

Integrating Social Comparison Theory and Self-Esteem within Objectification Theory to Predict Women's Disordered Eating

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Abstract This study integrated social comparison theory and self-esteem into the objectification theory framework to broaden our understanding of sexual objectification as it relates to body shame and disordered eating. Women ($N=274$) from a Midwestern U.S. college completed measures of sexual objectification via appearance feedback, body surveillance, body shame, body comparison, self-esteem, and disordered eating. Structural equation modeling indicated that this expanded model fit the data. Appearance feedback predicted body surveillance, body comparison, self-esteem and—unexpectedly—disordered eating. Body surveillance, body comparison, and self-esteem predicted body shame. Furthermore, hierarchical moderated regression revealed that body comparison moderated the body surveillance—disordered eating link; women who frequently monitored their body and compared it to others' bodies reported the highest disordered eating.

Keywords Objectification theory · Appearance feedback · Body surveillance · Body shame · Body comparison · Self-esteem · Eating disorder symptomatology

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Introduction

In this study, we extended objectification theory (Fredrickson and Roberts 1997) as it predicts body shame and disordered eating by integrating social comparison (Festinger 1954) and self-esteem (Striegel-Moore and Cachelin 1999) into its framework. Hesse-Biber et al. (2006, p. 208) speculated that objectification theory and social comparison theory are part of a “nexus of influence” that should be integrated to better understand women's negative body image and disordered eating. In their review of objectification theory, Moradi and Huang (2008) discussed objectification's potential connection with self-esteem and went a step further to suggest that research should simultaneously examine appearance comparison and the objectification theory variables. However, until now, researchers have not tested a model integrating these approaches.

The integration of objectification theory, body comparison, and self-esteem allows for a broader understanding of objectification and its correlates that has been missing in previous literature. Specifically, it addresses how objectifying messages about appearance could prime women to focus more on their appearance. One manifestation of this appearance-focus could be comparing their body with other women's bodies as a guide for how to look and a gauge for their relative attractiveness. Given that many women learn that their worth is equivalent to their appearance, another manifestation of this appearance-focus could be women's decreased self-worth if they do not match up with societal ideals. By integrating these approaches, we further addressed whether women who frequently monitor their appearance also frequently compare their bodies against other women's bodies, as well as the interactive contribution of these variables to women's disordered eating.

Consequently, in a sample of college women in the Midwestern U.S., we examined the associations between sexual objectification, body surveillance, body shame, body comparison, self-esteem, and disordered eating. American women are appropriate to sample in this context, as the capitalistic structure of the U.S. encourages women to be dissatisfied with their appearance in order to purchase products to improve it (Kilbourne 2000; Pipher 1994). Yet, the ideology that women should be valued by their sexual attractiveness permeates many cultures (Hesse-Biber et al. 2006). This study, then, will likely be relevant and important to women from various geographical regions.

A succinct yet powerful message—that women’s worth depends on their resemblance to a thin, youthful image—is sent to individuals in Western cultures (Hesse-Biber et al. 2006). This message is cast via multiple media venues that portray women who fit this image as desirable, successful, healthy, empowered, and happy. Embedded in the projection of this image is that (a) it is acceptable and entertaining for men and women to judge and evaluate women’s worth vis-à-vis their bodies (e.g., beauty pageants, *Playboy* Playmate of the Year competitions, wet t-shirt contests; Pettijohn and Jungeberg 2004; Tylka and Augustus-Horvath in press; Wolf 1991) and (b) these activities liberate women rather than oppress them (Levy 2005). The message that women’s worth is equated with their bodies is often internalized by women as well as their significant others, who then evaluate the worth of their female partners, daughters, mothers, sisters, and female friends by the extent to which they resemble this image (i.e., appearance feedback). Thus, women are reminded by others to evaluate their bodies and other women’s bodies against this “American ideal of female body image” (Hesse-Biber et al. 2006, p. 208).

This image is a result of selecting the 5–10% of women with an already aberrant body type (e.g., lean, tall, big breasts) and further airbrushing and photo-editing any perceived imperfection; hence, it is impossible to attain (Kilbourne 2000; Tiggemann and Pickering 1996). Women may be left perceiving that “their bodies fail the beauty test” (Hesse-Biber et al. 2006, p. 212) and experience distress with their body image as a result. Mounting research evidence suggests that both media exposure to this image and direct pressures to be thin from significant others influence U.S. women’s body dissatisfaction (Groesz et al. 2002; Thompson et al. 1995). Body image disturbance, such as body shame and dissatisfaction, is experienced by many women who feel that their body falls short of the thin, youthful ideal and view this discrepancy as reflecting the inadequacy of their body (Fredrickson and Roberts 1997). Not only do media exposure and interpersonal pressures to be thin encourage body dissatisfaction, but they also predict U.S. and Canadian women’s tendency to focus

on their body, such as by constantly monitoring their appearance and comparing their body with other women’s bodies (Augustus-Horvath and Tylka 2009; Heinberg and Thompson 1995; Morry and Staska 2001).

Objectification theory organizes these sociocultural (e.g., sexual objectification via media and interpersonal pressures to be thin, body evaluation) and intrapersonal (e.g., body focus) variables within a framework to explain women’s shameful stance toward their bodies, which then contributes to their disordered eating, depression, and sexual dysfunction (Fredrickson and Roberts 1997). Specifically, objectification theory states that women regularly experience sexual objectification, being treated as bodies or body parts rather than a whole person; thus, their inner qualities are neglected at the expense of their physical appearance (Bartky 1990; Fredrickson and Roberts 1997). Sexual objectification regularly occurs through (a) media outlets that depict interpersonal and social interactions and (b) interpersonal encounters that mimic these interactions (Fredrickson and Roberts 1997). One frequent way sexual objectification is manifested is through men gazing at women (i.e., evaluating their bodies) for their personal gratification.

Yet, measures of sexualized gaze/body evaluation only contribute 2.0–6.7% of unique variance in body surveillance among young adult U.S. women (Augustus-Horvath and Tylka 2009; Moradi et al. 2005). Not only men evaluate women’s bodies. Women could gaze at other women as a means of evaluation or comparison. Women who are recipients of this objectification may not know the intent behind this gaze but simply realize that they are objects of this gaze and their bodies are the focus of attention. This certainly fits into the schema of sexual objectification proposed by Fredrickson and Roberts (1997), as they recognized that it has many forms with a common thread—treating individuals as bodies. Therefore, for our study, we honored this perspective and conceptualized sexual objectification more broadly as appearance feedback.

Scholars have argued that appearance feedback is a key form of sexual objectification, as this feedback encourages U.S. women to base their self-worth on their sexual attractiveness (Tylka and Hill 2004). It is often promulgated that the only acceptable bodies for women are sexually attractive, and therefore appearance comments are rooted in adherence to sexual beauty ideals (Calogero et al. 2009). For instance, when a person hints that a woman should try a new diet, laughs at her size, and/or comments negatively about her weight, it indicates to this woman that someone assessed her body and determined that (a) it did not match up to the thin-ideal beauty standard, (b) she should try to achieve this standard for respectful treatment, and (c) she is inadequate for not meeting this standard. Weight commentary seems to be especially relevant for U.S. women’s levels of self-objectification, body shame, and disordered eating

due to American culture's focus on thinness (Tylka and Hill 2004).

Our Proposed Integrative Model

Per objectification theory (Fredrickson and Roberts 1997), the influence of sexual objectification on eating disorder symptomatology is indirect in that it is mediated by body-related variables. Encounters with sexual objectification socialize girls and women to engage in self-objectification (see path a in Fig. 1). Self-objectification occurs when women exchange their own perspective of their physical appearance for an observer's perspective and treat their body as an object to be looked at and evaluated. It is often assessed by the degree to which women monitor their own body, or engage in body surveillance (Augustus-Horvath and Tylka 2009; Lindberg et al. 2007). As such, we focused on body surveillance as the manifestation of self-objectification and hereby refer to this variable, as it pertains to this study, as body surveillance. Assessments of sexual objectification, such as media exposure (Morry and Staska 2001), pressure to be thin (Tylka and Hill 2004), and sexualized body evaluation (Augustus-Horvath and Tylka 2009; Kozee and Tylka 2006; Kozee et al. 2007; Moradi et al. 2005) have been shown to predict U.S. and Canadian women's tendency to engage in body surveillance.

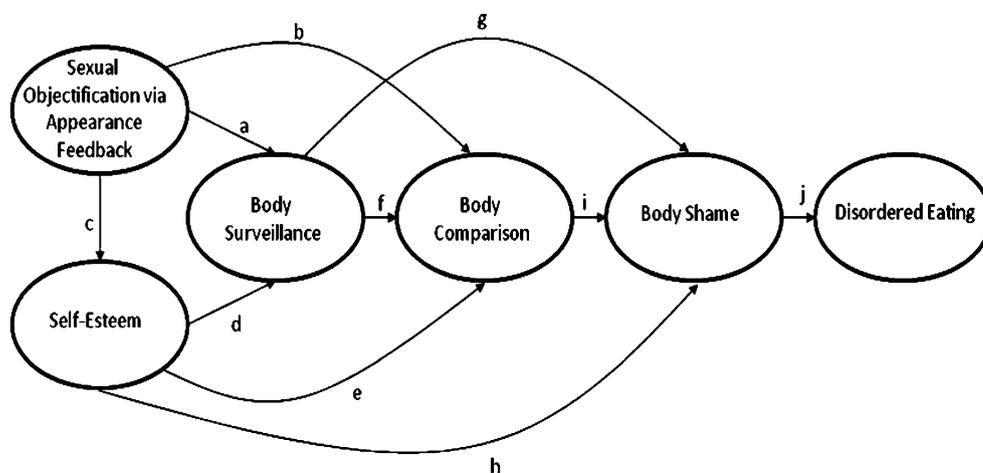
When women are sexually objectified, they may internalize society's view that it is acceptable to focus on the appearance of all women, not just themselves. Thus, they may treat other women's bodies as objects to be looked at and evaluated. For instance, women are reducing other women to their body when they engage in body comparison, or evaluating their body against other women's bodies. Social comparison theory (Festinger 1954), suggests that individuals have a drive to gauge how they are doing in a given area, and in order to estimate how they are

doing, they look for comparison targets in their social environment. Given that women are so frequently judged on their appearance, many choose to compare their bodies to other women's bodies (Stice et al. 2001). Therefore, sexual objectification could predict women's tendency to scrutinize other women's physical appearance to determine how it compares with their own (see path b). Bessenoff (2006) found that U.S. college women tend to engage in body comparison when exposed to thin-ideal media advertisements. In a study of college women in Australia, Tiggemann and McGill (2004) found that viewing images of women's bodies and body parts elicited body comparison.

Low self-esteem is also a logical consequence of sexual objectification (see path c). Sexual objectification has profound negative consequences on women's sense of self, as their physical appearance is highlighted and other aspects of themselves (e.g., personality, intellect, feelings, and attitudes) are downplayed or neglected (Fredrickson and Roberts 1997). During puberty, girls begin to realize that they are seen and evaluated by others as a body or a collection of body parts and may experience reduced self-esteem as a result (Pipher 1994). Indeed, the more encounters with sexual objectification (e.g., pressures for thinness, appearance commentary) U.S. women reported, the lower their self-esteem (Herbozo and Thompson 2006; Phan and Tylka 2006; Tylka and Subich 2004).

In turn, low self-esteem is considered a predisposing factor to internalizing societal images of thinness (Striegel-Moore and Cachelin 1999), which then predicts body surveillance (e.g., Moradi et al. 2005). Women who have a low self-esteem may turn to societal ideals, rather than look within themselves, to determine their goals (Tylka and Subich 2004). Given society's message for women to focus on their appearance, women with low self-esteem may be more likely to engage in constant body surveillance (see path d) and/or body comparison to determine how their

Fig. 1 Proposed model combining tenets of objectification theory, social comparison theory, and self-esteem.



appearance compares with other women (see path e). In support, U.S. women with low self-esteem experience increased body surveillance (Mercurio and Landry 2008) and engage in greater body comparison (van den Berg et al. 2007) than women with high self-esteem. In contrast, U.S. college women with high self-esteem tend to be more satisfied with and less focused on their appearance (Cook-Cottone and Phelps 2003; Fingeret and Gleaves 2004), and therefore may have less of a need to habitually monitor their appearance and compare their bodies against other women's bodies.

Body surveillance could prompt women to compare their bodies with other women's bodies (see path f). Women who hold their appearance in special prominence are likely to focus on the appearance of others as well. Individuals assess their status in a given area by comparing themselves to others (Festinger 1954); thus, engaging in body comparison may help women judge the status of their appearance. To our knowledge, no empirical research has explored the association between body surveillance and body comparison.

According to objectification theory, body shame is a logical consequence to self-objectification (see path g). Body shame results when women perceive that their body falls short of cultural ideals for appearance (Fredrickson and Roberts 1997). Given the impossibility of these ideals (Hesse-Biber et al. 2006), women who self-objectify likely feel shameful toward their bodies. In support, the path from body surveillance to body shame has received support for U.S. college women, older women, and lesbian samples (e.g., Augustus-Horvath and Tylka 2009; Kozee and Tylka 2006; Kozee et al. 2007; Moradi et al. 2005; Tiggemann and Slater 2001; Tylka and Hill 2004). Self-objectification is also posited to increase women's appearance anxiety, reduce awareness of internal body states, and disrupt flow, or deep concentration in non-appearance-related tasks (Fredrickson and Roberts 1997); however, these variables have received less empirical support among U.S. college women (Augustus-Horvath and Tylka 2009; Moradi et al. 2005). Therefore, we chose to focus on body shame as the consequence to body surveillance in our model.

Self-esteem may also predict body shame in a negative direction in the model (see path h). Preliminary research supports the relationship between these variables. U.S. college women who devalue their overall self-worth also tend to hold their bodies in low esteem. Low self-esteem predicts body dissatisfaction among college women (Tylka and Subich 2004) and low self-esteem is associated with body shame among exotic dancers (Downs et al. 2006) and college women (Mercurio and Landry 2008) from the U.S. Interestingly, van den Berg et al. (2007) found a direct path from self-esteem to body dissatisfaction for U.S. women, even after considering their level of body comparison.

Body comparison is also likely to predict body shame in the model (see path i). Canadian, Australian, and U.S. women who compared their bodies or body parts to others perceived as more attractive (i.e., upward social comparison), such as those who resemble the thin-ideal, experienced body image distress (Morrison et al. 2004; Paxton et al. 1999; Thompson et al. 1999; van den Berg et al. 2007). U.S. college women who made upward social comparisons with advertisements featuring attractive models reported greater body dissatisfaction (Engeln-Maddox 2005). Also, body comparison predicted body dissatisfaction in Caucasian U.S. women (Stormer and Thompson 1996; van den Berg et al. 2002) and Japanese women (Yamamiya et al. 2008).

Women who are shameful of their bodies may then engage in disordered eating, perhaps in an attempt to lose weight in order to appear more consistent with the thin ideal standard for women (see path j; Fredrickson and Roberts 1997). This path has been empirically supported with largely Caucasian samples of U.S. and Australian college women (Moradi et al. 2005; Noll and Fredrickson 1998; Tiggemann and Slater 2001; Tylka and Hill 2004) and non-collegiate U.S. women (Augustus-Horvath and Tylka 2009).

Interaction of Body Surveillance and Body Comparison

Self-objectification is a key variable in objectification theory (Fredrickson and Roberts 1997); the extent to which one internalizes sexual objectification is the first step toward increased disordered eating. Similarly, body comparison is an important component of social comparison theory in the prediction of disordered eating (Stice et al. 2001). In the spirit of integrating these theories, we examined whether body surveillance and body comparison would interact to predict disordered eating. Theoretically, the tendency to compare the body against other women's bodies (media images or encounters with actual women perceived as more attractive) strengthens U.S. women's motivation to alter their bodies in accordance with the ideal (Cahill and Mussap 2007; Stormer and Thompson 1996; Thompson et al. 1999; van den Berg et al. 2007). This process may be particularly strong for women high in body surveillance, as physical attractiveness is a more salient goal for these women. Engaging in frequent upward body comparison would serve as a constant reminder to women high in body surveillance that they are falling short of their goal. Hence, the more they compare their bodies with unrealistic media images and other women more similar to the societal ideal, the more women high in body surveillance will be motivated to lose weight. Specifically, we argued that frequent body comparison would prompt women high in body surveillance to engage in greater disordered eating behaviors.

Specific Hypotheses

Our hypotheses are as follows:

- H1: The model proposed in Fig. 1 would fit the data, with variables embedded in objectification theory, body comparison, and self-esteem making unique contributions to women's body shame and disordered eating. The paths specified, as well as their anticipated direction, i.e., positive (+) or negative (–), are as follows:
- H1a: Appearance feedback would predict unique variance in body surveillance (+), body comparison (+), and self-esteem (–).
 - H1b: Self-esteem would predict unique variance in body surveillance (–), body comparison (–), and body shame (–).
 - H1c: Body surveillance would predict unique variance in body shame (+) and body comparison (+).
 - H1d: Body comparison would predict unique variance in body shame (+).
 - H1e: Body shame would predict unique variance in disordered eating (+).
- H2: Body comparison would moderate the relationship between body surveillance and disordered eating. Specifically, the relationship between body surveillance and disordered eating would be stronger for women who more frequently engage in body comparison.

Method

Participants and Procedure

Participants entered into the data set were 274 college women ranging in age from 18–29 years ($M=19.22$, $SD=1.71$) recruited from a large Midwestern university. This sample size exceeded the 230 participants required to estimate this model, as five participants are needed for each of the 46 paths estimated (Hu and Bentler 1999). Most women (76.7%) identified as Caucasian American, followed in frequency by African American (10.4%), Latina (3.6%), and Asian American (2.4%). Seventeen participants (6.8%) indicated “other” and identified as multiracial, African, or Asian. Women classified themselves as first year students (67.9%), sophomores (15.7%), juniors (8.4%), seniors (6.8%), or post-baccalaureate (0.4%). Two participants (0.8%) did not specify their college rank. Most participants identified their socioeconomic standing as upper-middle class (45.8%) or middle class (40.2%), whereas fewer participants endorsed working class (10.4%) and upper class (3.2%) labels.

Women enrolled in the university introductory psychology course were recruited via an online advertisement of the study presented on the psychology department's website. Students had a choice of participating in this study or one of several other studies advertised on this website. Women who elected to participate were instructed that their responses would remain anonymous. After providing their consent, they completed the questionnaires in a classroom setting used as a research lab. Measures were counter-balanced to control for order effects. Participants received credit that was applied toward their class grade. To be entered into the data set, women needed to have completed at least 90% of all measures.

Latent Variables and Measures

Sexual Objectification via Appearance Feedback

The Feedback on Physical Appearance Scale (FOPAS; Tantleff-Dunn et al. 1995) was chosen as it assesses perceived sexual objectification related to verbal and nonverbal appearance feedback. Other measures of perceived sexual objectification (e.g., the Interpersonal Sexual Objectification Scale; Kozee et al. 2007) measure body evaluation meant for the gratification of the objectifier (e.g., whistles, cat calls, ogling). The FOPAS's 8 items (e.g., “Someone made some facial expression when looking at your body,” “Someone suggested a new diet that's available”) are rated along a 5-point scale ranging from 1 (*never*) to 5 (*always*). Five items directly assess weight-related appearance commentary, which is especially relevant to body shame and disordered eating (Tylka and Hill 2004). Items are averaged to obtain a total score, and higher scores indicate greater perceived appearance feedback. Among college women, Tantleff-Dunn et al. (1995) reported that scores on the FOPAS were internally consistent ($\alpha=.88$) and stable over a 2-week period ($r=.82$). These authors also reported that the FOPAS was related to appearance evaluation ($r=-.37$), body satisfaction ($r=-.34$), weight-related anxiety ($r=.27$), and drive for thinness ($r=.48$), supporting its construct validity. Further, these authors reported support for its discriminant validity in that it was unrelated to socially desirable responding. For the present study, alpha was .89 for its scores.

Self-Esteem

The Rosenberg Self Esteem Scale (RSE; Rosenberg 1965) was used to measure self-esteem. Participants rate its 10 items (e.g., “On the whole, I am satisfied with myself”) along a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Items are averaged to arrive at a total score, and higher scores reflect greater self-esteem. For samples of college women, internal consistency reliability

estimates (e.g., $\alpha=.93$; Tylka and Subich 2004) and test-retest reliability estimates over a 2-week period (e.g., $r=.85$; Robinson and Shaver 1973) are adequate. Among college women, the RSES correlated with another measure of self-esteem ($r=.59$; Robinson and Shaver 1973), and it was related to optimism ($r=.73$), life satisfaction ($r=.61$), and proactive coping ($r=.63$; Tylka 2006), supporting its convergent validity. For the present study, alpha was .88 for its scores.

Body Surveillance

The Body Surveillance subscale of the Objectified Body Consciousness Scale (OBCS; McKinley and Hyde 1996) was used to measure the degree to which a woman looks at her body and thinks of her body in terms of how it appears to others rather than its functionality. It includes 8 items, such as “I think that it is more important that my clothes are comfortable than whether they look good on me [reverse scored],” that are rated on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Items are averaged; higher scores indicate greater levels of body surveillance. For this subscale, McKinley and Hyde (1996) reported that its scores were internally consistent ($\alpha=.89$), stable over a 2-week period ($r=.73$), and related to public self-consciousness among college women ($r=.46$). For the present study, alpha was .85 for its scores.

Body Comparison

The Body Comparison Scale (Fisher and Thompson 1998) contains 25 items measuring how often one compares specific body sites (e.g., buttocks, thighs, hips, calves, waist, thighs, etc.), as well as overall body shape and muscle tone, to other individuals of the same gender. Item responses range from 1 (*never*) to 5 (*always*) and are averaged. Higher total scores reflect greater body comparison. Reliability and validity information have not been published for this scale. For the present study, alpha was .94 for its scores.

Body Shame

The Body Shame subscale of the OBCS (McKinley and Hyde 1996) was used to measure the level of shame women feel towards their bodies. This subscale contains 8 items (e.g., “When I can’t control my weight, I feel like something must be wrong with me”) that are rated on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Items are averaged; higher subscale scores demonstrate greater levels of body shame. McKinley and Hyde (1996) reported alpha levels ranging from .70 to .84, found that it was stable over a 2-week period ($r=.79$), and noted

that it was related to body esteem ($r=-.46$) for a sample of young adult women. For the present study, alpha was .84 for its scores.

Eating Disorder Symptomatology

The Eating Attitudes Test-26 (EAT-26; Garner et al. 1982) was used to determine women’s levels of this construct. Its 26 items (e.g., “I avoid eating when I am hungry”, “I vomit after I’ve eaten”) are rated along a 6-point scale ranging from 1 (*never*) to 6 (*always*). Garner et al. (1982) recommended that the responses *never*, *rarely*, and *sometimes* receive a score of 0, while the responses *often*, *very often*, and *always* receive scores of 1, 2, and 3, respectively. However, in the statistical analyses reported in the present study, EAT-26 scores were treated as continuous variables, as researchers (e.g., Mazzeo 1999) have suggested that the EAT-26 can be used as a continuous measure in nonclinical samples of women. The reason for using this continuous scoring procedure was that, due to the relatively low base rate of clinical eating disorders, it was expected that the distribution of EAT-26 scores would be skewed which would jeopardize the assumptions of the planned analyses. Thus, total scores were equal to the sum of all coded responses (i.e., ranging from 26–156), with higher scores reflecting greater symptomatology. Among college women, the EAT-26 has been found to be internally consistent ($\alpha=.92$; Moradi et al. 2005) and stable over a 3-week period ($r=.86$; Mazzeo 1999) when it was scored continuously. Further, it was related to bulimic symptomatology ($r=.55$) and drive for thinness ($r=.84$) for college women (Brookings and Wilson 1994), upholding its convergent validity. For the present study, alpha was .91 for its scores.

Creation of Measured/Observed Variables

We followed Russell et al. (1998) recommendations on constructing three parcels, or measured indicators, for each of our six latent variables. Specifically, for each scale or subscale, an exploratory factor analysis was first performed using the maximum likelihood (ML) method of extraction, and a single factor was specified to be extracted. The factor loadings from this analysis were then rank-ordered by their magnitude and successively assigned (from the highest to the lowest factor loading) to each of three parcels; this process equalized the average loadings of each parcel on its respective latent factor. Last, items within each parcel were averaged to obtain a total parcel score. Parcel scores were used to estimate their respective latent variable within the SEM analyses. Four BCS items (comparison of ears, nose, lips, and shape of face) were not included in these parcels as they had extremely low item-factor loadings (i.e., loadings $\leq .15$).

Results

We handled the few missing data points by substituting participants' mean scale or subscale scores for the missing value and then examined data for normality of distribution. Researchers testing latent variable structural equation and hierarchical regression models need to transform variables that have absolute values of skewness > 3 and kurtosis > 10 (Kline 2005). The skewness and kurtosis values for the 18 parcels and for the total scale/subscale scores were lower than these values (skewness range = -0.54 to 0.90, kurtosis range -0.60 to 1.10); therefore, we did not transform any variable. Next, we calculated the scale/subscale means, standard deviations, and intercorrelations. These values are presented in Table 1. As expected, constructs embedded with objectification theory, social comparison theory, and self-esteem were significantly related to each other and to eating disorder symptomatology, offering preliminary evidence that they may combine together in a meaningful way to predict disordered eating among college women.

Test of the Hypothesized Latent Variable Model

For all latent variable analyses, we used Mplus Version 4.1 (Muthén and Muthén 2006) with maximum likelihood estimation and the covariance matrix as input. We determined the adequacy of model fit by the consensus among three indices recommended by Hu and Bentler (1999): the Comparative Fit Index (CFI), the standardized root-mean square residual (SRMR), and the root mean square error of approximation (RMSEA). Findings from a Monte Carlo simulation study revealed that CFI values of .95 and higher, SRMR values of .08 or lower, and RMSEA values of .06 and lower indicate a relatively good fit of the model to the data, whereas CFI values of .90–.94, SRMR values of .09–.10, and RMSEA values of .07–.10 indicate an acceptable fit. Values outside of these ranges reflect an unacceptable fit of the model to the data.

Examination of the Measurement Model

We first evaluated our measurement model, or the parcel-factor loadings and relationships among latent variables, using confirmatory factor analysis. The measurement model provided an acceptable to good fit to the data (CFI = .97, SRMR = .04, RMSEA = .06). Significant parcel-factor loadings ranged from .73–.95 (all $ps < .001$), indicating that all latent factors were adequately operationalized. Therefore, this measurement model was used to test the hypothesized structural model. Parcel-factor loadings are included in Fig. 2, and the relationships between the latent variables are presented in Table 2.

Examination of the Structural Model

Next, to test H1, we evaluated the hypothesized structural model (Fig. 1). As expected, this model provided an acceptable to good fit to the data (CFI = .97, SRMR = .06, RMSEA = .06). All hypothesized paths were significant (H1a–H1e); these path coefficients are presented in Fig. 2. Data indicated that sexual objectification via appearance feedback accounted for 6.3% of the variance in self-esteem. Appearance feedback and self-esteem accounted for 14.8% of the variance in body surveillance. Appearance feedback, self-esteem, and body surveillance accounted for 44.7% of the variance in body comparison. Self-esteem, body surveillance, and body comparison accounted for 61.1% of the variance in body shame. Last, body shame accounted for 67.9% of the variance in disordered eating.

Alternative Models

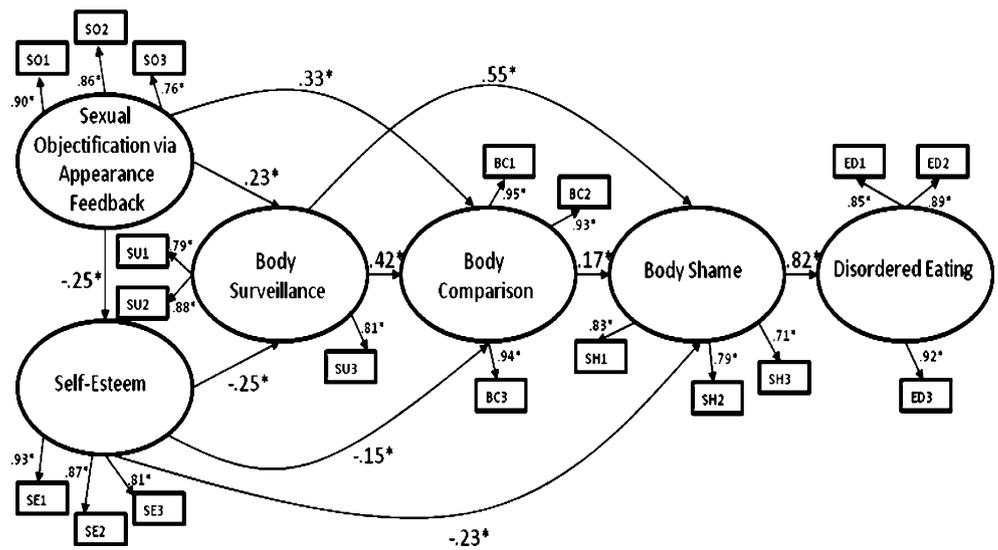
To further provide evidence for our model, we explored four alternative models. In each model, a direct path was added to the model presented in Fig. 1. These added direct paths should not be significant based on extant theoretical and/or empirical evidence. In the first alternative model, a

Table 1 Scale/subscale means, standard deviations, and intercorrelations.

Instrument	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. FOPAS—Sexual objectification	2.21	.53	—				
2. RSE—Self-esteem	3.16	.46	-.23*	—			
3. OBBS—Body surveillance	4.92	.94	.25*	-.28*	—		
4. Body Comparison Scale	2.85	.70	.45*	-.34*	.50*	—	
5. OBBS—Body shame	3.82	1.04	.32*	-.40*	.57*	.45*	—
6. EAT-26—Disordered eating	65.94	18.14	.39*	-.35*	.57*	.46*	.68*

N = 274. FOPAS = Feedback on Physical Appearance Scale, RSE = Rosenberg Self-Esteem Scale, OBBS = Objectified Body Consciousness Scale, EAT-26 = Eating Attitudes Test-26. Scores can range from: 1 (low) to 5 (high) for the FOPAS, 1 (low) to 4 (high) for the RSE, 1 (low) to 7 (high) for the OBBS Body surveillance subscale, 1 (low) to 5 (high) for the Body Comparison Scale, 1 (low) to 7 (high) for the OBBS Body shame subscale, and 26 (low) to 156 (high) for the EAT-26. * $p < .001$.

Fig. 2 Path coefficients and parcel-factor loadings for the structural model. * $p < .05$.



direct path was added from sexual objectification to disordered eating. According to Fredrickson and Roberts (1997), there should not be a direct relationship between these variables after accounting for body surveillance and body shame. Unexpectedly, this direct path was significant, suggesting that appearance feedback accounted for unique variance in disordered eating above and beyond the variance accounted for by body shame, $\beta = .142$, $t(273) = 2.63$, $p < .05$. The first alternative model fit the data better than the model presented in Fig. 1, $\chi^2_{\text{difference}}(1) = 7.49$, $p < .05$. In the second alternative model, we added a direct path from body surveillance to disordered eating. Fredrickson and Roberts (1997) suggested that body shame should account for this link; yet, Moradi and Huang (2008) noted several studies that supported this direct link. Interestingly, body surveillance accounted for unique variance in disordered eating, $\beta = .158$, $t(273) = 2.01$, $p < .05$, but this second alternative model did not fit the data better than the model presented in Fig. 1, $\chi^2_{\text{difference}}(1) = 3.65$, ns .

In the third alternative model, a direct path was added from self-esteem to disordered eating. Self-esteem should only influence eating disorder symptomatology through body shame (Tylka and Subich 2004). As predicted, this direct path was not significant, $\beta = -.01$, $t(273) = -.017$, ns ,

and the third alternative model did not fit the data better than the model presented in Fig. 1; $\chi^2_{\text{difference}}(1) = 0.03$, ns . Last, we examined whether there was a direct path from body comparison to disordered eating in the fourth alternative model, as body image disturbance has been proposed to account for the link between body comparison and disordered eating (Thompson et al. 1999). Consistent with predictions, body comparison did not directly predict disordered eating, $\beta = .119$, $t(273) = 1.81$, ns , and the fourth alternative model did not fit the data better than the original model, $\chi^2_{\text{difference}}(1) = 3.69$, ns .

Hierarchical Moderated Regression (HMR)

To test H2, we used HMR to examine whether body comparison moderated the relationship between body surveillance and disordered eating. According to many scholars (e.g., Aiken and West 1991; Frazier et al. 2004), HMR is the best analysis to detect the presence or absence of moderating effects. To conduct this analysis, we first centered the scale scores for the predictor (i.e., body surveillance) and proposed moderator (i.e., body comparison) in order to reduce the likelihood of multicollinearity between the main effect and interaction terms (Cronbach

Table 2 Correlations between the latent variables obtained via analyzing the measurement model.

Latent variable	1	2	3	4	5
1. Sexual objectification	–				
2. Self-esteem	-.25*	–			
3. Body surveillance	.29*	-.31*	–		
4. Body comparison	.49*	-.36*	.56*	–	
5. Body shame	.34*	-.46*	.70*	.52*	–
6. Eating disorder symptomatology	.39*	-.39*	.64*	.53*	.79*

$N = 274$. * $p < .01$.

1987). Second, we entered body surveillance and body comparison at Step 1 of the analysis. Third, we entered the interaction of body surveillance and body comparison (i.e., body surveillance \times body comparison) at Step 2 of the analysis. Evidence for a significant moderator effect, or interaction, is noted at Step 2 by a statistically significant increment in R^2 (i.e., ΔR^2) and beta weight. Also, the effect size was considered; ΔR^2 values at or above .02 were considered to make unique and meaningful contributions to the criterion (Cohen 1992). While at first glance a ΔR^2 value of .02 appears to be minimal, suggesting that the moderator effect only accounted for 2% of the variance in the criterion, it is common that these effects only account for between 1–3% of criterion variance in non-experimental designs, as these designs make it very difficult to detect moderator effects (McClelland and Judd 1993).

Consistent with H2, body comparison strengthened the relationship between body surveillance and disordered eating, $\beta=1.10$, $t(273)=3.01$, $p<.05$. Thus, at high levels of body surveillance, women who also reported high body comparison reported significantly greater disordered eating than participants who reported low body comparison. This interaction accounted for 2.3% of the variance in eating disorder symptomatology beyond the variance accounted for by body surveillance and body shame, ΔR^2 at Step 2=.023. The regression slopes of this interaction were plotted in a graph, which is presented in Fig. 3, using predicted values for eating disorder symptomatology calculated from representative groups at the mean, 1 standard deviation (SD) above the mean and 1 SD below the mean on body surveillance and body comparison. These predicted values were obtained by multiplying the respective unstandardized regression coefficients for each centered variable by its appropriate value (i.e., +1 SD or -1 SD of body surveillance for the first term, +1 SD or -1 SD of body comparison for the second term, and the product of the

standard deviations of body surveillance and body comparison for the interaction term), summing these products, and then adding the constant value (Aiken and West 1991; Frazier et al. 2004). An analysis of the significance of simple slopes (Aiken and West 1991) showed that body surveillance strongly predicted disordered eating for women high on body comparison, $\beta=.64$, $t(273)=7.36$, $p<.05$, whereas body surveillance more modestly predicted disordered eating for women low on body comparison, $\beta=.36$, $t(273)=5.50$, $p<.05$.

Discussion

Integrating social comparison theory and self-esteem into the objectification theory framework broadens our understanding of sexual objectification and its connection to women's body image and disordered eating. Hence, we added to the literature on body image and eating disorder symptomatology by developing a structural model that articulated how objectification theory variables, body comparison, and self-esteem work together. To do this, we focused on appearance feedback as the measure of sexual objectification, as well as body surveillance, body comparison, and self-esteem, because these variables all have clear sociocultural and intrapersonal connections to women's appearance (Wolf 1991). Overall, our model fit the data for our sample of young adult U.S. college women. Especially noteworthy is that, when examined simultaneously, body surveillance, body comparison, and self-esteem remained significant predictors of body shame, emphasizing their incremental contribution and the multifaceted nature of body image.

Additionally, this integration adds complexity to the gender-specific model of objectification posed by Fredrickson and Roberts (1997). In their model, men are typically the perpetrators of sexual objectification. The objectifying nature of social comparison suggests that women are routinely directing their gaze towards other women—a phenomenon that has received little attention in the previous literature. Our model also highlights the connection between body surveillance, social comparison, and objectification. Women who are focused on their appearance are more attentive to other women's appearance and how it compares to their own; this body comparison may simultaneously direct their attention back to their own body (e.g., heightened body surveillance) while perpetuating the objectification of other women's bodies.

The importance of combining these approaches is further underscored when comparing the findings from our integrated model with findings from a model that contained only objectification theory constructs (Augustus-Horvath and Tylka 2009). The sample used in the Augustus-Horvath

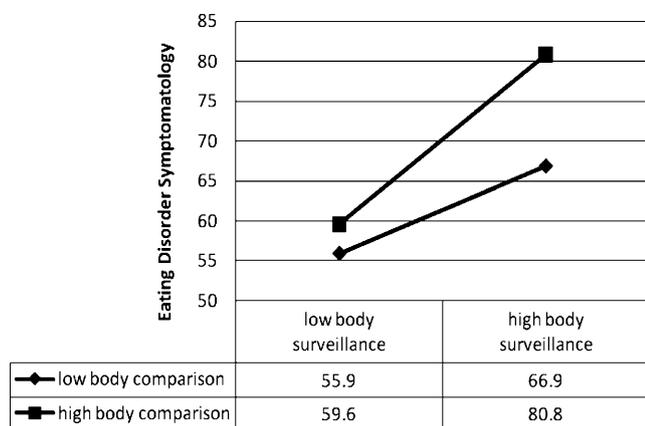


Fig. 3 The interaction of body surveillance with body comparison in the prediction of disordered eating.

and Tylka (2009) study was similar to ours—young adult Midwestern U.S. college women. In the present study, appearance feedback and self-esteem explained 14.8% of the variance in body surveillance. In contrast, Augustus-Horvath and Tylka (2009) found that interpersonal sexual objectification only explained 6.7% of the variance in body surveillance. In the present study, body surveillance, body comparison, and self-esteem contributed a total of 61.1% of the variance in body shame. Augustus-Horvath and Tylka found that body surveillance contributed 53.3% of the variance in body shame.

Each hypothesized path was significant in our model. Sexual objectification via appearance feedback positively predicted body surveillance and body comparison and negatively predicted self-esteem. Thus, it appears that sexual objectification, when conceptualized as appearance feedback, predicts more than women's tendency to monitor their bodies. Individually, researchers have found that interpersonal sexual objectification predicts body surveillance (e.g., Augustus-Horvath and Tylka 2009; Moradi et al. 2005), that exposure to thin images of women predict body comparison (Bessenoff 2006; Tiggemann and McGill 2004), and that sexual objectification negatively predicts women's self-esteem (Herbozo and Thompson 2006; Phan and Tylka 2006; Tylka and Subich 2004). However, these studies have not measured objectification as appearance feedback. If internalized, appearance feedback may translate into women reducing their self-worth as well as other women's worth by scrutinizing their appearance to determine how it compares with their own.

Self-esteem uniquely predicted body surveillance, body comparison, and body shame within our model, which illustrates the importance of including self-esteem as a variable within the objectification theory framework. Given that women with high self-esteem are generally satisfied with their inner qualities as well as appearance, they may be more likely to accept their body as it is rather than vigilantly monitoring it and comparing it against other women's bodies. In contrast, women with low self-esteem tend to lack confidence in their inner qualities and their outer appearance and are likely to turn to societal ideals for guidance, which encourages them to focus on their appearance and to gauge their appearance against other women's appearance.

Consistent with prior theory (Fredrickson and Roberts 1997) and research on college women (e.g., Augustus-Horvath and Tylka 2009; Moradi et al. 2005; Noll and Fredrickson 1998; Tylka and Hill 2004), body surveillance predicted body shame in our model. Yet, our findings highlight the importance of exploring body surveillance, body comparison, and body shame in tandem. Habitually monitoring their bodies focuses women's attention on their appearance, which heightens their tendency to comparing

themselves to impossible media body ideals (Kilbourne 2000; Tiggemann and Pickering 1996). Perceiving that they fall short of these ideals, they experience body shame. Based on our findings, body comparison partially drives the relationship between body surveillance and body shame.

As expected, body shame predicted eating disorder symptomatology in our model. This significant path has been proposed (Fredrickson and Roberts 1997) and supported in several studies (e.g., Moradi et al. 2005; Noll and Fredrickson 1998; Tiggemann and Slater 2001; Tylka and Hill 2004). Women high in body shame appear to be more likely to try harmful and drastic measures to alter their bodies and lose weight, perhaps in an attempt to dissipate the embarrassment they feel from their bodies not measuring up to the thin-ideal for women.

In a series of four post-hoc analyses, we further determined whether sexual objectification via appearance feedback, body surveillance, self-esteem, or body comparison predicted unique variance in women's disordered eating, as each of these four variables was theorized to be indirectly rather than directly associated with disordered eating (Fredrickson and Roberts 1997; Moradi et al. 2005; Thompson et al. 1999; Tylka and Subich 2004). Curiously, appearance feedback and body surveillance each predicted disordered eating above and beyond all other variable associations within our model; however, only the addition of the appearance feedback—disordered eating path improved model fit. The fact that we assessed sexual objectification as appearance feedback, which is tailored toward weight commentary, may account for our finding. Other researchers who have assessed sexual objectification as sexualized body evaluation have not found it to be directly related to disordered eating in models of objectification theory (Augustus-Horvath and Tylka 2009; Kozee and Tylka 2006; Moradi et al. 2005).

Interestingly, body comparison intensified the relationship between body surveillance and disordered eating. This interaction effect accounted for 2.3% of the criterion variance above and beyond the individual body surveillance and body comparison predictors, which is within the 1–3% range for significant interaction effects typically found in non-experimental research (McClelland and Judd 1993). Engaging in frequent body comparison, which is often upward as women compare themselves to media images of women and other women perceived to be thinner or more attractive (van den Berg et al. 2007; Thompson et al. 1999), would serve as a regular reminder to women high in body surveillance that they are not achieving their appearance-related goals. Because the comparison targets are often thin, continual body comparison may direct women high in body surveillance to use drastic measures (i.e., disordered eating behaviors) in an attempt to lose weight. Therefore, triggers and contexts that promote body comparison (e.g., reading

fashion magazines; fitness centers which contain large mirrors, posters featuring sexualized and idealized female bodies, and female members wearing revealing clothing) for women high in body surveillance may be especially damaging for their disordered eating.

Limitations and Implications for Future Research

This study has limitations that need to be addressed. First, we explored women's dispositional tendency to engage in body comparison in general and did not have participants report the direction of this comparison (i.e., the degree to which they engaged in upward body comparison and downward body comparison on a separate basis). To our knowledge, there is no measure of dispositional body comparison that has participants report the degree to which they engage in both types of comparison. Dispositional body comparison (without specifying the direction of comparison) has been shown to predict women's body dissatisfaction (Stormer and Thompson 1996; Thompson et al. 1999). Experimental studies that have manipulated the direction of state body comparison (e.g., by exposing participants to an overweight or slender model supposedly in order to provoke downward or upward comparison, respectively) have indicated that upward, but not downward, body comparison is associated with body dissatisfaction (Lin and Kulik 2002; van den Berg and Thompson 2007). Therefore, the type of dispositional body comparison would be important to consider in future research on our model.

Additionally, we did not gather information about the targets of women's body comparisons, which may have made a difference in our findings. In an experimental study, Shomaker and Furman (2007) found that body comparisons with same gender peers produced stronger associations with negative body image than body comparisons with media images. Thus, assessing participants' target(s) of body comparison is an additional important direction for future research.

Although we used latent variable SEM to simultaneously examine the associations between the variable paths, the model was embedded within a correlational methodology. As a result, firm conclusions cannot be made about the direction of the model variables. Whereas, the fit of the model tested supported our hypotheses, other orderings of the variables may be equally plausible. A longitudinal examination of our model could better explore the directionality of the model paths.

Alternatively, directional paths may not be the best conceptualization of the model variables. For instance, body surveillance and body comparison may actually promote each other. Women who frequently compare their body/body parts to the body/body parts of other women may feel a greater need, in turn, to habitually monitor their

own body. Engaging in body comparison may constantly remind women that other women may be using their bodies for comparison. This realization may encourage women to habitually monitor their appearance to look their best for others' comparisons. It would be worthy to explore whether this process is bidirectional.

Additionally, researchers should expand this model. As disordered eating is not the only proposed psychological disorder to result from body shame (Fredrickson and Roberts 1997), it would be useful to incorporate depression and sexual dysfunction as criteria within our model. Other researchers have found support that body shame is linked to depression (Szymanski and Henning 2007) and sexual dysfunction (Steer and Tiggemann 2008), although sexual objectification, self-esteem, and body comparison have not been explored within these studies. We also encourage researchers to explore whether other measures of the same construct (e.g., the Physical Appearance Comparison Scale in lieu of the Body Comparison Scale) would produce similar findings.

We especially urge researchers to include body comparison in their models of objectification theory. A woman who compares her body to other women's bodies places herself in a unique situation wherein she is both the purveyor of objectification (objectifying the target of her comparison) and the recipient of objectification (i.e., objectifying her own body). Thus, body comparison is likely to simultaneously raise the prevalence of sexual and self-objectification. Researchers may wish to further explore this dynamic. It is also critical that researchers understand that objectifying gaze may come from both men (perhaps more for their personal gratification) and women (perhaps more as a means of body comparison). Assessing the degree to which women perceive that they are targets of other women's body comparison and the associations between this variable and body surveillance, body shame, their own body comparison tendencies, self-esteem, and disordered eating would be a worthwhile avenue for research.

Overall, the majority of the research on objectification theory, social comparison theory, and self-esteem related to body image and disordered eating has used predominantly White, heterosexual samples of young adult college women. It is unclear if constructs embedded in objectification theory, body comparison, and self-esteem relate to one another in a similar manner for more diverse samples. Some studies have indicated that many, but not all, tenets of objectification theory can be applied to women older than 25 (Augustus-Horvath and Tylka 2009), lesbian women (Kozee and Tylka 2006), and women who are deaf (Moradi and Rottenstein 2007). Research on body comparison and self-esteem also has used samples of predominantly White, heterosexual samples of adolescent or young adult women,

although some researchers have found an association between body comparison and body dissatisfaction in Japanese women (Yamamiya et al. 2008) and college men (Tylka et al. 2005). Self-esteem was negatively associated with body dissatisfaction in Asian American (Phan and Tylka 2006) and African American (Russell and Cox 2003) college women. Clearly, future research should examine the model investigated in this study with more diverse samples of women and men.

Gaining a clearer understanding of the link between objectification, social comparison, and disordered eating is the first step in finding ways to interrupt these processes. Tiggemann and McGill (2004) explained that body comparison is a strong predictor of body dissatisfaction, indicating that body comparison is a possible specific target for future interventions. Specifically, they suggested that if girls and women are taught to resist making comparisons with the bodies of others, their future levels of body dissatisfaction and body surveillance may be reduced. Other studies have suggested that girls and women prompted to make downward comparisons, especially on non-appearance-related dimensions, reported higher body satisfaction and positive mood than those instructed to make upward body comparisons (van den Berg and Thompson 2007). Similarly, an intervention that asked participants to make downward comparisons to models on non-appearance dimensions, such as special talents or important friendships, reported more positive shifts in body image, weight satisfaction, and anxiety related to appearance than did women who simply compared themselves to models (Lew et al. 2007). It is possible that interventions designed to lessen the amount of body surveillance may also reduce their tendency to make body comparisons and body shame. For instance, teaching girls and women how to contextualize sexual objectification; articulating specific ways in which engaging in body surveillance and body comparison have limited their authenticity, development, relationships, body, mind, and spirit; and managing triggers to engage in body surveillance and body comparison (e.g., creation of scripts they can use with themselves and others; Tylka and Augustus-Horvath in press).

Conclusion

This study adds to our understanding of the complex and multifaceted relationships between objectification (sexual and self), social comparison, self-esteem, body shame, and disordered eating. When we take a broad perspective and think about how various theories contribute to the prediction of the same phenomenon, we can see more clearly how elements from each might work together in previously unrecognized ways. By understanding how these processes

work together, we are better equipped to interrupt negative body image and disordered eating, which contributes to and enhances the positive mental health of women.

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