

The Relationships Among Social Comparisons, Body Surveillance, and Body Dissatisfaction in the Natural Environment

Ellen E. Fitzsimmons-Craft

Washington University School of Medicine

Anna M. Bardone-Cone

University of North Carolina at Chapel Hill

Stephen A. Wonderlich

Ross D. Crosby

Scott G. Engel

Neuropsychiatric Research Institute

University of North Dakota School of Medicine & Health Sciences

Cynthia M. Bulik

University of North Carolina at Chapel Hill

Karolinska Institutet

We examined the relationships among social comparisons (i.e., body, eating, and exercise), body surveillance, and body dissatisfaction in the natural environment. Participants were 232 college women who completed a daily diary protocol for 2 weeks, responding to online surveys 3 times per day. When the contemporaneous relationships among these variables were examined in a single model, results indicated that comparing one's body, eating, or exercise to

others or engaging in body surveillance was associated with elevated body dissatisfaction in the same short-term assessment period. Additionally, individuals with high trait-like engagement in body comparisons or body surveillance experienced higher levels of body dissatisfaction. Trait-like eating and exercise comparison tendencies did not predict unique variance in body dissatisfaction. When examined prospectively in a single model, trait-like body comparison and body surveillance remained predictors of body dissatisfaction, but the only more state-like behavior predictive of body dissatisfaction at the next assessment was eating comparison. Results provide support for the notion that naturalistic body dissatisfaction is predicted by both state- and trait-like characteristics. In particular, social comparisons (i.e., body, eating, and exercise) and body surveillance may function as proximal triggers for contemporaneous body dissatisfaction, with eating comparisons emerging as an especially important predictor of body dissatisfaction over time. Regarding trait-like predictors, general tendencies to engage in body comparisons and body surveillance may be more potent distal predictors of body dissatisfaction than general eating or exercise comparison tendencies.

This research is based on the doctoral dissertation of Ellen Fitzsimmons-Craft under the direction of Anna Bardone-Cone and was conducted at the University of North Carolina at Chapel Hill. This research was supported by the following grants: F31 MH093978 from the National Institute of Mental Health; T32 HL007456 from the National Heart, Lung, and Blood Institute; University of North Carolina at Chapel Hill Department of Psychology Earl and Barbara Baughman Dissertation Research Award.

Address correspondence to Ellen E. Fitzsimmons-Craft, Ph.D., Washington University School of Medicine, Dept. of Psychiatry, Campus Box 8134, 660 S. Euclid Ave., St. Louis, MO 63110; e-mail: fitzsimmonscrafte@psychiatry.wustl.edu

0005-7894/© 2014 Association for Behavioral and Cognitive Therapies. Published by Elsevier Ltd. All rights reserved.

Keywords: daily diary; social comparison; body surveillance; body dissatisfaction

BODY DISSATISFACTION REFERS TO the negative subjective evaluation of one's physical body, such as one's weight and shape (Garner, 2002; Pearson, Heffner, & Follette, 2010; Stice & Shaw, 2002), and is ubiquitous among women in Western society. Indeed, body dissatisfaction is experienced by up to 80% of college women (Neighbors & Sobal, 2007; Silberstein, Striegel-Moore, Timko, & Rodin, 1988; Vohs, Heatherton, & Herrin, 2001). Furthermore, body dissatisfaction is a strong risk factor for disordered eating and eating disorders (Stice, 2002). In particular, body dissatisfaction is thought to increase risk for eating pathology via two main mechanisms: dieting and negative affect (Stice & Shaw). Given the associations between body dissatisfaction and various negative consequences, it is important to understand specific factors that may impact an individual's level of discontent with the body. We will explore two such constructs in the current study: social comparison and body surveillance.

Social comparison theory (Festinger, 1954) posits that humans have a natural drive to assess their standing in life, and thus, individuals engage in social comparisons with others in order to understand how and where they fit into the world. In order to make an accurate comparison, individuals will typically compare themselves to those with whom they are most similar—that is, a peer (Lin & Kulik, 2002). There is ample evidence that college women engage in frequent comparisons with peers (e.g., Leahey, Crowther, & Mickelson, 2007). Indeed, college campuses are settings that lend themselves to engagement in this behavior (Fitzsimmons-Craft, 2011), as women are surrounded by many other women of about their same age with whom they interact both directly and indirectly on a near-constant basis (Lindner, Hughes, & Fahy, 2008). Engaging in social comparison with peers (both generally and specific to appearance) has been found to be associated with body dissatisfaction—a finding that has been demonstrated by both correlational and experimental work (e.g., Bamford & Halliwell, 2009; Myers & Crowther, 2009; Heinberg & Thompson, 1992; Stormer & Thompson, 1996; Thompson, Heinberg, & Tantleff, 1991; Trottier, Polivy, & Herman, 2007). It may be that via social comparison, an individual comes to realize that there is a discrepancy between her ideal body and her actual body.

It thus appears that general and appearance-related social comparison tendencies are associated with body dissatisfaction. However, not all individuals who engage in high levels of general comparison focus on appearance as a prominent area of comparison, which may result in a weakened social comparison–body dissatisfaction relationship (relative to using a more body-related measure of this construct). From a different perspective, only assessing appearance-related comparison may be too narrow of an approach since it does not account for the potential effects of other body-related comparisons, such as comparisons regarding exercise, on body dissatisfaction (Fitzsimmons-Craft, Harney, et al., 2012). Thus, it may be important to measure social comparison in a way that more comprehensively assesses the types of comparisons that play a role in eating pathology. For example, other more specific social comparison domains, such as those related to eating and exercise, may also play a role in body dissatisfaction. Indeed, body, eating, and exercise social comparison tendencies have been found to account for significant variance in body dissatisfaction both contemporaneously and 1 year later (Fitzsimmons-Craft & Bardone-Cone, 2014; Fitzsimmons-Craft, Bardone-Cone, & Harney, 2012). Thus, we will assess all three of these types of social comparison in the current study.

Objectification theory holds that within dominant American culture, the feminine body has been constructed as an object to be looked at (Fredrickson & Roberts, 1997; McKinley & Hyde, 1996) and gazed upon (Spitzack, 1990). Because the feminine body exists in this context, females learn to view themselves from an observer's perspective and to treat themselves as objects to be looked at, which is known as self-objectification (Fredrickson & Roberts; McKinley & Hyde). Self-objectification is in turn thought to behaviorally manifest itself in the act of body surveillance (Moradi & Huang, 2008), which involves thinking about how one's body looks to an outside observer and thinking more about how one's body looks than how it feels (McKinley & Hyde). Body surveillance may lead a woman to realize that there is a discrepancy between what her body actually looks like and what she would ideally like her body to look like, which in turn may be associated with negative consequences. Indeed, both correlational and experimental studies have demonstrated that engagement in body surveillance is associated with body dissatisfaction (e.g., Forbes, Jobe, & Revak, 2006; Fredrickson, Roberts, Noll, Quinn, & Twenge, 1998; Knauss, Paxton, & Alsaker, 2008; McKinley, 1998).

Although there is evidence that both social comparison and body surveillance are associated

with body dissatisfaction, previous research has typically been done in settings that lack ecological validity (e.g., laboratory). This is problematic given that data generated in such settings may not be generalizable to real-world, daily life experience (Shiffman, Stone, & Hufford, 2008). Additionally, much of the past work on these constructs has used traditional self-report questionnaires, which require participants to recall thoughts, emotions, experiences, and behaviors from days, weeks, or months ago. This is an issue given that memory over such long periods of time can be unreliable; in particular, individuals' recollections may not only be inaccurate, they are also often systematically biased (e.g., individuals are more likely to remember negatively valenced information when they are in a negative mood; Shiffman et al., 2008).

Daily diary methods represent an improvement upon traditional self-report methods given that data are collected in the natural environment and that participants are asked to recall thoughts, emotions, experiences, and behaviors that were relatively more recent. Some past work has examined social comparison behavior and the objectifying behavior of body surveillance in the natural environment. Research has indicated that women regularly engage in upward appearance-related social comparisons (i.e., comparisons to individuals perceived as "better off") and that these comparisons are associated with negative affect, body dissatisfaction, and other negative outcomes (Leahey et al., 2007; Leahey, Crowther, & Ciesla, 2011; Myers, Ridolfi, Crowther, & Ciesla, 2012). Furthermore, individuals with elevated body dissatisfaction and/or eating pathology make more upward appearance-related social comparisons (and are more negatively influenced by these comparisons) than women low on these attributes (Leahey & Crowther, 2008; Leahey et al., 2007, 2011), and momentary self-objectification is generally associated with decreased well-being (Breines, Crocker, & Garcia, 2008). To date, researchers have yet to use daily diary methods to examine the relationships among body-, eating-, and exercise-related social comparisons and body dissatisfaction or to simultaneously examine social comparison and body surveillance as predictors of body dissatisfaction. Research on the contemporaneous and prospective relationships between these behaviors and body dissatisfaction using daily diary methods represents an important contribution to the literature given that past work has indicated that both of these behaviors may be ones that play a role in the translation of thin ideal internalization into body dissatisfaction (e.g., Blowers, Loxton, Grady-Flessler, Occhipinti, & Dawe, 2003; Fitzsimmons-Craft, Harney, et al., 2012).

The purpose of the current study was thus to examine the contemporaneous and prospective relationships among social comparisons (i.e., body, eating, and exercise), body surveillance, and body dissatisfaction using daily diary methods. In order to provide an even more stringent test of these predictors, analyses were run controlling for negative affect, a construct that has been found to play a significant role in body dissatisfaction (e.g., Bearman, Presnell, Martinez, & Stice, 2006; Presnell, Bearman, & Stice, 2004). We hypothesized that social comparisons and body surveillance would be contemporaneously and prospectively associated with body dissatisfaction both within- and between-persons, controlling for the within- and between-person effects of negative affect. More specifically, for the within-person effect, we hypothesized that on those occasions in which an individual engaged in higher levels of these comparisons or body surveillance, that individual would experience higher levels of body dissatisfaction at that assessment and at the next study assessment. Regarding the between-person effect, we hypothesized that individuals who, on average, engaged in higher levels of these comparisons or body surveillance would experience higher levels of body dissatisfaction.

Method

PARTICIPANTS

We recruited 238 women attending a large, public Southeastern university for participation in this study. At the initial study assessment, they ranged in age from 17 to 22 years, with a mean age of 18.71 years ($SD = 1.00$). Recruitment occurred through introductory psychology courses. Most women (68.5%) identified themselves as White, 8.4% as African American or Black, 7.6% as Asian, 4.2% as Hispanic, 1.3% as American Indian or Alaskan Native, 9.7% as multiracial/multiethnic, and .4% as other races/ethnicities. Highest parental education was used as a proxy for socioeconomic status and ranged from 7 to 21 years ($M = 16.50$ years, $SD = 2.68$). This sample's mean score on the Eating Attitudes Test-26 (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982) was 9.24 ($SD = 7.30$). The EAT-26 is a commonly used measure of eating disorder attitudes and behaviors, and a score of 20 or more indicates a probable eating disorder (King, 1989, 1991). On average, this sample exhibited a level of disordered eating that was similar in magnitude to that observed in other studies of college women (e.g., Desai, Miller, Staples, & Bravender, 2008; Fitzsimmons-Craft, Bardone-Cone, & Harney, 2012).

PROCEDURE

The data that are a focus of this work were part of a larger study. First, at the beginning of an academic semester and in an informational session with approximately 30 study participants, the following were described: study procedures, rationale for the daily diary component of the study, logistics of completing daily diary reports, definitions of the behaviors (e.g., social comparison) they were to track during this period; and solutions to potential problems they may encounter. Participants were provided with a short manual containing information discussed, as well as the phone numbers and email addresses for the principal investigator and a research assistant for round-the-clock availability in case of any questions/problems recording data.

Second, participants completed an online self-report questionnaire battery (i.e., Time 1 [T1]) within several days of this informational session. Participants thus completed this questionnaire battery at the beginning of an academic semester.

Third, participants completed a 2-week daily diary protocol in the middle of the semester in which they used their own personal electronic devices (e.g., laptop computer, tablet, smartphone, or some combination) to answer questions three times per day as a means of examining their own thoughts, emotions, experiences, and behaviors in the natural environment. These are the data that are the focus of the current study. Research has indicated that collecting daily diary data via personal computers is feasible with good compliance rates among college students (Zuckerman & O'Loughlin, 2006). For this portion of the study, participants provided data three times per day: in the late morning, late afternoon, and before going to sleep. They were given time guidelines for filling out the surveys (i.e., late morning = 10:30 A.M.–1:30 P.M.; late afternoon = 3:30 P.M.–6:30 P.M.; before going to sleep = 10:00 P.M.–1:00 A.M.) and were also sent reminder emails with the survey link (i.e., signals for reporting) during each of these time periods on each day of the daily diary period. Additionally, all but one participant (who opted out of receiving text messages) were sent reminder text messages for the first 3 days of the data collection period. These text messages reminded them to fill out a survey soon and to check their email for the survey link. Shiffman (2009) notes that participant-management procedures such as training, feedback, and check-ins contribute to high compliance; thus, participants were contacted by their assigned research assistant at least once per

week via phone and twice per week via email to check in and address problems. On each morning of the daily diary period, we checked whether participants completed a bedtime report for the previous day and called and emailed those who failed to do so; we reminded them of the incentives for completing the daily diary question sets and asked them to complete the reports for that day.

Fourth, participants completed an online self-report questionnaire battery (i.e., Time 2 [T2]) at the end of an academic semester. T2 procedures were identical to T1 procedures.

Participants were provided with research credit in their introductory psychology courses for their participation. They received full credit if they adequately completed all components of the larger study, including filling out the daily diary question sets at least 30 (of the possible 42) times. Credit was prorated if they responded less frequently or did not complete all study components. Participants were also entered into a drawing for one of six \$100 prizes if they completed both questionnaire sessions (T1 and T2) and at least 36 (85%) of the daily diary question sets. This study was approved by the university's Institutional Review Board.

Of an initial 238 participants, 3 participants only completed T1 and did not complete the daily diary portion of the study or T2. Two of these individuals dropped their psychology course and thus no longer needed credit; the third individual dropped out of the study for personal reasons. Thus, a total of 235 individuals completed the daily diary portion of the study.

DAILY DIARY MEASURES

Social Comparison

Visual analogue scales were used to assess social comparison. In particular, the following question was used to assess body-related social comparison: "Please slide the bar to indicate the level of BODY comparison behavior you have engaged in since the last time you were signaled, where 0 = *No Body Comparisons* and 100 = *Constantly Making Body Comparisons*." Similar questions assessing level of eating- and exercise-related social comparison behavior were administered as well.

Body Surveillance

To assess body surveillance, we modified the 8-item Body Surveillance subscale of McKinley and Hyde's (1996) Objectified Body Consciousness Scale (OBCS), similar to the approach of Breines et al. (2008). In particular, we asked participants to "please think about the period of time since the last time [they] were signaled in answering the following questions." An example item is: "I thought

about how I looked many times.” In order to minimize issues related to construct overlap, the one comparison-related item (i.e., “I rarely compared how I looked with how other people looked”) was not included when computing the subscale score. All analyses were run using the 7-item version of the modified OBCS Body Surveillance subscale, with response options ranging from 1 = *strongly disagree* to 7 = *strongly agree*. Items were averaged to create a subscale score. The traditional self-report version of the OBCS Body Surveillance subscale has demonstrated reliability and validity in a sample of college women (McKinley & Hyde). In the current study, internal consistency was high ($\alpha = .93$).

Body Dissatisfaction

Visual analogue scales were used to assess body dissatisfaction. In particular, the following question was used to assess weight dissatisfaction: “Please slide the bar to indicate how dissatisfied with your WEIGHT you have been since the last time you were signaled, where 0 = *Not at All Dissatisfied* and 100 = *Very Dissatisfied*.” A similar question assessing level of shape dissatisfaction was administered as well. The two items assessing levels of weight and shape dissatisfaction were averaged to create a measure of body dissatisfaction (range = 0–100). In the current study, internal consistency was high ($\alpha = .89$).

Negative Affect

Negative affect was assessed using a 10-item version of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) developed by Kercher (1992) and further validated by Mackinnon et al. (1999). The negative affect subscale of this 10-item version of the PANAS is comprised of 5 items (i.e., distressed, upset, scared, nervous, afraid). Participants were asked to rate their current mood on a scale ranging from 1 = *not at all* to 5 = *very much*. Items were summed to create a subscale score, with higher scores indicating greater negative affect. In the current study, internal consistency was high ($\alpha = .86$).

Of note, we chose how to assess the study constructs based on how this had been done in past research while being mindful of participant burden. Previous naturalistic work on social comparison and body dissatisfaction has often used single items (Durkin, Paxton, & Sorbello, 2007; Leahey et al., 2007; Myers et al., 2012), and visual analogue scales have been shown to be sensitive enough to register differences over short periods of time and are quick and easy to complete (McCormack, Horne, & Sheather, 1988). Previous naturalistic work on body surveillance (Breines et al., 2008) used a modified version of the Body

Surveillance subscale of the OBCS, and trait levels of this construct have been assessed using this instrument. Finally, the PANAS is frequently used to assess current mood (e.g., Engel et al., 2013; Heron, Scott, Sliwinski, & Smyth, 2014).

ANALYTIC STRATEGY

Generalized estimating equations (GEEs) with a gamma distribution (described in more detail below) were used to examine the influences of (a) time, (b) body-related social comparison behavior over the past several hours, (c) eating-related social comparison behavior over the past several hours, (d) exercise-related social comparison behavior over the past several hours, (e) body surveillance over the past several hours, and (f) current negative affect on body dissatisfaction experienced over the past several hours, over the 2-week daily diary period. These models assume that repeated observations are nested within persons. Level 1 observations represent the multiple daily reports of social comparisons (i.e., body, eating, exercise), body surveillance, negative affect, and body dissatisfaction. Level 2 observations represent individual participants. In order to evaluate whether social comparisons, body surveillance, and negative affect were differentially associated with body dissatisfaction within versus between persons, both the person-mean centered levels of these predictors (which represent the tests of the within-person effects) and the individuals’ mean levels of the predictors (which represent the tests of the between-person effects) were entered into the models.

In addition to looking at the contemporaneous relationships between the predictors and body dissatisfaction, we also ran the aforementioned analyses looking at the prospective (i.e., lagged) effects of social comparisons and body surveillance (within-person) on body dissatisfaction. More specifically, within-person levels of social comparisons and body surveillance at the prior study assessment were examined as predictors of body dissatisfaction, and only within-day lagged effects were examined. That is, within-person levels of the predictors before going to sleep one evening were not examined as predictors of body dissatisfaction the next morning given other factors (aside from the model predictors) that could have contributed to findings (e.g., long period of time between assessments, long period of sleep). Social comparisons and body surveillance at the first assessment of the day were used as predictors of body dissatisfaction at the second assessment, and social comparisons and body surveillance at the second assessment of the day were used as predictors of body dissatisfaction at the third assessment.

Table 1
Correlations Among and Grand Means and Standard Deviations of the Measured Variables as Collected Using the Daily Diary Methods ($N = 232$)

Measure	1	2	3	4	5	6	<i>M</i>	<i>SD</i>	Possible Range
1. Body-related social comparison	-						18.23	23.14	0-100
2. Eating-related social comparison	.62***	-					12.36	20.38	0-100
3. Exercise-related social comparison	.55***	.54***	-				9.08	18.14	0-100
4. Body surveillance	.45***	.33***	.23***	-			3.94	1.49	1-7
5. Body dissatisfaction	.52***	.46***	.38***	.40***	-		31.84	28.08	0-100
6. Negative affect	.14***	.16***	.12***	.08***	.09***	-	7.91	3.58	5-25

Note. *** $p < .001$.

Of note, for both the contemporaneous and lagged analyses, we examined separate models of body comparisons, eating comparisons, exercise comparisons, and body surveillance as predictors of body dissatisfaction, as well as a single model examining the influences of all of these variables (so that they could be compared to one another). For all models, we calculated pseudo- R^2 as a measure of effect size using quasi likelihood under independence model criterion (QICC) values. This value represents the change in pseudo- R^2 when the variables of interest (i.e., social comparisons and body surveillance) were added to the model. Analyses were performed using SPSS Version 19.0.

Results

PRELIMINARY ANALYSES

The 235 participants who completed the daily diary portion of the study provided 8,813 separate recordings. Compliance with reporting was quite good, with overall compliance rates for the sample at an average of 89.3% of daily diary surveys completed (about 38 surveys out of the possible 42). Further, 97% of the participants completed 70% or more of the surveys, and 78% completed 85% or more of the surveys. Participants' timeliness was good as well, with overall compliance within the time guidelines provided at an average of 73.8%. We examined z scores in order to determine whether there were any outliers with respect to number of surveys completed. Three participants completed 21, 24, and 26 surveys ($z \geq -3.0$), whereas all other participants completed 28 or more surveys. Data from these 3 participants were excluded from all analyses, yielding a total n of 232. Grand means of and correlations among daily diary variables in this sample are provided in Table 1.

We examined whether our dependent variable, body dissatisfaction, was normally distributed. Results indicated that this variable was very highly skewed (standardized skew = 22.22); a histogram of this variable revealed that 15.2% of the values for this variable were zero. Given this, we attempted to log

transform this variable, but this improved the distribution only slightly. Therefore, instead of using multilevel modeling based upon a general linear model (which assumes that the dependent variable follows a normal distribution; Raudenbush & Bryk, 2002), we chose to run our analyses using GEEs (Liang & Zeger, 1986) with a gamma distribution (using the raw values for the dependent variable), which is appropriate for skewed continuous data (e.g., Manning, Basu, & Mullahy, 2005). Such analyses generate population-averaged coefficients, as opposed to cluster-specific coefficients. Population-averaged parameters represent the averaged effect of a unit change in the predictors for the whole population, whereas cluster-specific parameters assume there is heterogeneity across individuals in their regression coefficients; these two sets of parameters are the same when there are no Level 1 random effects (Ghisletta & Spini, 2004; Zorn, 2001). Of note, the intraclass correlation coefficient (ICC; degree of dependence in the data) for body dissatisfaction was .75, indicating that 75.0% of the variance in body dissatisfaction was attributable to between-person (as opposed to within-person) differences.¹

¹Data collection for this study occurred over the course of two academic semesters; 118 participants completed the study during the Spring 2012 semester and 117 participants took part in the study during the Fall 2012 semester. It is possible that these two separate 2-week periods may have differed systematically in various ways. We tested for group (i.e., spring semester versus fall semester participants) differences in average levels of body-, eating- and exercise-related social comparison behavior, body surveillance, and body dissatisfaction reported during the daily diary period. Results indicated that the groups did not differ in average levels of exercise-related social comparison behavior or body surveillance ($ps > .283$). However, groups did significantly differ in average levels of body-related social comparison behavior, eating-related social comparison behavior, and body dissatisfaction ($ps < .005$), with those participating in the fall reporting higher levels of these constructs than the spring participants, perhaps reflecting an effect of returning to (or starting at) the college campus. All study analyses were re-run controlling for semester of participation. Patterns of significance remained the same whether or not this covariate was included in the model, and in no case was semester of participation a significant predictor of the outcome variable.

CONTEMPORANEOUS ANALYSES

Results of the separate analyses of social comparisons (i.e., body, eating, and exercise) and body surveillance as contemporaneous predictors of body dissatisfaction controlling for negative affect

are presented in Table 2. Across all models (contemporaneous and prospective), results indicated that, on average, body dissatisfaction increased over the course of the 2-week daily diary period (all $ps < .002$). Further, results indicated

Table 2

Separate Generalized Estimating Equations Analyses Using a Gamma Distribution of Social Comparisons (i.e., Body, Eating, and Exercise) and Body Surveillance as Predictors of Contemporaneous Body Dissatisfaction Controlling for Negative Affect

For the model involving the predictor variable of body-related social comparison:

Parameter Estimates	B	SE	Wald χ^2	df	p
<i>Outcome variable: body dissatisfaction, $N_{Level\ 1} = 8742, N_{Level\ 2} = 232$</i>					
Intercept	2.78	.17	281.89	1	<.001
Body-related Social Comparison (person-mean centered)	.01	.001	116.12	1	<.001
Body-related Social Comparison (person means)	.04	.003	138.49	1	<.001
Time	.001	.0001	18.00	1	<.001
Negative Affect (person-mean centered)	.003	.003	1.10	1	.295
Negative Affect (person means)	-.02	.02	1.73	1	.189
(Scale)	.91				
<i>Pseudo-$R^2 = .186$</i>					

For the model involving the predictor variable of eating-related social comparison:

Parameter Estimates	B	SE	Wald χ^2	df	p
<i>Outcome variable: body dissatisfaction, $N_{Level\ 1} = 8742, N_{Level\ 2} = 232$</i>					
Intercept	3.14	.17	361.62	1	<.001
Eating-related Social Comparison (person-mean centered)	.01	.001	102.62	1	<.001
Eating-related Social Comparison (person means)	.03	.003	103.80	1	<.001
Time	.0004	.0001	10.99	1	.001
Negative Affect (person-mean centered)	.01	.003	2.92	1	.087
Negative Affect (person means)	-.02	.02	1.38	1	.240
(Scale)	1.00				
<i>Pseudo-$R^2 = .118$</i>					

For the model involving the predictor variable of exercise-related social comparison:

Parameter Estimates	B	SE	Wald χ^2	df	p
<i>Outcome variable: body dissatisfaction, $N_{Level\ 1} = 8742, N_{Level\ 2} = 232$</i>					
Intercept	3.03	.18	297.64	1	<.001
Exercise-related Social Comparison (person-mean centered)	.01	.001	69.16	1	<.001
Exercise-related Social Comparison (person means)	.03	.003	87.00	1	<.001
Time	.0005	.0001	14.20	1	<.001
Negative Affect (person-mean centered)	.01	.003	2.95	1	.086
Negative Affect (person means)	.004	.02	.04	1	.837
(Scale)	.81				
<i>Pseudo-$R^2 = .090$</i>					

For the model involving the predictor variable of body surveillance:

Parameter Estimates	B	SE	Wald χ^2	df	p
<i>Outcome variable: body dissatisfaction, $N_{Level\ 1} = 8742, N_{Level\ 2} = 232$</i>					
Intercept	1.42	.24	36.20	1	<.001
Body Surveillance (person-mean centered)	.13	.01	99.08	1	<.001
Body Surveillance (person means)	.41	.04	85.55	1	<.001
Time	.001	.0001	28.99	1	<.001
Negative Affect (person-mean centered)	.01	.003	5.89	1	.015
Negative Affect (person means)	.03	.02	3.18	1	.075
(Scale)	.79				
<i>Pseudo-$R^2 = .132$</i>					

that on their own (i.e., when examining separate models of social comparisons and body surveillance as predictors of body dissatisfaction), both within- and between-person levels of body comparisons (within: $B = .01$, $p < .001$; between: $B = .04$, $p < .001$), eating comparisons (within: $B = .01$, $p < .001$; between: $B = .03$, $p < .001$), exercise comparisons (within: $B = .01$, $p < .001$; between: $B = .03$, $p < .001$), and body surveillance (within: $B = .13$, $p < .001$; between: $B = .41$, $p < .001$) predicted levels of body dissatisfaction contemporaneously while controlling for negative affect. Neither within- nor between-person levels of negative affect accounted for unique variance in body dissatisfaction in any of the models ($ps > .074$), with the exception of within-person levels of negative affect being a significant predictor of body dissatisfaction in the body surveillance model ($p = .015$).

When examining these contemporaneous relationships in a single model controlling for negative affect (see Table 3), results indicated that within- and between-person levels of body comparisons (within: $B = .003$, $p < .001$; between: $B = .04$, $p < .001$) and body surveillance (within: $B = .10$, $p < .001$; between: $B = .19$, $p = .002$), within-person levels of eating comparisons ($B = .003$, $p < .001$), and within-person levels of exercise comparisons ($B = .003$, $p < .001$) predicted levels of body dissatisfaction contemporaneously. Between-person levels of eating and exercise comparisons did not predict unique variance in body dissatisfaction ($ps > .125$). Neither within- nor between-person levels of negative affect accounted for unique variance in body dissatisfaction ($ps > .126$).

Table 3

Generalized Estimating Equations Analysis Using a Gamma Distribution of Social Comparisons (i.e., Body, Eating, and Exercise) and Body Surveillance as Predictors of Contemporaneous Body Dissatisfaction in a Single Model Controlling for Negative Affect

Parameter Estimates	B	SE	Wald χ^2	df	p
<i>Outcome variable: body dissatisfaction, $N_{Level\ 1} = 8742$, $N_{Level\ 2} = 232$</i>					
Intercept	1.97	.25	61.10	1	<.001
Body-related Social Comparison (person-mean centered)	.003	.001	32.97	1	<.001
Body-related Social Comparison (person means)	.04	.01	34.60	1	<.001
Eating-related Social Comparison (person-mean centered)	.003	.001	22.81	1	<.001
Eating-related Social Comparison (person means)	-.01	.01	2.35	1	.126
Exercise-related Social Comparison (person-mean centered)	.003	.001	16.86	1	<.001
Exercise-related Social Comparison (person means)	.001	.01	.05	1	.823
Body Surveillance (person-mean centered)	.10	.01	60.75	1	<.001
Body Surveillance (person means)	.19	.06	9.43	1	.002
Time	.001	.0002	31.19	1	<.001
Negative Affect (person-mean centered)	.004	.003	2.33	1	.127
Negative Affect (person means)	-.01	.02	.29	1	.587
(Scale)	.90				
<i>Pseudo-$R^2 = .228$</i>					

PROSPECTIVE ANALYSES

Results of the separate analyses of the lagged effects of social comparisons and body surveillance on body dissatisfaction controlling for negative affect are presented in Table 4. Results indicated that on their own, both within- (lagged) and between-person levels of body comparisons (within: $B = .002$, $p = .001$; between: $B = .04$, $p < .001$), eating comparisons (within: $B = .002$, $p < .001$; between: $B = .03$, $p < .001$), exercise comparisons (within: $B = .001$, $p = .031$; between: $B = .03$, $p < .001$), and body surveillance (within: $B = .03$, $p = .011$; between: $B = .42$, $p < .001$) predicted levels of body dissatisfaction while controlling for negative affect. Neither within- nor between-person levels of negative affect accounted for unique variance in body dissatisfaction in any of the models ($ps > .059$).

When examining these lagged effects in a single model controlling for negative affect (see Table 5), results indicated that between-person levels of body comparisons ($B = .04$, $p < .001$), within-person (lagged) levels of eating comparisons ($B = .002$, $p = .010$), and between-person levels of body surveillance ($B = .19$, $p = .002$) predicted levels of body dissatisfaction. Within-person (lagged) levels of body comparisons, exercise comparisons, and body surveillance and between-person levels of eating and exercise comparisons did not predict unique variance in body dissatisfaction ($ps > .086$). Neither within- nor between-person levels of negative affect accounted for unique variance in body dissatisfaction ($ps > .338$).

Discussion

This study investigated the relationships between naturally occurring social comparisons (i.e., body,

Table 4

Separate Generalized Estimating Equations Analyses Using a Gamma Distribution of the Lagged Effects of Body-, Eating-, and Exercise-Related Social Comparison and Body Surveillance on Body Dissatisfaction Controlling for Negative Affect

For the model involving the predictor variable of body-related social comparison:

Parameter Estimates	B	SE	Wald χ^2	df	<i>p</i>
<i>Outcome variable: body dissatisfaction, N_{Level 1} = 8742, N_{Level 2} = 232</i>					
Intercept	2.74	.17	277.97	1	<.001
Lagged Body-related Social Comparison (person-mean centered)	.002	.001	10.96	1	.001
Body-related Social Comparison (person means)	.04	.003	142.66	1	<.001
Time	.001	.0001	22.41	1	<.001
Negative Affect (person-mean centered)	.004	.01	.67	1	.414
Negative Affect (person means)	-.02	.02	1.52	1	.218
(Scale)	.91				
<i>Pseudo-R² = .183</i>					

For the model involving the predictor variable of eating-related social comparison:

Parameter Estimates	B	SE	Wald χ^2	df	<i>p</i>
<i>Outcome variable: body dissatisfaction, N_{Level 1} = 8742, N_{Level 2} = 232</i>					
Intercept	3.11	.17	357.06	1	<.001
Lagged Eating-related Social Comparison (person-mean centered)	.002	.001	16.32	1	<.001
Eating-related Social Comparison (person means)	.03	.003	106.28	1	<.001
Time	.001	.0001	18.17	1	<.001
Negative Affect (person-mean centered)	.004	.01	.99	1	.319
Negative Affect (person means)	-.02	.02	1.34	1	.248
(Scale)	1.00				
<i>Pseudo-R² = .120</i>					

For the model involving the predictor variable of exercise-related social comparison:

Parameter Estimates	B	SE	Wald χ^2	df	<i>p</i>
<i>Outcome variable: body dissatisfaction, N_{Level 1} = 8742, N_{Level 2} = 232</i>					
Intercept	2.99	.18	288.26	1	<.001
Lagged Exercise-related Social Comparison (person-mean centered)	.001	.001	4.65	1	.031
Exercise-related Social Comparison (person means)	.03	.003	88.33	1	<.001
Time	.001	.0001	18.82	1	<.001
Negative Affect (person-mean centered)	.01	.01	.96	1	.326
Negative Affect (person means)	.01	.02	.10	1	.748
(Scale)	.81				
<i>Pseudo-R² = .093</i>					

For the model involving the predictor variable of body surveillance:

Parameter Estimates	B	SE	Wald χ^2	df	<i>p</i>
<i>Outcome variable: body dissatisfaction, N_{Level 1} = 8742, N_{Level 2} = 232</i>					
Intercept	1.39	.24	34.74	1	<.001
Lagged Body Surveillance (person-mean centered)	.03	.01	6.41	1	.011
Body Surveillance (person means)	.42	.04	89.19	1	<.001
Time	.001	.0001	23.89	1	<.001
Negative Affect (person-mean centered)	.01	.004	1.45	1	.229
Negative Affect (person means)	.03	.02	3.55	1	.060
(Scale)	.78				
<i>Pseudo-R² = .123</i>					

eating, and exercise) and body surveillance and contemporaneous and prospective body dissatisfaction. All of these analyses were run controlling for negative affect, a construct that has been found to be associated with body dissatisfaction in past

research (e.g., Bearman et al., 2006; Presnell et al., 2004). A strength of the current study was the use of daily diary assessment. This improved upon traditional self-report methods in that it provided more ecologically valid information about behaviors

Table 5

Generalized Estimating Equations Analysis Using a Gamma Distribution of the Lagged Effects of Body-, Eating-, and Exercise-Related Social Comparison and Body Surveillance on Body Dissatisfaction in a Single Model Controlling for Negative Affect

Parameter Estimates	B	SE	Wald χ^2	df	<i>p</i>
<i>Outcome variable: body dissatisfaction, N_{Level 1} = 8742, N_{Level 2} = 232</i>					
Intercept	2.00	.25	63.60	1	<.001
Lagged Body-related Social Comparison (person-mean centered)	.0002	.001	.10	1	.757
Body-related Social Comparison (person means)	.04	.01	35.27	1	<.001
Lagged Eating-related Social Comparison (person-mean centered)	.002	.001	6.63	1	.010
Eating-related Social Comparison (person means)	-.01	.01	1.74	1	.188
Lagged Exercise-related Social Comparison (person-mean centered)	.001	.001	2.92	1	.087
Exercise-related Social Comparison (person means)	-.00003	.01	.00002	1	.996
Lagged Body Surveillance (person-mean centered)	.02	.01	2.92	1	.087
Body Surveillance (person means)	.19	.06	9.27	1	.002
Time	.001	.0002	21.36	1	<.001
Negative Affect (person-mean centered)	.004	.01	.91	1	.339
Negative Affect (person means)	-.01	.02	.31	1	.576
(Scale)	.89				
<i>Pseudo-R² = .221</i>					

as they occurred in the natural environment with a reduced reliance on retrospective recall and the facilitation of a large number of observations. An additional strength of the current study involved our assessment of different types of social comparisons, which provided important information on differential relationships between these domains of social comparison and body dissatisfaction.

We first examined separate models of social comparisons and body surveillance as predictors of contemporaneous and prospective body dissatisfaction. Results indicated that when individuals reported engaging in higher levels of these comparisons or body surveillance over the past several hours, they experienced higher levels of body dissatisfaction at both that assessment and the next assessment. Further, individuals who reported higher levels of engagement in these comparisons or body surveillance on average (i.e., individuals with high trait-like social comparison or body surveillance) experienced higher levels of body dissatisfaction.

When the contemporaneous relationships were examined in a single model, results indicated that comparing one's body, eating, or exercise to others or engaging in body surveillance was associated with elevated body dissatisfaction in the same short-term assessment period. This study thus provides information on several behaviors that are associated with body dissatisfaction in the shorter term and perhaps involved in its maintenance on a day-to-day basis. One specific way in which these behaviors could be involved in this maintenance is via translating thin ideal internalization into body dissatisfaction, as has been suggested by cross-sectional studies using traditional self-report measures (e.g., [Blowers et al.,](#)

[2003; Fitzsimmons-Craft, Harney, et al., 2012](#)). More specifically, these behaviors may provide a woman with the knowledge that there is a discrepancy between how she would ideally like to look, eat, or exercise and how she currently looks, eats, or exercises, which may result in body dissatisfaction. However, future research needs to specifically test whether more state-like comparisons and body surveillance function in this role. In this single contemporaneous model, only trait-like body comparison and body surveillance were associated with body dissatisfaction. When examined prospectively in a single model, trait-like body comparison and body surveillance remained predictors of body dissatisfaction, but the only more state-like behavior predictive of body dissatisfaction at the next assessment was eating comparison. This suggests that engagement in more state-like eating comparisons may be especially damaging over time. Eating may be associated with changes in bloating or fullness—feelings that may “stick with” individuals over an extended period of time and have an impact on body dissatisfaction prospectively. In contrast, body and exercise comparisons are not as readily associated with physiological sensations and may thus not have as pronounced prospective effects relative to eating comparisons.

Although trait-like tendencies to engage in eating and exercise comparisons may be at least somewhat damaging, as suggested by the separate contemporaneous and prospective models involving these constructs on their own, their effects may be less so than trait-like tendencies to engage in body comparisons and body surveillance. It may be that general tendencies to engage in high levels of body comparisons and body surveillance are especially damaging

because such behaviors may provide individuals with a rather direct understanding that their bodies are not what they would like them to be. Body comparisons and body surveillance can be thought of as forms of body checking (Fairburn, 2008; Tiggemann, 2013). Body checking behaviors are considered behavioral manifestations of the core psychopathology of eating disorders (i.e., overevaluation of weight and shape) in cognitive-behavioral theories and also play a role in eating disorder maintenance given that they typically intensify weight/shape concerns (Fairburn, Shafran, & Cooper, 1998; Shafran, Lee, Payne, & Fairburn, 2007; Tiggemann, 2013). On the other hand, eating and exercise comparisons focus more on the actions associated with achieving the appearance-related goal gleaned from body-related comparisons or body surveillance (Fitzsimmons-Craft, Bardone-Cone, & Harney, 2012). Based on eating and exercise comparisons, a woman may conclude that she must behave differently in terms of eating and exercise if she is to achieve her ideal weight and shape. Therefore, it may be that general tendencies to engage in body comparisons and body surveillance are more damaging than general tendencies to engage in eating or exercise comparisons because the latter are more “secondary” in terms of their influence on body dissatisfaction. Furthermore, it is possible that engaging in eating and exercise comparisons could actually increase a woman’s efficacy by identifying actions she believes could “improve” her body. In contrast, body comparisons and body surveillance in and of themselves do not provide women with information on how to “improve,” and thus, it may be that little good can come of them.

It is interesting that across study analyses, body dissatisfaction increased over the course of the study. It is possible that repeated assessments over the course of the 2-week daily diary component of the study may have increased participants’ self-monitoring and awareness of their feelings and behaviors, which may have accounted for the increase in body dissatisfaction across time. Although this would reflect the well-established phenomenon of reactivity (Campbell & Stanley, 1963), prior research using even more intensive data collection methods (i.e., ecological momentary assessment (EMA) using five semi-random signals per day) found no systematic change in average body dissatisfaction reported across study days over the course of 1 week (Heron & Smyth, 2013). Further, across various areas of research and using different study designs, there is very little evidence that participants’ self-reports are reactive to the use of more naturalistic assessment (e.g., Aaron, Turner, Mancl, Brister, & Sawchuk, 2005; Le

Grange, Gorin, Dymek, & Stone, 2002; Stein & Corte, 2003). However, we cannot completely rule out the possibility that the assessment period was reactive in some way. Alternatively, to the degree that elevations in body dissatisfaction were a response to a trigger, it could be that individuals experienced more of these triggers as the daily diary period of the study progressed.

Our results have various clinical implications. In particular, it may be useful to target both social comparison and body surveillance behaviors and tendencies in a cognitive-behavioral framework in prevention efforts as well as in clinical settings. Regarding social comparison, individuals could be encouraged to use self-monitoring logs when they engage in this behavior. This would involve logging the thoughts (e.g., “My friend borrowed my dress and it looks amazing on her; it always looks horrible on me”) and emotions (e.g., sadness, anxiety) they experience after they compare. Clinicians could then teach individuals to identify cognitive distortions apparent in their thoughts (e.g., all-or-nothing thinking, labeling) and challenge negative automatic thoughts (e.g., “Three people complimented me on my appearance the last time I wore that dress”). Further, using self-monitoring logs, clear connections between comparisons (antecedents) and resultant emotions (consequences) could be made and explored. Behavioral interventions emerging from these findings could take the form of behavioral experiments. For example, clients could be guided in being more scientific when choosing someone to whom to compare themselves (e.g., every fifth person encountered versus every very thin person), comparing to non-appearance-related aspects of others for one day, and employing behavioral control strategies (e.g., not using social networking sites) so as to reduce the frequency of comparisons in general for one day; all of these behavioral experiments could be used to help individuals become aware of the different thoughts and emotions they may experience if they were to change their comparison behavior. These techniques may help individuals recognize that their comparisons are often in a single domain (e.g., appearance-related) and in one direction (e.g., always comparing to very thin individuals) and that they often lead to negative emotions, which may motivate individuals to change. Therapists could then help their clients practice comparing in a way that is consistent with the behavioral experiments mentioned above on a day-to-day basis, which may result in decreased body dissatisfaction (Fairburn, 2008; Rosen, 1997).

Our prospective analyses also highlight the importance of targeting eating comparison behaviors in particular, and intervention efforts should thus focus on these comparisons using the aforementioned

cognitive-behavioral techniques. In the context of eating comparisons, negative automatic thoughts regarding the meaning of fullness and bloating (e.g., “Feeling full and bloated means that I will gain weight”) may especially need to be challenged. Finally, many women have been socialized to assume that body surveillance is natural (e.g., Calogero, Davis, & Thompson, 2005; Fairburn, 2008). Thus, intervention efforts could help individuals build awareness of these behaviors and their consequences through the use of self-monitoring, and could intervene by identifying situations in which this is most likely to occur and practicing resisting the urge (Fairburn, 2008) or focusing on what the body can do rather than how it looks (Tiggemann, 2013), which may aid in reducing body dissatisfaction.

The current study had several limitations. First, we asked participants to fill out the daily diary question sets three times per day during certain windows of time without the use of random signals. Future investigations would benefit from collecting EMA data at random intervals, which would allow for in-the-moment assessment of participants' experiences. Second, participants evidenced relatively low grand means for social comparisons and body dissatisfaction assessed via the daily diary reports. These floor effects could have influenced the models/results in some way (e.g., decreased power, attenuated relationships between study variables; Shadish, Cook, & Campbell, 2002).²

² At T1 (i.e., online self-report questionnaire battery participants completed at the beginning of an academic semester), we assessed the constructs that were examined in the daily diary portion of the study via traditional self-report measures. Social comparison behavior, including body, eating, and exercise social comparison tendencies, was assessed using the 18-item Body, Eating, and Exercise Comparison Orientation Measure (BEECOM; Fitzsimmons-Craft, Bardone-Cone, & Harney, 2012), which yielded Body Comparison Orientation ($M = 31.26, SD = 7.20$), Eating Comparison Orientation ($M = 28.26, SD = 7.43$), and Exercise Comparison Orientation ($M = 22.97, SD = 8.03$) subscale scores (possible range = 6–42). Body dissatisfaction was assessed by the Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987; $M = 92.17, SD = 34.48$; possible range = 34–204), the Body Dissatisfaction subscale of the Eating Disorder Inventory (EDI-BD; Garner, Olmsted, & Polivy, 1983; $M = 31.94, SD = 10.22$; possible range = 9–54), and the Weight Concern and Shape Concern subscales of the Eating Disorder Examination–Questionnaire (EDE-Q; Fairburn & Beglin, 2008; $M = 2.67, SD = 1.53$; possible range = 0–6). These means were very similar to those reported in other samples of college women (e.g., Benas, Uhrlass, & Gibb, 2010; Fitzsimmons-Craft, Bardone-Cone, & Harney, 2012; Gordon, Castro, Sitnikov, & Holm-Denoma, 2010). That is, using traditional self-report measures, this sample was as symptomatic as other college samples, but their mean levels of several of the daily diary constructs were somewhat low (although with very wide standard deviations). It may have been that the methods used in the daily diary component of the study, including the use of visual analogue scales with a range of 0–100, contributed to this discrepancy.

Third, regarding the contemporaneous analyses, the possibility that social comparisons and body surveillance result from body dissatisfaction instead of triggering it cannot be ruled out. In terms of other future directions, the use of body dissatisfaction as our outcome variable of interest could be expanded upon. For example, future investigators might explore the influence of social comparison and body surveillance on the presence of driven exercise (i.e., a particular form of excessive exercise that has the following characteristics: subjective sense of being driven or compelled to exercise; giving exercise precedence over other activities; exercising even when it might do physical harm; Fairburn, 2008) and/or binge eating episodes that same day. It may also be important to examine whether engagement in more state-like social comparison or body surveillance behavior is most closely tied to body dissatisfaction for certain groups (e.g., overweight, highly perfectionistic, low self-esteem).

The current study extended research on social comparison and objectification theories and their relationship to body dissatisfaction using daily diary methods. Results suggest that body dissatisfaction is predicted by both trait- and state-like characteristics, with general tendencies to engage in body comparisons and body surveillance emerging as more potent trait-like predictors of body dissatisfaction than general tendencies to engage in eating or exercise comparisons. In contrast, many more state-like behaviors (i.e., body, eating, and exercise comparisons, body surveillance) are contemporaneously associated with body dissatisfaction, and over time, more state-like eating comparisons may be especially damaging in terms of their relationship to body dissatisfaction.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest.

References

- Aaron, L. A., Turner, J. A., Mancl, L., Brister, H., & Sawchuk, C. N. (2005). Electronic diary assessment of pain-related variables: Is reactivity a problem? *The Journal of Pain*, *6*, 107–115. <http://dx.doi.org/10.1016/j.jpain.2004.11.003>
- Bamford, B., & Halliwell, E. (2009). Investigating the role of attachment in social comparison theories of eating disorders within a non-clinical female population. *European Eating Disorders Review*, *17*, 371–379. <http://dx.doi.org/10.1002/erv.951>
- Bearman, S. K., Presnell, K., Martinez, E., & Stice, E. (2006). The skinny on body dissatisfaction: A longitudinal study of adolescent girls and boys. *Journal of Youth and Adolescence*, *35*, 229–241. <http://dx.doi.org/10.1007/s10964-005-9010-9>
- Benas, J. S., Uhrlass, D. J., & Gibb, B. E. (2010). Body dissatisfaction and weight-related teasing: A model of cognitive vulnerability to depression among women. *Journal*

- of Behavior Therapy and Experimental Psychiatry, 41, 352–356. <http://dx.doi.org/10.1016/j.jbtep.2010.03.006>
- Blowers, L. C., Loxton, N. J., Grady-Flessner, M., Occhipinti, S., & Dawe, S. (2003). The relationship between sociocultural pressure to be thin and body dissatisfaction in preadolescent girls. *Eating Behaviors*, 4, 229–244. [http://dx.doi.org/10.1016/S1471-0153\(03\)00018-7](http://dx.doi.org/10.1016/S1471-0153(03)00018-7)
- Breines, J. G., Crocker, J., & Garcia, J. A. (2008). Self-objectification and well-being in women's daily lives. *Personality and Social Psychology Bulletin*, 34, 583–598. <http://dx.doi.org/10.1177/0146167207313727>
- Calogero, R. M., Davis, W. N., & Thompson, J. K. (2005). The role of self-objectification in the experience of women with eating disorders. *Sex Roles*, 52, 43–50. <http://dx.doi.org/10.1007/s11199-005-1192-9>
- Campbell, D. T., & Stanley, J. C. (1963). *Experimental and quasi-experimental designs for research*. Boston: Houghton Mifflin.
- Cooper, P. J., Taylor, M. J., Cooper, Z., & Fairburn, C. G. (1987). The development and validation of the Body Shape Questionnaire. *International Journal of Eating Disorders*, 6, 484–494. [http://dx.doi.org/10.1002/1098-108X\(198321\)2:2<15::AID-EAT2260020203>3.0.CO;2-6](http://dx.doi.org/10.1002/1098-108X(198321)2:2<15::AID-EAT2260020203>3.0.CO;2-6)
- Desai, M. N., Miller, W. C., Staples, B., & Bravender, T. (2008). Risk factors associated with overweight and obesity in college students. *JOURNAL OF AMERICAN COLLEGE HEALTH*, 57, 109–114. <http://dx.doi.org/10.3200/JACH.57.1.109-114>
- Durkin, S. J., Paxton, S. J., & Sorbello, M. (2007). An integrative model of the impact of exposure to idealized female images on adolescent girls' body satisfaction. *JOURNAL OF APPLIED SOCIAL PSYCHOLOGY*, 37, 1092–1117. <http://dx.doi.org/10.1111/j.1559-1816.2007.00201.x>
- Engel, S. G., Wonderlich, S. A., Crosby, R. D., Mitchell, J. E., Crow, S., Peterson, C. B., ... Gordon, K. H. (2013). The role of affect in the maintenance of anorexia nervosa: Evidence from a naturalistic assessment of momentary behaviors and emotion. *JOURNAL OF ABNORMAL PSYCHOLOGY*, 122, 709–719. <http://dx.doi.org/10.1037/a0034010>
- Fairburn, C. G. (2008). *Cognitive behavior therapy and eating disorders*. New York: Guilford.
- Fairburn, C. G., & Beglin, S. (2008). Eating Disorder Examination Questionnaire (EDE-Q 6.0). In C. G. Fairburn (Ed.), *Cognitive Behavior Therapy and Eating Disorders* (pp. 309–313). New York: Guilford.
- Fairburn, C. G., Shafran, R., & Cooper, Z. (1998). A cognitive behavioral theory of anorexia nervosa. *Behaviour Research and Therapy*, 37, 1–13. [http://dx.doi.org/10.1016/S0005-7967\(98\)00102-8](http://dx.doi.org/10.1016/S0005-7967(98)00102-8)
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7, 117–140. <http://dx.doi.org/10.1177/001872675400700202>
- Fitzsimmons-Craft, E. E. (2011). Social psychological theories of disordered eating in college women: Review and integration. *Clinical Psychology Review*, 31, 1224–1237. <http://dx.doi.org/10.1016/j.cpr.2011.07.011>
- Fitzsimmons-Craft, E. E., & Bardone-Cone, A. M. (2014). One-year temporal stability and predictive and incremental validity of the Body, Eating, and Exercise Comparison Orientation Measure (BEECOM) among college women. *Body Image*, 11, 27–35. <http://dx.doi.org/10.1016/j.bodyim.2013.09.003>
- Fitzsimmons-Craft, E. E., Bardone-Cone, A. M., & Harney, M. B. (2012). Development and validation of the Body, Eating, and Exercise Comparison Orientation Measure (BEECOM) among college women. *Body Image*, 9, 476–487. <http://dx.doi.org/10.1016/j.bodyim.2012.07.007>
- Fitzsimmons-Craft, E. E., Harney, M. B., Koehler, L. G., Danzi, L. E., Riddell, M. K., & Bardone-Cone, A. M. (2012). Explaining the relation between thin ideal internalization and body dissatisfaction among college women: The roles of social comparison and body surveillance. *Body Image*. <http://dx.doi.org/10.1016/j.bodyim.2011.09.002>
- Forbes, G. B., Jobe, R. L., & Revak, J. A. (2006). Relationships between dissatisfaction with specific body characteristics and the Sociocultural Attitudes Toward Appearance Questionnaire-3 and Objectified Body Consciousness Scale. *Body Image*, 3, 295–300. <http://dx.doi.org/10.1016/j.bodyim.2006.07.003>
- Fredrickson, B. L., & Roberts, T. (1997). Objectification theory: Toward understanding women's lived experiences and mental health risks. *Psychology of Women Quarterly*, 21, 173–206. <http://dx.doi.org/10.1111/j.1471-6402.1997.tb00108.x>
- Fredrickson, B. L., Roberts, T., Noll, S. M., Quinn, D. M., & Twenge, J. M. (1998). That swimsuit becomes you: Sex differences in self-objectification, restrained eating, and math performance. *Journal of Personality and Social Psychology*, 75, 269–284. <http://dx.doi.org/10.1037/0022-3514.75.1.269>
- Garner, D. M. (2002). Body image and anorexia nervosa. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research, and clinical practice* (pp. 295–303). New York: Guilford.
- Garner, D. M., Olmsted, M. P., Bohr, Y., & Garfinkel, P. E. (1982). The Eating Attitudes Test: Psychometric features and clinical correlates. *Psychological Medicine*, 12, 871–878. <http://dx.doi.org/10.1017/S0033291700049163>
- Garner, D. M., Olmsted, M. P., & Polivy, J. (1983). The development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, 2, 15–34.
- Ghisletta, P., & Spini, D. (2004). An introduction to generalized estimating equations and an application to assess selectivity effects in a longitudinal study on very old individuals. *Journal of Educational and Behavioral Statistics*, 29, 421–437. <http://dx.doi.org/10.3102/10769986029004421>
- Gordon, K. H., Castro, Y., Sitnikov, L., & Holm-Denoma, J. M. (2010). Cultural body shape ideals and eating disorder symptoms among White, Latina, and Black college women. *Cultural Diversity and Ethnic Minority Psychology*, 16, 135–143.
- Heinberg, L. J., & Thompson, J. K. (1992). The effects of figure size feedback (positive vs. negative) and target comparison group (particularistic vs. universalistic) on body image disturbance. *International Journal of Eating Disorders*, 12, 441–448.
- Heron, K. E., Scott, S. B., Sliwinski, M. J., & Smyth, J. M. (2014). Eating behaviors and negative affect in college women's everyday lives. *International Journal of Eating Disorders*. Advance online publication <http://10.1002/eat.22292>
- Heron, K. E., & Smyth, J. M. (2013). Is intensive measurement of body image reactive? A two-study evaluation using ecological momentary assessment suggests not. *Body Image*, 10, 35–44. <http://dx.doi.org/10.1016/j.bodyim.2012.08.006>
- Kercher, K. (1992). Assessing subjective well-being in the old-old: The PANAS as a measure of orthogonal dimensions of positive and negative affect. *Research on Aging*, 14, 131–168. <http://dx.doi.org/10.1177/0164027592142001>
- King, M. B. (1989). Eating disorders in general practice population: Prevalence, characteristics and follow-up at 12 to 18 months. *Psychological Medicine, Monograph Suppl.*, 14, 1–34. <http://dx.doi.org/10.1017/S0264180100000515>
- King, M. B. (1991). The natural history of eating pathology in attenders to primary medical care. *International Journal of Eating Disorders*, 10, 379–387. <http://dx.doi.org/10.1002/>

- 1098-108X(199107)10:4b379::AID-EAT2260100402N3.0.CO;2-I
- Knauss, C., Paxton, S. J., & Alsaker, F. D. (2008). Body dissatisfaction in adolescent boys and girls: Objectified body consciousness, internalization of the media body ideal and perceived pressure from media. *Sex Roles, 59*, 633–643. <http://dx.doi.org/10.1007/s11199-008-9474-7>
- Leahey, T. M., & Crowther, J. H. (2008). An ecological momentary assessment of comparison target as a moderator of the effects of appearance-focused social comparisons. *Body Image, 5*, 307–311. <http://dx.doi.org/10.1016/j.bodyim.2008.03.002>
- Leahey, T. M., Crowther, J. H., & Ciesla, J. A. (2011). An ecological momentary assessment of the effects of weight and shape social comparisons on women with eating pathology, high body dissatisfaction, and low body dissatisfaction. *Behavior Therapy, 42*, 197–210. <http://dx.doi.org/10.1016/j.beth.2010.07.003>
- Leahey, T. M., Crowther, J. H., & Mickelson, K. D. (2007). The frequency, nature, and effects of naturally occurring appearance-focused social comparisons. *Behavior Therapy, 38*, 132–143. <http://dx.doi.org/10.1016/j.beth.2006.06.004>
- Le Grange, D., Gorin, A., Dymek, M., & Stone, A. (2002). Does ecological momentary assessment improve cognitive behavioural therapy for binge eating disorder? A pilot study. *European Eating Disorders Review, 10*, 316–328. <http://dx.doi.org/10.1002/erv.469>
- Liang, K. Y., & Zeger, S. L. (1986). Longitudinal data analysis using general linear models. *Biometrika, 73*, 13–22. <http://dx.doi.org/10.1093/biomet/73.1.13>
- Lin, L. F., & Kulik, J. A. (2002). Social comparison and women's body satisfaction. *Basic and Applied Social Psychology, 24*, 115–123.
- Lindner, D., Hughes, A., & Fahy, R. (2008). Eating pathology and social comparison in college females. *North American Journal of Psychology, 10*, 445–462.
- Mackinnon, A., Jorm, A. F., Christensen, H., Korten, A. E., Jacomb, P. A., & Rodgers, B. (1999). A short form of the Positive and Negative Affect Schedule: Evaluation of factorial validity and invariance across demographic variables in a community sample. *Personality and Individual Differences, 27*, 405–416. [http://dx.doi.org/10.1016/S0191-8869\(98\)00251-7](http://dx.doi.org/10.1016/S0191-8869(98)00251-7)
- Manning, W. G., Basu, A., & Mullahy, J. (2005). Generalized modeling approaches to risk adjustment of skewed outcomes data. *Journal of Health Economics, 24*, 465–488. <http://dx.doi.org/10.1016/j.jhealeco.2004.09.011>
- McCormack, H. M., Horne, D. J., & Sheather, S. (1988). Clinical applications of visual analogue scales: A critical review. *Psychological Medicine, 18*, 1007–1019. <http://dx.doi.org/10.1017/S0033291700009934>
- McKinley, N. M. (1998). Gender differences in undergraduates' body esteem: The mediating effect of objectified body consciousness and actual/ideal weight discrepancy. *Sex Roles, 39*, 113–123. <http://dx.doi.org/10.1023/A:1018834001203>
- McKinley, N. M., & Hyde, J. S. (1996). The Objectified Body Consciousness Scale: Development and validation. *Psychology of Women Quarterly, 20*, 181–215. <http://dx.doi.org/10.1111/j.1471-6402.1996.tb00467.x>
- Moradi, B., & Huang, Y. (2008). Objectification theory and psychology of women: A decade of advances and future directions. *Psychology of Women Quarterly, 32*, 377–398. <http://dx.doi.org/10.1111/j.1471-6402.2008.00452.x>
- Myers, T. A., & Crowther, J. H. (2009). Social comparison as a predictor of body dissatisfaction: A meta-analytic review. *Journal of Abnormal Psychology, 118*, 683–698. <http://dx.doi.org/10.1037/a0016763>
- Myers, T. A., Ridolfi, D. R., Crowther, J. H., & Ciesla, J. A. (2012). The impact of appearance-focused social comparisons on body image disturbance in the naturalistic environment: The roles of thin-ideal internalization and feminist beliefs. *Body Image, 9*, 342–351. <http://dx.doi.org/10.1016/j.bodyim.2012.03.005>
- Neighbors, L. A., & Sobal, J. (2007). Prevalence and magnitude of body weight and shape dissatisfaction among university students. *Eating Behaviors, 8*, 429–439. <http://dx.doi.org/10.1016/j.eatbeh.2007.03.003>
- Pearson, A. N., Heffner, M., & Follette, V. M. (2010). *Acceptance & commitment therapy for body image dissatisfaction*. Oakland, CA: New Harbinger.
- Presnell, K., Bearman, S. K., & Stice, E. (2004). Risk factors for body dissatisfaction in adolescent boys and girls: A prospective study. *International Journal of Eating Disorders, 36*, 389–401. <http://dx.doi.org/10.1002/eat.20045>
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods*. Thousand Oaks, CA: Sage.
- Rosen, J. C. (1997). Cognitive-behavioral body image therapy. In D. M. Garner & P. E. Garfinkel (Eds.), *Handbook of treatment for eating disorders* (pp. 188–201). (2nd ed.). New York, NY: Guilford.
- Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston, MA: Houghton Mifflin.
- Shafran, R., Lee, M., Payne, E., & Fairburn, C. G. (2007). An experimental analysis of body checking. *Behaviour Research and Therapy, 45*, 113–121. <http://dx.doi.org/10.1016/j.brat.2006.01.015>
- Shiffman, S. (2009). Ecological momentary assessment (EMA) in studies of substance abuse. *Psychological Assessment, 21*, 486–497. <http://dx.doi.org/10.1037/a0017074>
- Shiffman, S., Stone, A. A., & Hufford, M. R. (2008). Ecological momentary assessment. *Annual Review of Clinical Psychology, 4*, 1–32. <http://dx.doi.org/10.1146/annurev.clinpsy.3.022806.091415>
- Silberstein, L. R., Striegel-Moore, R. H., Timko, C., & Rodin, J. (1988). Behavioral and psychological implications of body dissatisfaction: Do men and women differ? *Sex Roles, 19*, 219–232. <http://dx.doi.org/10.1007/BF00290156>
- Stein, K. F., & Corte, C. M. (2003). Ecologic momentary assessment of eating-disordered behaviors. *International Journal of Eating Disorders, 34*, 349–360. <http://dx.doi.org/10.1002/eat.10194>
- Spitzack, C. (1990). *Confessing excess: Women and the politics of body reduction*. Albany, NY: State University of New York Press.
- Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta-analytic review. *Psychological Bulletin, 128*, 825–848. <http://dx.doi.org/10.1037//0033-2909.128.5.825>
- Stice, E., & Shaw, H. E. (2002). Role of body dissatisfaction in the onset and maintenance of eating pathology: A synthesis of research findings. *Journal of Psychosomatic Research, 53*, 985–993. [http://dx.doi.org/10.1016/S0022-3999\(02\)00488-9](http://dx.doi.org/10.1016/S0022-3999(02)00488-9)
- Stormer, S. M., & Thompson, J. K. (1996). Explanations of body image disturbance: A test of maturational status, negative verbal commentary, social comparison, and socio-cultural hypotheses. *International Journal of Eating Disorders, 19*, 193–202.
- Thompson, J. K., Heinberg, L. J., & Tantleff, S. (1991). The Physical Appearance Comparison Scale (PACS). *Behavior Therapist, 14*, 174.
- Tiggemann, M. (2013). Objectification theory: of relevance for eating disorder researchers and clinicians? *Clinical Psychologist, 17*, 35–45. <http://dx.doi.org/10.1111/cp.12010>

- Trottier, K., Polivy, J., & Herman, C. P. (2007). Effects of exposure to thin and overweight peers: Evidence of social comparison in restrained and unrestrained eaters. *Journal of Social and Clinical Psychology, 26*, 155–172. <http://dx.doi.org/10.1521/jscp.2007.26.2.155>
- Vohs, K. D., Heatherton, T. F., & Herrin, M. (2001). Disordered eating and the transition to college: A prospective study. *International Journal of Eating Disorders, 29*, 280–288. <http://dx.doi.org/10.1002/eat.1019>
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063–1070. <http://dx.doi.org/10.1037/0022-3514.54.6.1063>
- Zorn, C. J. W. (2001). Generalized estimating equation models for correlated data: A review with applications. *American Journal of Political Science, 45*, 470–490. <http://dx.doi.org/10.2307/2669353>
- Zuckerman, M., & O'Loughlin, R. E. (2006). Self-enhancement by social comparison: A prospective analysis. *Personality and Social Psychology Bulletin, 32*, 751–760. <http://dx.doi.org/10.1177/0146167205286111>

RECEIVED: August 30, 2013

ACCEPTED: September 11, 2014

Available online 18 September 2014