C. B. (1998). Age of onset for binge eating and purging during late adolescence: A 4-year survival analysis. *Journal of Abnormal Psychology*, 107, 671–675.
- Striegel-Moore, R. H., Dohm, F. A., Kraemer, H. C., Taylor, C. B., Daniels, S., Crawford, P. B., et al. (2003). Eating disorders in White and Black women. *The American Journal of Psychiatry*, 160, 1326–1331.
- Striegel-Moore, R. H., & Smolak, L. (2002). Gender, ethnicity, and eating disorders. In C. G. Fairburn & K. D. Brownell (Eds.), *Eating disorders and obesity: A comprehensive handbook* (2nd ed., pp. 251–255). New York: Guilford Press.
- Striegel-Moore, R. H., Wilfley, D., Pike, K., Dohm, F., & Fairburn, C. (2000). Recurrent binge eating in Black American women. *Archives of Family Medicine*, 9, 83–87.
- Stunkard, A. J., & Messick, S. (1985). The three-factor eating questionnaire to measure dietary restraint, disinhibition, and hunger. *Journal of Psychosomatic Research*, 29, 71–83.
- Thelen, M. H., Farmer, J., Wonderlich, S., & Smith, M. (1991). A revision of the Bulimia Test: The BULIT-R. *Psychological Assessment*, 3, 119–124.
- Thiel, A., & Paul, T. (2006). Test-retest reliability of the Eating Disorder Inventory 2. *Journal of Psychosomatic Research*, 61, 567–569.
- van Strien, T., Frijters, J. E. R., Bergers, G. P. A., & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International Journal of Eating Disorders*, 5, 295–315.
- van Strien, T., & Ouwens, M. (2003). Validation of the Dutch EDI-2 in one clinical and two nonclinical populations. *European Journal of Psychological Assessment*, 19, 66–84.
- Welch, G., Thompson, L., & Hall, A. (1993). The BULIT-R: Its reliability and clinical validity as a screening tool for *DSM-III-R* bulimia nervosa in a female tertiary education population. *International Journal of Eating Disorders*, 14, 95–105.
- White, M. A., & Grilo, C. M. (2005). Ethnic differences in the prediction of eating and body image disturbances among female adolescent psychiatric inpatients. *International Journal of Eating Disorders*, 38, 78–84.
- Williamson, D. A., Anderson, D. A., Jackman, L. P., & Jackson, S. R. (1995). Assessment of eating disordered thoughts, feelings, and behaviors. In D. B. Allison (Ed.), *Handbook of assessment methods for eating behaviors and weight-related problems* (pp. 347–386). Thousand Oaks, CA: Sage.
- Wilson, G. T. (2002). The controversy over dieting. In C. G. Fairburn & K. D. Brownell (Eds.), *Eating disorders and obesity* (2nd ed., pp. 93–97). New York: Guilford Press.
- Wilson, G. T., Nonas, C. A., & Rosenblum, G. D. (1993). Assessment of binge eating in obese patients. *International Journal of Eating Disorders*, 13, 25–33.

Received September 15, 2006

Revision received March 27, 2007

Accepted April 9, 2007 ■