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Evaluation of a Structural Model of Objectification Theory and Eating Disorder Symptomatology among European American and African American Undergraduate Women

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Abstract

The current study evaluated a structural equation model of objectification theory among European American (n = 408) and African American women (n = 233). Modeling results indicated a particularly strong association between thin-ideal internalization/body monitoring and eating disorder symptoms, with weaker relationships among body dissatisfaction, depression, anxiety, and eating disorder symptoms. The measurement model was not equivalent for European Americans and African Americans; however, the structural model was invariant, suggesting that the relationships among these variables may be similar for both groups. Thus, objectification theory does appear to be applicable to African American women, although specification of relevant constructs and refinement of assessment instruments are warranted.

Keywords

eating disorders; objectification theory; structural equation modeling; thin-ideal internalization

Eating disorders are often chronic conditions that significantly impair affected individuals' quality of life (de la Rie, Noordenbos, & van Furth, 2005). Objectification theory is one frequently cited etiological perspective on eating disorders (Fredrickson & Roberts, 1997). This theory posits that women internalize the societal message that their bodies are objects, valuable only for their potential use by others. As a result, women come to view their bodies as objects (self-objectification) and engage in habitual body monitoring. This self-objectification, in turn, is hypothesized to be associated with negative psychological consequences, such as depression, anxiety, body dissatisfaction, and disordered eating (Fredrickson & Roberts, 1997; Grupski & Espelage, 2005; Noll & Fredrickson, 1998).

Empirical evaluations of the validity of objectification theory generally have been supportive, although few studies have examined comprehensive models that include multiple constructs as proposed by Fredrickson and Roberts (1997). For example, earlier studies, such as that conducted by Noll and Fredrickson (1998), found that body shame mediated the relationship between self-objectification and bulimic symptoms. Another study indicated that self-objectification contributed to habitual body monitoring, which was related to body shame and body dissatisfaction, appearance anxiety, and disordered eating (Tiggeman & Lynch, 2001). Several recent studies have investigated objectification theory

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using structural equation modeling (SEM; Grupski & Espelage, 2005; Kozee & Tylka, 2006; Moradi, Dirks, & Matteson, 2005; Phan & Tylka, 2006; Tylka & Hill, 2004; Tylka & Subich, 2004), a methodological approach that facilitates examination of the interrelationships among multiple variables. Grupski and Espelage (2005) investigated objectification theory in a sample of undergraduate women and found that self-objectification and habitual body monitoring/body surveillance were associated with social comparison and appearance anxiety; these, in turn were related to body dissatisfaction and disordered eating. Notably, a model that included both body shame and body dissatisfaction did not fit the data as well as a model that included only body dissatisfaction. Although Fredrickson & Roberts (1997) emphasized the mediating role of body shame and not body dissatisfaction, investigations of this theory have found support for the role of body dissatisfaction (e.g., Tiggeman & Lynch, 2001). Further, studies have identified a significant inverse correlation between measures of body shame and body satisfaction (Avalos, Tylka, & Wood-Barcalow, 2005; McKinley, 2004). Thus, a focus in the current study was body dissatisfaction, rather than body shame.

The importance of body image dissatisfaction in models of objectification theory was further supported in a study by Tylka and Subich (2004). They found that thin-ideal internalization (used as a proxy for self-objectification) contributed partially to the variance in body image disturbance, which ultimately influenced eating disorder symptomatology. Phan and Tylka (2006) evaluated this model in a sample of Asian American women and found that it fit best with the addition of a direct path from thin-ideal internalization to disordered eating. In contrast, Tylka and Subich (2004) did not find support for this direct relationship in their primarily European American sample, highlighting the importance of examining models of objectification theory within specific cultural groups.

The role of sexual objectification as an important component of the process proposed in this etiological model has also been highlighted in previous research (Kozee & Tylka, 2006; Moradi et al., 2005). Moradi et al. found that sexual objectification experiences were associated with thin-ideal internalization and body surveillance, which, in turn, were linked to body shame. Thin-ideal internalization, body surveillance, and body shame all were directly related to disordered eating. Similar results were obtained by Kozee and Tylka (2006), further highlighting the importance of sexual objectification experiences in this theoretical model.

Does Objectification Theory Have Etiological Relevance to Eating Disorders among African American Women?

Although the studies reviewed thus far generally supported the validity of objectification theory, it is important to note that they have been conducted in samples of predominantly European American women. A growing body of literature suggests that eating disorders might be under-diagnosed in African American women, due to pervasive stereotypes of eating disorders as a problem exclusive to European American women (Mulholland & Mintz, 2001). For example, Becker and colleagues (Becker, Franko, Speck & Herzog, 2003) evaluated data from the National Eating Disorders Screening Program and found that African American and Latin American women were less likely to be referred for further evaluation than European American women, regardless of the severity of their eating disorder symptoms. In addition, many studies of eating disorders have utilized clinical samples (Striegel-Moore & Cachelin, 2001). Because women of color are less likely to seek eating disorder treatment (Cachelin, Veisel, Barzegarnazari, & Striegel-Moore, 2000), results from clinical samples might not generalize to them.

Despite increased awareness of the problem of disordered eating among African American women (Mulholland & Mintz, 2001), research is still needed to determine whether

etiological models such as objectification theory, which were developed and evaluated in European American women, are relevant to African American women with eating problems. Previous research has suggested that the correlates of disordered eating behaviors differ somewhat between African American and European American women. For example, Mitchell and Mazzeo (2004) reported that anxiety was uniquely associated with binge eating among African American women; in contrast, depression was the only variable significantly related to binge eating among European American women. Although this study was cross-sectional and cannot demonstrate causality, these differences are potentially important, given that depression and anxiety are nonspecific risk factors for eating disorders (Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004). Other cross-sectional studies have found ethnic differences in correlates of eating disorders as well. Cashel and colleagues (Cashel, Cunningham, Landeros, Cokley, & Muhammad, 2003) found that, when controlling for Body Mass Index (BMI), African American undergraduate women had significantly lower scores on the body dissatisfaction and drive for thinness subscales of the Eating Disorder Inventory than European American or Latin American participants. Similarly, Breitkopf and colleagues (Breitkopf, Littleton, & Berenson, 2007) found that, among African American women, BMI was not associated with appearance anxiety. In contrast, appearance anxiety was positively related to BMI among Latina and European American women in the sample.

A small number of studies have explicitly evaluated objectification theory in samples of African American women. For example, the aforementioned study by Breitkopf et al. (2007) examined some components of objectification theory in an ethnically diverse sample. These authors found that European American women reported higher body surveillance scores than did either Latina or African American women. More recently, Buchanan and colleagues (Buchanan, Fischer, Tokar, & Yoder, 2008) evaluated components of objectification theory using path analysis in a sample of 117 African American undergraduates. This study did not evaluate disordered eating specifically, but rather focused on body shame and skin tone dissatisfaction as negative outcomes of self-objectification and surveillance. Results indicated that body monitoring was significantly associated with body shame; however, self-objectification was not. The authors recommend additional study of the relevance of objectification theory among African American women. This study is notable for the participation of a relatively large number of African American women and its inclusion of skin color satisfaction as a variable in the model. However, Buchanan et al.'s model did not include measures of sexual objectification, anxiety, negative affect, or specific disordered eating behaviors.

Summary and Hypotheses

The current study evaluated a model of the associations among variables selected on the basis of theoretical and empirical research (see Figure 1 for a depiction of the hypothesized directions of all associations included in the model). Variables are presented in the model according to Fredrickson and Roberts' (1997) articulation of objectification theory and on research cited above. Both depression symptoms and anxiety were included, because objectification theory posits that these variables are consequences of sexual objectification. In the only study to assess both within objectification theory, Tylka and Subich (2004) combined anxiety and depression as the latent construct negative affect; thus, their individual contributions were not assessed.

Methods

Participants

Participants were 408 European American (46.2%) and 233 African American women (26.4%) who were part of a larger sample (N = 893) of undergraduate women recruited from

the Psychology subject pool at a large, southeastern U.S. university. They were given course credit for their participation. All participants were women, due to the low base rates of disordered eating among men (APA, 2000). Participants' mean age at baseline was 19.12 (*SD* = 2.53); 67.4% were first-year students, 19.5% were sophomores, 7.8% were juniors, 4.4% were seniors, and .5% were nontraditional students. Participants' mean BMI was 24.43 (*SD* = 5.63).

Measures

Typically, multiple measures are needed for each construct in a structural equation model to achieve identification (Bollen, 1989). If only one measure was available for a given construct (e.g., body dissatisfaction), it was divided into two or three parcels. Questionnaires were administered in a randomized sequence to control for the effects of participant fatigue.

Sexual Objectification—The Daily Sexist Events Questionnaire assesses experiences of sexual objectification (Swim, Cohen, & Hyers, 1998) and was selected for this study based on Moradi and colleagues' (2005) earlier work. It was developed based on a daily diary study (*N* = 344 undergraduate women and 144 undergraduate men; predominantly European American) in which participants recorded daily experiences of sexist events. The questionnaire contains 25 items comprising two subscales: traditional gender stereotypes and roles and sexual objectification. The current study used only the sexual objectification subscale, which consists of seven items scored on a scale ranging from 1 (*never*) to 5 (about two or more times a week during the last semester). Moradi and colleagues (2005) reported an alpha of .87 for the sexual objectification subscale. In the current study, items from the sexual objectification subscale were used to create three parcels, which were used as indicators of the latent construct sexual objectification experiences. Cronbach's alphas for the three indicators were: .80, .82, and .76 for the European American subsample and .80, . 79, and .75 for the African American subsample.

Habitual Body Monitoring—The Self-Objectification Questionnaire (SOQ; Noll & Fredrickson, 1998) was used to assess the latent construct habitual body monitoring. This measure was developed with a sample of undergraduate women (*N* = 204) and is based on objectification theory (Fredrickson & Roberts, 1997) as well as the Body Esteem Scale (Franzoi & Shields, 1984). The SOQ “assesses the extent to which individuals view their bodies in observable, appearance-based (objectified) terms versus nonobservable, competence-based (nonobjectified) terms” (Noll & Fredrickson, 1998, p. 628). This measure asks participants to rank body attributes according to importance. Six attributes concern physical appearance (e.g., physical attractiveness), and six refer to competency (e.g., muscular strength). Scores are obtained by summing ranks for the appearance and competency items and computing the difference between the two categories. Noll and Fredrickson (1998) reported that the SOQ has demonstrated acceptable construct validity and is correlated positively with the Appearance Anxiety Questionnaire (Dion, Dion, & Keelan, 1990) and the Body Image Assessment (Williamson, Davis, Bennett, Goreczny, & Gleaves, 1985). It is not possible to obtain estimates of internal consistency for rank-order measures. However, a previous study reported that the SOQ demonstrates acceptable stability over time among a sample of undergraduate women (*r* =.62; Aubrey, 2006).

The Objectified Body Consciousness Scale (OBC) assesses objectified body consciousness in young women (McKinley & Hyde, 1996) and consists of three subscales: surveillance (viewing the body as an outside observer), body shame, and appearance control beliefs. Based on Moradi and colleagues' (2005) work, the surveillance subscale was used as an indicator of the latent construct habitual body monitoring in the current study. The OBC was developed and validated in three samples of women. Cronbach's alphas ranged from .79 to .

89 for the surveillance subscale (McKinley & Hyde, 1996). Additionally, the measure's developers reported that it demonstrated construct, convergent, and divergent validity. Furthermore, the Eating Attitudes Test-26 (Garner, Olmstead, Bohr, & Garfinkel, 1982) was positively correlated (r = .48) with the Surveillance subscale. Of note, this measure was developed with primarily European American samples (McKinley & Hyde, 1996). Alphas for the European American and African American subsamples were .84 and .77, respectively.

Thin-Ideal Internalization—The Eating Disorder Inventory (EDI) is a 64-item self-report measure consisting of eight subscales, with response options ranging from 1 (*always*) to 6 (*never*) (Garner, Olmstead, & Polivy, 1983). The body dissatisfaction (EDI-BD) and drive for thinness subscales (EDI-DT), which consist of eight items each, were used in this study. Criterion-related, convergent, and discriminant validity have been established for the subscales of the EDI among European American women (Garner et al., 1983). For example, the EDI discriminates between women with and without clinical eating disorders, including undergraduates (Garner et al., 1983; Gross, Rosen, Leitenberg, & Willmuth, 1986).

Few studies have investigated the psychometric properties of the EDI among women of color in the United States. Notably, Wilfley and colleagues (1996) found that seven of the eight subscales, including the EDI-DT and EDI-BD, yielded internally consistent scores (alphas greater than .70) in a sample of middle-aged, African American women. Total scores on the EDI-DT were used as an indicator of thin-ideal internalization. Cronbach's alphas for the European American and African American subsamples were .91, and .87, respectively.

The Sociocultural Attitudes Towards Appearance Scale SATAQ (Heinberg, Thompson, & Stormer, 1995) assesses awareness of societal pressure to be thin and attractive as well as internalization of these standards. In the current study, Internalization was used as an indicator of the latent variable thin-ideal internalization. A total of 14 items are included in the SATAQ; response options range from 1 (*completely disagree*) to 5 (*completely agree*). Only the internalization subscale was used in the current study. The developers reported that this subscale demonstrated convergent validity with the EDI-DT (rs ranged from .45 to .61) and yielded internally consistent scores (Cronbach's alpha = .88).

The SATAQ was developed in a sample of mostly (75%) European American undergraduate women (N = 346). However, a recent study (Cashel et al., 2003) found that African American women had lower scores on both subscales of the SATAQ than either European American or Latin American women. The Internalization subscale was significantly associated with the EDI-BD and EDI-DT among all three groups; however, the magnitude of these correlations was stronger among the European American and Latin American participants. Cronbach's alphas were .87 and .82 for the European American and African American participants, respectively.

Body Dissatisfaction—The EDI-BD items, described above, were used to create three parcels, which served as indicators for the latent construct body dissatisfaction. Cronbach's alphas were .77, .78, and .70 for European American participants and .74, .73, and .68 for African American participants.

Anxiety Symptomatology—The State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) is a self-report measure of anxiety, consisting of two subscales: state and trait anxiety. The complete measure includes 40 items with response options ranging from 1 (*not at all* or *almost never*) to 4 (*very much so* or *almost always*). This measure yields internally consistent scores (Cronbach's alphas > .90; Spielberger et al., 1983). Additionally, concurrent, convergent, divergent, and construct

validity of the STAI were demonstrated by its developers (Spielberger et al., 1983; Spielberger, 1984). Novy and colleagues (Novy, Nelson, Goodwin, & Rowzee, 1993) found that the STAI demonstrated acceptable internal consistency among European American, African American, and Latino/a men and women (all Cronbach's alphas > .90). Further, the STAI demonstrated convergent and divergent validity among all ethnic groups with various subscales of the Minnesota Multiphasic Personality Inventory. In the current study, both the state and trait subscales of the STAI were used to create four parcels for the latent construct anxiety. These subscales are highly correlated; further, inclusion of both state and trait anxiety was thought to provide a broad, general, assessment of this construct. Cronbach's alphas for the parcels were as follows: .84, .83, .84, and.84 for the European American subsample and .84, .84, .84, and .80 for the African American subsample.

Depressive Symptomatology—The Center for Epidemiologic Studies-Depression Scale (CES-D; Radloff, 1977) is a 20-item scale that assesses depressive symptomatology in the general population. Participants rate the frequency of each symptom over the past week on a 4-point scale, ranging from 0 (*rarely*) to 3 (*all of the time*). This measure includes four subscales: Depressed Affect, Positive Affect, Interpersonal Symptoms, and Somatic and Vegetative Activity. All four subscales have been found to yield internally consistent scores (Cronbach's alphas ≥.80), demonstrate convergent validity with other measures of depression, and discriminate between levels of severity of depression among clinical samples (Radloff, 1977). In addition, this measure has been found to better predict depressive symptoms among an undergraduate sample than did the Beck Depression Inventory (Santor, Zuroff, Ramsay, Cervantes, & Palacios, 1995).

The CES-D was developed in an exclusively European American sample (Radloff, 1977). A more recent investigation evaluated the psychometrics of this measure among African American cancer survivors (N = 216; Conerly, Baker, Dye, Douglas, & Zabora, 2002). Conerly and colleagues reported that the CES-D had acceptable internal consistency (Cronbach's alpha = .90 for the total scale) and was significantly correlated with other measures of mood states. In the current study, CES-D items were used to create four parcels for the latent construct depression. Cronbach's alphas were: .76, .73, .68, and .66 for the European American subsample and .74, .68, .71, and .46 for the African American subsample. Some of these estimates are rather low, in contrast to those found in an earlier study (Mazzeo, Mitchell, & Williams, 2008), which used this measure with undergraduate women. Cronbach's alphas in Mazzeo et al.'s study were .89 (European American participants) and .85 (African American participants) for Depressed Affect, .84 (European American participants) and .76 (African American participants) for Positive Affect, .76 (European American participants) and .66 (African American participants) for Somatic/ Vegetative, and .72 (European American participants) and .67 (African American participants) for Interpersonal. The use of parcels in the current study, vs. subscales in Mazzeo et al.'s investigation, may have resulted in lower internal consistency estimates. However, as described below in the Statistical Procedures section, using parcels for indicators is considered more advantageous than using subscales (Williams & O'Boyle, 2008).

Eating Disorder Symptomatology—The Eating Disorder Diagnostic Scale (EDDS) is a 22-item self-report measure of Anorexia Nervosa (AN), Bulimia Nervosa (BN), and Binge Eating Disorder (BED) symptomatology (Stice, Telch, Rizvi, 2000). The EDDS generates a composite score of eating disorder symptomatology, which is obtained by summing all of the items except height, weight, and whether participants are taking hormonal birth control. The EDDS has been found to yield stable and internally consistent scores (one week test-retest reliability for the EDDS symptom composite was .87; Cronbach's alpha was .89; Stice

et al., 2000). Convergent validity evidence includes high correlations between the EDDS symptom composite and scores on other measures of eating disturbances (Stice et al., 2000).

The EDDS was developed in a community sample of women (N = 367; M_{age} = 29.7, SD = 13.2; 80% European American; Stice et al., 2000). A series of subsequent validation studies (Stice, Fisher, & Martinez, 2004) included a broader range of ethnic groups, including African American individuals. In the current study, items from the EDDS and BES were parceled to create three indicators for the latent construct eating disorder symptomatology (see alphas for these parcels in the following paragraph).

The Binge Eating Scale (BES) is a 16 item self-report measure of binge eating (Gormally, Black, Daston, & Rardin, 1982) and was developed in samples of men and women seeking obesity treatment (ns = 65 and 47). Gormally and colleagues found that the BES discriminated among individuals with no, moderate, and severe binge eating problems and yielded internally consistent scores (Cronbach's alpha = .85). Demographics of the development sample were not reported. Celio and colleagues (Celio, Wilfley, Crow, Mitchell, & Walsh, 2004) evaluated the BES in a sample of 157 men and women (M_{age} = 41.9, SD = 11.3) participating in a clinical trial for binge eating disorder. Their sample was primarily European American (70.3%). In the current study, BES and EDDS items were used to create three parcels, which served as indicators of the latent construct eating disorder symptomatology. Cronbach's alphas for the three parcels were .78, .77, and .74 for the European American subsample and .69, .71, and .69 for the African American subsample.

Procedures

Participants were recruited from the Psychology 101 Subject Pool and met once for a period of approximately 45–60 minutes to complete the questionnaires. Informed consent was obtained prior to survey administration. Data were collected in groups of 10–15 participants who met in an on-campus classroom. Questionnaires were counter-balanced to control for order effects. In addition to the measures previously described, participants completed a demographic questionnaire assessing their age, year in school, current height and weight, and ethnicity/race.

Statistical Procedures

SPSS 15.0 was used for data entry and descriptive analyses. SEM, using Mplus 4.1 (Muthén & Muthén, 1998-2006) was used to evaluate the model. In most cases, parcels, which served as observed variables in the models, were created from questionnaire items, as described previously. Parceling multidimensional constructs so that each indicator is a stand-alone measure of the latent factor maximizes the correlations among observed variables (see Williams & O'Boyle, 2008, for a review). Items were rank-ordered according to their reliability and then distributed across parcels. For example, the item with the highest reliability was placed into the first parcel; the item with the second highest reliability was placed into the second parcel, and so on, to yield parcels of relatively comparable internal consistency. Mplus uses all available raw data to estimate model parameters via full information maximum likelihood (Muthén & Muthén, 1998-2006).

Several steps were involved in estimating structural equations models. First, according to Anderson and Gerbing's (1988) recommended two-step approach, the measurement model was evaluated separately from the structural model. The measurement model was evaluated among the total sample (European Americans and African Americans together) and then separately for each ethnic group. Next, structural paths were added to the established measurement model. Several nested models were evaluated among the total sample and compared to one another via the chi-square difference test. A significant result indicates that

the null model (i.e., the more parsimonious one) should be rejected in favor of the model with the additional path or paths.

We focused on the Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA) in evaluating model fit, as recommended by Bludau and colleagues (Bludau, Herman, & Cortina, in preparation). The CFI is calculated using the chi-square and degrees of freedom from the "target" model (i.e., the model being tested) as well as the null model. The RMSEA is calculated based on the target model chi-square and degrees of freedom and takes sample size into account. In their meta-analytic research, Bludau and colleagues found that these two fit indices were negatively correlated with one another. Thus, reporting both is recommended. We also reported the Standardized Root Mean Square Residual (SRMR), calculated using residuals and standard deviations, and the Tucker-Lewis Index (TLI), calculated using the chi-square of the target model and null model as well as the minimum fit function value and degrees of freedom.

The structural model that was retained after submodel comparisons was evaluated separately among the European American and African American subsamples and examined for invariance between these two groups. Invariance was assessed using a chi-square difference test as well. Specifically, a model with all structural paths estimated freely among each group (European Americans and African Americans) was compared to a model with the structural paths constrained to be equivalent (invariant) in both groups. A significant chi-square indicates that the structural model is not equivalent for the two groups.

Results

Descriptives

Means, standard deviations, ranges, and factor loadings for all observed variables among the European American and African American subsamples are presented in Table 1.

Measurement Model

The measurement model was evaluated first among the total sample, to establish goodness-of-fit before adding structural paths. All measured variables, including subscales and parcels, loaded significantly onto their respective latent factors. The overall fit of the measurement model was adequate, $\chi^2 = 399.72$, df=168, CFI=.98, RMSEA=.046. However, when structural paths were added, the strong correlation ($r = .77$) between thin-ideal internalization and body monitoring prevented the model from converging. Specifically, the structural path representing the relationship between these two variables yielded a standardized coefficient that appeared to be greater than 1.0, suggesting a linear dependency between these two variables. Standard errors could not be computed, and the model would not converge.

Revised Measurement Model

Given the high correlation between thin-ideal internalization and body monitoring, a revised measurement model (see Figure 2), with these two constructs collapsed into one, was evaluated. One latent construct, instead of two, was measured by all indicators for thin-ideal internalization and body monitoring in this revised model. This revision seems reasonable from a theoretical perspective, because it makes sense that individuals who engage in a significant amount of body monitoring would have internalized the thin ideal. Results indicated that this model provided an adequate fit to the data among the combined sample, $\chi^2 = 488.72$, df=174, CFI=.97, RMSEA=.053, and European American, $\chi^2 = 380.70$, df=174, CFI=.97, RMSEA=.054, and African American subsamples, $\chi^2 = 308.07$, df=174,

CFI=.96, RMSEA=.058. All factor loadings were significant (see Table 1 for a summary of factor loadings).

Structural Model

Two models were initially proposed (see Figure 1). These models included thin-ideal internalization and habitual body monitoring as distinct latent constructs. As explained above, however, these models would not converge. The revised model (Model 1), with these two constructs collapsed into one, is shown in Figure 3.

Model 1—The revised first model, with thin-ideal internalization and body monitoring as a single latent construct, was evaluated among European Americans and African Americans together. Results indicated that this model provided less-than-ideal fit to the data (see Table 2 for fit information and guidelines). However, the paths from sexual objectification to thin-ideal internalization/body monitoring, $\beta = .11$, $T = 2.63$, $p < .05$; thin-ideal internalization/body monitoring to body dissatisfaction, $\beta = .88$, $T = 24.67$, $p < .05$; body dissatisfaction to anxiety, $\beta = .52$, $T = 12.51$, $p < .05$, depressive symptomatology, $\beta = .41$, $T = 9.38$, $p < .05$, and eating disorders, $\beta = .70$, $T = 16.55$, $p < .05$; and depressive symptomatology to eating disorders, $\beta = .15$, $T = 3.14$, $p < .05$, were all significant. Only the path representing the association between anxiety and eating disorder symptoms was not, $\beta = .09$, $T = 1.87$, $p > .05$.

Model 2—The latent constructs assessing anxiety and depressive symptoms were strongly correlated. This is consistent with clinical literature suggesting that these two variables are highly comorbid. Moreover, Moffitt and colleagues (2007) found that the onset of anxiety preceded that of depression more often than the reverse. Therefore, a direct path was added from anxiety to depressive symptomatology, which was consistent with an earlier structural equation modeling study that included these two variables as mediators of the impact of childhood abuse on eating disorders (Mazzeo et al., 2008). This model, Model 2 (see Figure 3), was evaluated among the total sample and fit the data well. Of note, when this direct path from anxiety to depressive symptomatology was included, the path from body dissatisfaction to depression became quite small and negative, and was not statistically different from zero, $\beta = -.04$, $T = -1.27$, $p > .05$. In addition, the path from anxiety to eating disorders remained non-significant, $\beta = .06$, $T = .93$, $p > .05$. A chi-square difference test was conducted to compare Models 1 and 2, $\Delta\chi^2 = 530.812$, $\Delta df = 1$, $p < .05$. This test was significant, indicating that adding the path from anxiety to depressive symptomatology improved the fit. Thus, Model 2 was retained for further comparisons.

Model 3—Thin-ideal internalization is a strong predictor of eating disorders (e.g., Jacobi et al., 2004). Therefore, a third model, with a direct path from thin-ideal internalization/body monitoring to eating disorders, was estimated (see Figure 3). This model fit the data well in the total sample (see Table 2). Further, the path from body dissatisfaction to eating disorders was no longer significant, suggesting that there is a strong, direct influence of thin-ideal internalization/body monitoring on disordered eating. Mplus has an option that calculates indirect effects by taking the products of all paths between two variables. Standard errors are calculated in order to obtain the significance of indirect effects (Muthén & Muthén, 1998-2006). There was also a smaller, but significant, $\beta = .08$, $T = 3.84$, $p < .05$, indirect effect of thin-ideal internalization on eating disorder symptoms, through body dissatisfaction to anxiety to depressive symptomatology. In addition, the percentage of variance in the latent construct eating disorder symptomatology explained by the model was .73.

A chi-square difference test was conducted to compare Models 2 and 3, $\Delta\chi^2 = 89.821$, $\Delta df = 1$, $p < .05$; results indicated that adding the direct path from thin-ideal internalization to eating disorders significantly improved the fit of the model. Model 3 was retained.

This model was also evaluated among European Americans only and African Americans only. For the most part, the pattern of significance of the relationships among latent variables was consistent across groups (see Figure 3). However, two notable differences emerged: Among only European Americans, the direct path from body dissatisfaction to eating disorders was significant, and among only African Americans, the path from depressive symptomatology to eating disorders was non-significant. This may have been due to the relatively smaller sample of African American participants.

To determine whether body mass index (BMI) influenced the associations among these constructs, Model 3 was re-estimated, controlling for the influence of BMI on each association. Results indicated very few differences in path coefficients for the models with and without BMI, among the total sample as well as the European American and African American subsamples. For example, among all three groups, the magnitude of the association between thin-ideal internalization/body monitoring and body dissatisfaction was reduced but remained significant, and the path from body dissatisfaction to anxiety was increased (and remained significant).

Test of Measurement Invariance

Before evaluating the invariance of the structural model, the revised measurement model was compared between the European and African American subsamples to determine whether this model was equivalent in both ethnic groups. To do this, two models are compared: one which estimates the measurement model for both groups and one which constrains the paths for one ethnic group to be equal to those of the other. In this case, the factor loadings were equated between European and African Americans. Results of a chi-square difference test were significant, $\Delta\chi^2 = 59.04$, $\Delta df = 21$, $p < .05$, suggesting that the factor loadings were not equivalent between these two groups. Follow up analyses were conducted to determine specifically which factor loadings were not significant. Constraining factor loadings to be equal between groups, one latent variable at a time, indicated that they were not equivalent for the thin-ideal internalization/body monitoring and body dissatisfaction indicators.

Similarly, a model with factor loadings freely estimated and residual variances equated between groups was compared to a model with all parameters freely estimated (i.e., factor loadings and residuals). The chi-square difference test was significant, $\Delta\chi^2 = 89.65$, $\Delta df = 21$, $p < .05$, suggesting that residual variances differ between European American and African Americans as well. Follow up analyses indicated that residuals for the sexual objectification, eating disorders, and body dissatisfaction indicators were not equivalent. Thus, measurement model parameters were estimated among both groups in subsequent tests of structural invariance.

Test of Structural Invariance

Model 3 was evaluated for invariance between European and African Americans. A model with all structural and measurement parameters estimated for both groups was compared to one in which the structural parameters were equated. The chi-square difference test was non-significant, $\Delta\chi^2 = 7.76$, $\Delta df = 9$, $p > .05$, suggesting that the structural model was equivalent for European Americans and African Americans.

Discussion

The current study investigated a model of objectification theory in a sample of European American and African American undergraduate women. The model that best fit the data included direct paths from thin-ideal internalization/body monitoring, body dissatisfaction, depressive symptoms, and anxiety to eating disorders. Notably, when the direct path from thin-ideal internalization/body monitoring to eating disorder symptomatology was added, the other three paths became much smaller and, in some cases, non-significant. Thus, thin-ideal internalization and body monitoring account for the greatest variance in disordered eating symptomatology in this model. Notably, this association was observed among both the European American and African American subsamples; however, there were some differences between ethnic groups in the indirect association between thin-ideal internalization and eating disorder symptoms, through body dissatisfaction, anxiety, and depressive symptomatology. Moreover, it should be noted that the final path, from depressive symptomatology to eating disorders, was not significant among the African American subsample. This finding might be due to low power because the test of structural invariance revealed no significant differences between ethnic groups.

In the current study, thin-ideal internalization and body monitoring were not empirically distinct. Although these two constructs have been evaluated separately in other studies of objectification theory (e.g., Grupski & Espelage, 2005), they have been operationalized somewhat differently across studies. Some studies have used body monitoring to represent self-objectification (Kozee & Tylka, 2006; Moradi et al., 2005), whereas others (e.g., Grupski & Espelage, 2005) have evaluated body monitoring and self-objectification as distinct latent constructs. Further, two studies (Phan & Tylka, 2006; Tylka & Subich, 2004) used thin-ideal internalization as a proxy for self-objectification in their models. Taken together, results of previous studies of objectification theory suggest that further clarification and consensus are needed regarding measurement of these constructs. The construct represented by these two variables may be “body focus.” Individuals who internalize the thin body ideal are those who focus on their physical appearance and compare themselves to others. The lack of distinction between these two variables in the current study could also be related to construct validity issues. Relative to other studies of objectification theory, the current study had the largest number of African American participants. It is possible that these measures behave differently among ethnic groups.

The findings of the current study were consistent with previous research that has shown that depression and anxiety are non-specific risk factors for eating disorders (e.g., Jacobi et al., 2004). Current results are also consistent with theoretical work suggesting that self-objectification is associated with depressive symptoms as well as disordered eating (Fredrickson & Roberts, 1997). However, the relations between depressive symptoms, anxiety, and eating disorders were fairly weak in the current study. Of note, other studies have found that body shame and appearance anxiety also were significantly associated with eating disorder symptomatology in investigations of objectification theory (e.g., Tiggeman & Lynch, 2001). Thus, it appears that general anxiety is less relevant to this model than is appearance-specific worry.

In the current study, the measurement model was not equivalent between European Americans and African Americans, particularly with respect to paths related to thin-ideal internalization/body monitoring and body dissatisfaction. However, when the measurement model was estimated freely, constraining structural parameters, the model was invariant across these two groups, suggesting that the relations among sexual objectification, thin-ideal internalization, body dissatisfaction, depression, anxiety, and disordered eating are similar for these ethnic groups. Yet, these measures were developed in predominantly

European American samples and may not adequately reflect the experiences of African American women.

The original study design proposed to evaluate the roles of ethnic and feminist identity as buffers of the association between sexual objectification and thin-ideal internalization/body monitoring. However, the measures used (the Multigroup Ethnic Identity Measure, Phinney, 1992; and the Liberal Feminist Attitudes and Ideology Scale, Morgan, 1996) demonstrated insufficient internal consistency in the current study; therefore, it was decided that moderation analyses would not be presented here[1]. Further psychometric development, utilizing both qualitative and quantitative research methods, is warranted because both measures are more than a decade old, and topics such as sexism, racism, ethnic identity, and feminism may have shifted in meaning and salience. Thus, the potential protective roles of factors such as ethnic and feminist identity development may represent an important avenue for future eating disorders research.

Strengths of the current study include the use of a large sample that included a significant number of African American women. Few studies of objectification theory have investigated its relevance for African American women (e.g., Buchanan et al., 2008). The use of SEM is particularly advantageous in that it allows for the simultaneous estimation of relationships among many variables. On the other hand, this study was limited by its use of self-report data and cross-sectional design. Results do not provide information regarding causal relationships among variables. Current findings among undergraduate women may not generalize to samples that are more diverse in age and SES. It is also important to note that the structural model retained in this study is not proven; it fits the data well but may be only one of many plausible models.

Nonetheless, the current findings do have several potential implications for research, prevention, and treatment. In particular, thin-ideal internalization, a potent eating disorder risk factor (Jacobi et al., 2004), was the variable most strongly associated with disordered eating in this study. This finding suggests that it might be beneficial to identify women evidencing high thin-ideal internalization and design prevention efforts specifically for them because previous studies indicate that eating disorder prevention is more successful when it is targeted (Stice & Shaw, 2004). In particular, prevention programs that address the “body focus” issues highlighted in the current study (i.e., high thin-ideal internalization and body monitoring) might be most successful in breaking the link between objectification experiences and disordered eating (Stice, Marti, Spoor, Presnell, & Shaw, 2008; Stice, Shaw, Becker, & Rohde, 2008).

The higher rates of obesity and related physical conditions among African Americans relative to European Americans (e.g., Melnyk & Weinstein, 1994; Pi-Sunyer, 2002) underscore the importance of investigating eating-related disturbances within this group. Women of color continue to be under-studied and under-treated with respect to eating disorders (e.g., Becker et al., 2003) possibly because the manifestation of these disturbances is not fully understood among diverse groups. An important step forward would be to explore constructs that may be uniquely relevant to diverse groups rather than examining differences and similarities to European Americans.

[1]Please contact the corresponding author for results of moderation analyses.

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Figure 1. The theoretical structural models

*Theoretical model 1 included a direct path from sexual objectification to thin-ideal internalization (represented in gray); theoretical model 2 removed this path.

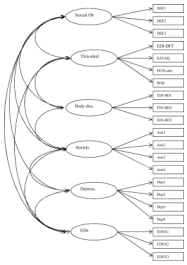

Figure 2. Revised measurement model, with moderators

Figure 3. Structural Models 1, 2, and 3

Coefficients for Model 3 for the European Americans and African Americans, the European American subsample (in italics), and the African American subsample (in bold) are provided. Model 1 included all paths represented in black. Model 2 added a direct path from anxiety to depression, represented in gray. Model 3 added a direct path from thin-ideal internalization/body monitoring to eating disorder symptoms, represented in gray.
*$p < .05$.

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Table 1

Means, Standard Deviations, Ranges, and Factor Loadings for the Total Sample and European American and African American Subsamples.

Measure	European Americans			African Americans		
	FL	Mean (SD)	Range	FL	Mean (SD)	Range
DSE1	.92	20.34 (5.84)	9.00–40.00	.90	19.39 (6.24)	9.00–41.00
DSE2	.92	18.51 (6.16)	9.00–39.00	.89	18.69 (6.31)	8.00–40.00
DSE3	.93	16.97 (5.23)	8.00–36.00	.90	16.71 (5.48)	8.00–36.00
EDI-DT	.89	23.91 (8.69)	7.00–42.00	.88	19.87 (8.32)	7.00–42.00
SATAQ-int	.74	22.24 (6.47)	7.00–35.00	.67	16.69 (6.09)	7.00–33.00
OBC-surv	.72	4.75 (1.07)	1.00–7.00	.51	4.52 (1.04)	1.13–7.00
SOQ	.52	−2.34 (13.47)	−25.00—25.00	.51	−3.58 (13.29)	−25.00—25.00
EDI-BD1	.92	11.91 (3.67)	3.00–18.00	.94	10.94 (4.06)	3.00–18.00
EDI-BD2	.78	9.10 (3.99)	3.00–18.00	.65	7.12 (3.90)	3.00–18.00
EDI-BD3	.88	11.37 (3.46)	3.00–18.00	.81	10.65 (3.75)	3.00–18.00
Anx1	.96	21.44 (5.88)	10.00–40.00	.94	19.82 (6.02)	10.00–40.00
Anx2	.92	19.15 (4.99)	9.00–36.00	.94	17.98 (5.20)	9.00–33.00
Anx3	.93	21.52 (5.26)	10.00–40.00	.94	19.95 (5.72)	11.00–36.00
Anx4	.94	19.88 (5.60)	10.00–40.00	.92	18.30 (5.41)	10.00–35.00
Dep1	.92	4.84 (3.18)	.00–15.00	.87	4.69 (3.35)	.00–15.00
Dep2	.85	4.52 (2.90)	.00–14.00	.86	4.32 (3.00)	.00–14.00
Dep3	.80	5.03 (3.12)	.00–15.00	.83	4.34 (3.22)	.00–14.00
Dep4	.84	4.51 (2.92)	.00–15.00	.76	4.62 (2.62)	.00–13.00
Edsx1	.91	9.44 (5.44)	.00–25.00	.85	7.41 (4.78)	.00–24.00
Edsx2	.84	14.96 (9.80)	.00–71.00	.86	11.50 (8.31)	.00–50.00
Edsx3	.88	11.86 (7.35)	.00–40.00	.86	9.63 (7.01)	.00–46.00

Note. EDI-DT=Eating Disorder Inventory-drive for thinness subscale; SATAQ=Sociocultural Attitudes Towards Appearance Scale-internalization subscale; OBC-sur=Objectified Body Consciousness Scale-surveillance subscale; SOQ=Self-Objectification Questionnaire; Edsx1-3=parcels of the Eating Disorder Diagnostic Scale and Binge Eating Scale; Dse1-3=parcels for the Daily Sexist Events Questionnaire; EDI-BD1-3=parcels for the body dissatisfaction subscale of the Eating Disorder Inventory; Anx1-4=parcels of the State Trait Anxiety Inventory; Dep1-4=parcels of the Center for Epidemiological Studies-Depression Scale.

For correlations among all measured variables, please e-mail the Corresponding Author at semazzeo@vcu.edu.

Table 2

Fit Statistics for Structural Models.

Model	χ^2 or Loglikelihood	Df	CFI	TLI	RMSEA (95% CIs)	SRMR
Structural model 1 (EAs and AAs)	1219.329	182	.91	.90	.094 (.089; .099)	.150
Structural model 2 (EAs and AAs)	688.517	181	.96	.95	.066 (.061; .071)	.078
Structural model 3 (EAs and AAs)	598.696	180	.96	.96	.060 (.055; .066)	.076
Structural model 3 (EAs only)	446.199	180	.97	.96	.060 (.053; .067)	.076
Structural model 3 (AAs only)	356.481	180	.95	.95	.065 (.055; .075)	.089
Structural model 3 EAs and AAs all parameters free	923.956	375	.95	.95	.068 (.062; .073)	.083
Structural model 3 EAs and AAs structural parameters equated	931.713	384	.95	.95	.067 (.061; .072)	.085

Note. EAs=European Americans; AAs=African Americans; CFI=Comparative Fit Index (≥.95 = acceptable fit); TLI=Tucker-Lewis Fit Index (≥.95 = acceptable fit); RMSEA=Root Mean Square Error of Approximation (.05–.08 = a fair fit); CIs=confidence intervals; SRMR=standardized root mean square residual (≥.10 = acceptable fit). A summary of guidelines for fit statistics can be found in Schermelleh-Engel, Moosbrugger, & Müller (2003).