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Mechanisms of action during a dissonance-based intervention through 14-month follow-up: The roles of body shame and body surveillance

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Abstract

Objectification theory posits that internalization of societal perspectives about the female body leads to increased body surveillance, which can result in body-related shame and subsequent eating disorder (ED) behaviors. Preliminary research indicates that these associations may be complex in nature. This study examined temporal relations among body surveillance, body shame, and eating disorder symptoms in the context of a dissonance-based body image intervention and through 14-month follow-up. College women ($N = 285$) completed assessments at baseline, post-intervention, and at 8-week, 8-month, and 14-month follow-up. Cross-lag panel analyses revealed that changes in body surveillance significantly mediated the association between body shame and ED symptoms over time. Alternatively, body shame did not change over time and was not a significant mediator of associations between body surveillance and ED symptoms longitudinally. Results indicate that the ameliorative effects of dissonance-based interventions may be due to reductions in body surveillance, rather than decreased body shame.

Keywords

Dissonance-based interventions; objectification theory; body surveillance; intervention mechanism of action

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Conflict of Interest Statement

Dr. Becker is Co-Director of the Body Project Collaborative, which was created in 2012 to support dissemination and implementation of the *Body Project*. Dr. Kilpela serves as a trainer for the Body Project Collaborative.

Introduction

Derived from feminist theory, objectification theory proposes that society views women as sexual objects to be gazed upon and evaluated (Frederickson & Roberts, 1997; McKinley & Hyde, 1996). Internalization of frequent sexual objectification can result in self-objectification. Body surveillance, which has been described as the behavioral manifestation of self-objectification, (e.g., Fitzsimmons & Bardone-Cone, 2011; Lindberg, Hyde, & McKinley, 2006), refers to the process in which individuals monitor their own bodies and evaluate themselves against cultural standards of attractiveness. Perceived failure to comply with societal appearance standards can lead to body-related shame (Tylka & Sabik, 2010) or body dissatisfaction (Fitzsimmons & Bardone-Cone, 2011).

Objectification theory further postulates that two forms of psychological consequences of being sexually objectified (i.e., body surveillance and body shame or dissatisfaction) may increase risk for eating disorder (ED) behaviors. Specifically, women may engage in ED behaviors in response to sexual objectification and associated consequences in an attempt to achieve societal appearance ideals (Noll & Fredrickson, 1998; Roberts, 2015). Indeed, cross-sectional research indicates that body shame at least partially mediates the association between self-objectification (Calogero, Davis, & Thompson, 2005), or body surveillance (Moradi, Dirks, & Matteson, 2005; Tiggemann & Williams, 2012; Tylka & Hill, 2004) and disordered eating. Therefore, it is important to interrupt the processes of body surveillance and body shame in the context of ED prevention.

Preliminary research suggests that body surveillance and body dissatisfaction reciprocally influence one another temporally in Caucasian samples (Fitzsimmons & Bardone-Cone, 2011), which indicates that the relationship between the constructs highlighted by objectification theory may be complex. As such, additional research is needed to explore the roles of these constructs, including how reductions in these ED risk factors (e.g., body surveillance and body shame) may mediate intervention outcomes. To date, researchers primarily have observed associations between these constructs under naturalistic circumstances. Two studies (Becker, Hill, Greif, Han, & Stewart, 2013; Kroon Van Deist & Perez, 2013), however, have examined these associations longitudinally following the *Body Project* (*tBP*; Becker & Stice, 2008), a dissonance-based ED prevention intervention that utilizes discussion-based and behavioral activities designed to target thin-ideal internalization, with effects demonstrated on associated ED risk factors, including body surveillance and body dissatisfaction. Importantly, in both Becker et al. (2013) and Kroon Van Deist & Perez (2013), *tBP* reduced body surveillance; but did not improve body shame despite significant reductions in ED symptoms. Thus, the interplay of body shame, body surveillance, and ED symptoms in the context of an intervention is not fully understood.

The current study aimed to elucidate the roles of body surveillance and body shame as mechanisms of action in the context of an ED prevention program, *tBP*, through 14-month follow-up. Because preliminary research suggests that the relationships between ED risk factors described in objectification theory may be complex (Fitzsimmons & Bardone-Cone, 2011), we examined two separate mediation models of intervention effects of *tBP*. Specifically, one model examined body shame as a mediator of the relationship between

body surveillance and ED symptoms. The second tested body surveillance as a mediator of the relation between body shame and ED symptoms, in order to evaluate modification of these two established risk factors as potential mechanisms of action of *tBP*.

Method

This study is a secondary analysis of an investigation regarding peer-leader trainer type using a task-shifting/train-the-trainer strategy for *tBP* dissemination (Kilpela et al., 2014). We randomly assigned peer-leaders to receive *tBP* training either from lay trainers who had been trained-to-train by a doctoral-level trainer or by the doctoral-level trainer plus lay trainers. Participants were randomly assigned to *tBP* groups by peer-leader trainer type; all participants received the same manualized intervention. Trainer type did not significantly predict intervention response for virtually all variables. On only one measure (ED symptoms), doctoral-level trainer predicted accelerated change in 12.5% of participants, slower change in 22.3%, and 65.2% was unaffected by trainer type. Given lack of meaningful differences between conditions, we collapsed groups for the current study.

Participants

Participants were college women participating in sorority new member orientation over three consecutive years. Of the 354 eligible women, 297 participated in *tBP*, and 285 (95.9%) participated in the associated research study. Participants ranged from 18 to 21 years of age ($M = 18.71$, $SD = 0.74$), with a mean BMI of 22.16 ($SD = 3.22$). The majority (76.6%) self-identified as Caucasian, 12.7% identified as Hispanic, 3.9% as Asian, 1.8% as African American, 6.7% endorsed multiple races, and 5.7% did not respond.

Overview and Participant Flow

The study received Institutional Review Board approval. Study participation consisted of completing self-report questionnaires at baseline, post-intervention (1 week later), and at 8-week, 8-month, and 14-month follow-ups. Regarding retention, 80.4% completed post-intervention measures, 81.8% completed 8-week, 75.1% completed 8-month, and 63.5% completed 14-month follow-up. Participants received no compensation for their participation (see Kilpela et al., 2014 for details).

Intervention

We utilized the two session, 2-hour version of *tBP* administered by 2–3 peer-leaders. Session One activities included: voluntary commitment to participate; defining the societal thin-ideal versus the healthy ideal; origins, costs, and pressures to pursue the thin-ideal; challenging pressures; and a mirror exposure home exercise. Session Two activities included: mirror exposure homework review; role-plays challenging the thin-ideal; identification of and commitment to body activism outside of group; and a self-affirmation exit exercise (Becker & Stice, 2008).

Measures

Body Surveillance—We used the body surveillance subscale of the Objectified Body Consciousness Scale-Youth (OBCS-Y; Lindberg et al., 2006) to operationalize self-

objectification. The OBCS-Y was modeled after the classic OBCS (McKinley & Hyde, 1996), which is frequently used to operationalize components of objectification theory (e.g., Becker et al., 2013; Fitzsimmons & Bardone-Cone, 2011; Tylka & Hill, 2004). The OBCS-Y has been validated in college samples (Lindberg et al., 2006 $\alpha = .89$), but is shorter and reduces participant burden. The body surveillance subscale includes four items (e.g., “I often compare how I look with how other people look”) rated on a scale from 1 (strongly disagree) to 7 (strongly agree), with an option to indicate that an item does not apply. Higher scores indicate greater surveillance. Internal consistency for the subscale was good ($\alpha = .85$) and comparable to the longer version.

Body Shame—We used the body shame subscale of the OBCS-Y, which includes five items (e.g., “I would be ashamed for people to know what I really weigh”) rated and scored on the same 7-point scale. Internal consistency for this subscale is adequate in college samples (Lindberg et al., 2006 $\alpha = .70$; current sample $\alpha = .83$) and comparable to the classic version.

Eating disorder symptoms—We used the Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 1994) global score to operationalize ED symptoms. The EDE-Q is a self-report measure of eating behaviors and attitudes over the past 28 days, with good internal consistency ($\alpha = .92$; current sample $\alpha = .79$) and test-retest reliability ($r = .90$; Stice, Shaw, Burton, & Wade, 2006).

Analytic Strategy

All analyses were conducted in SPSS® Version 20. To examine the longitudinal mediation models, we conducted cross-lagged panel analyses utilizing data from all time points. Analyses were conducted using multi-level modeling (MLM), with repeated measures (level 1) nested within participants (level 2). We used restricted maximum-likelihood estimation, and the covariance of the errors was modeled as autoregressive [AR(1)]. In keeping with recent studies that have examined the roles of body shame and surveillance in eating pathology (e.g., Trindade & Ferreira, 2015; Webb, Fiery, & Jafari, 2016), we included body mass index (BMI) as a covariate in all analyses.

Cross-lag panel analysis provides a more stringent test of temporal relations among variables and is considered one of the most effective methods for determining the direct effects and reciprocal relations among variables over time (Tschacher & Ramseyer, 2009). At Level 1, the outcome variable at each time point (t) was predicted by baseline BMI and two to three time-varying predictors. For example, when testing the b and c' paths (see Figure 1), the following variables were included in the model to predict ED symptoms at each time point: (1) BMI at baseline, (2) ED symptoms at the previous assessment ($t-1$), (3) the mediator at the previous assessment ($t-1$), and (4) the independent variable at two time points prior ($t-2$). Including the outcome at $t-1$ as an additional predictor allowed us to control for the potential influence of prior levels of the outcome on the outcome at t and the mediator at $t-1$.

Objectification theory mediation model:

$$c_1 \text{ path: } Y(\text{ED Symptoms}_t) = \beta_0 + \beta_1 * (\text{BMI}_{\text{BL}}) + \beta_2 * (\text{ED Symptoms}_{t-1}) + \beta_2 * (\text{Body Surveillance}_{t-2}) + \epsilon$$

$$a_1 \text{ path: } Y(\text{Body Shame}_{t-1}) = \beta_0 + \beta_1 * (\text{Body Surveillance}_{t-2}) + \beta_2 * (\text{BMI}_{\text{BL}}) + \epsilon$$

$$b_1 \text{ and } c'_1 \text{ paths: } Y(\text{ED Symptoms}_t) = \beta_0 + \beta_1 * (\text{BMI}_{\text{BL}}) + \beta_2 * (\text{ED Symptoms}_{t-1}) + \beta_3 * (\text{Body Surveillance}_{t-2}) + \beta_4 * (\text{Body Shame}_{t-1}) + \epsilon$$

Reverse mediation model:

$$c_2 \text{ path: } Y(\text{ED Symptoms}_t) = \beta_0 + \beta_1 * (\text{BMI}_{\text{BL}}) + \beta_2 * (\text{ED Symptoms}_{t-1}) + \beta_2 * (\text{Body Shame}_{t-2}) + \epsilon$$

$$a_2 \text{ path: } Y(\text{Body Surveillance}_{t-1}) = \beta_0 + \beta_1 * (\text{Body Shame}_{t-2}) + \beta_2 * (\text{BMI}_{\text{BL}}) + \epsilon$$

$$b_2 \text{ and } c'_2 \text{ paths: } Y(\text{ED Symptoms}_t) = \beta_0 + \beta_1 * (\text{BMI}_{\text{BL}}) + \beta_2 * (\text{ED Symptoms}_{t-1}) + \beta_3 * (\text{Body Shame}_{t-2}) + \beta_4 * (\text{Body Surveillance}_{t-1}) + \epsilon$$

We used the distribution of products test to determine the significance of the joint mediated $a*b$ pathway (MacKinnon, Fairchild, & Fritz, 2007). If the 95% confidence interval (CI) for the product of the regression coefficients of the two pieces of the mediated pathway (i.e., $a*b$) does not include 0, the mediated pathway is statistically significant (MacKinnon, Lockwood, & Williams, 2004). We used proportion mediated (PM; Shrout & Bolger, 2002) to estimate the effect size of the mediated pathway, using the formula $(a*b)/c$.

Results

Preliminary Analyses

Table 1 includes baseline correlations, as well as means and standard deviations at each time point. MLM analyses controlling for BMI and baseline levels of each dependent variable revealed that, over the course of the intervention and follow-up, there were significant improvements in ED symptoms ($b = -0.33$, $t(725) = -8.65$, $p < .001$) and body surveillance ($b = -0.27$, $t(731) = -7.31$, $p < .001$), but not body shame ($b = 0.03$, $t(738) = 0.97$, $p = .333$).

Body Shame as a Mediator

We conducted cross-lagged panel analyses in MLM to examine each path of the mediation model, controlling for baseline BMI, with ED symptoms at $t-1$ as a control variable for paths including ED symptoms (i.e., c , b , and c' paths). Although there was no significant change in body shame (indicating that it was not the mechanism of change), we evaluated this model for the purpose of fully examining relations among variables. Over time, body surveillance ($t-2$) significantly predicted subsequent ED symptoms (t): $b = 0.16$, $t(397) = 3.57$, $p < .0001$ (c_1 path). Body surveillance ($t-2$) did not predict subsequent levels of body shame ($t-1$): $b = 0.07$, $t(618) = 1.76$, $p = .078$ (a_1 path). Body shame ($t-1$) significantly predicted subsequent ED symptoms (t): $b = 0.15$, $t(396) = 3.37$, $p = .001$ (b_1 path). When accounting for the indirect effect of body shame ($t-1$), the association between body surveillance ($t-2$) and ED symptoms (t) remained significant: $b = 0.15$, $t(423) = 3.12$, $p = .002$ (c'_1 path). This mediation model was not significant (95% CI: -0.001 , 0.026), and body

shame mediated 6.6% of the effect of body surveillance on subsequent ED symptoms longitudinally.

Body Surveillance as Mediator (Figure 1)

Across the intervention and 14-month follow-up, body shame ($t-2$) significantly predicted subsequent ED symptoms (t): $b = 0.11$, $t(314) = 2.46$, $p = .014$ (c_2 path). In our examination of the indirect path, body shame ($t-2$) significantly predicted subsequent body surveillance ($t-1$): $b = 0.19$, $t(596) = 4.91$, $p < .001$ (a_2 path); and body surveillance ($t-1$) significantly predicted subsequent ED symptoms (t): $b = 0.10$, $t(361) = 2.05$, $p = .041$ (b_2 path). When accounting for the indirect effect of body surveillance ($t-1$), the association between body shame ($t-2$) and ED symptoms (t) was no longer significant: $b = 0.09$, $t(337) = 1.88$, $p = .060$ (c'_2 path). The mediation model was statistically significant (95% CI: 0.001, 0.040), with body surveillance mediating 17.5% of the effect of body shame on subsequent ED symptoms over time.

Discussion

This study examined the roles of body shame and body surveillance in the context of *tBP*. Results indicated that body shame did not account for the relationship between body surveillance and subsequent levels of ED symptoms throughout *tBP* and 14-month follow-up. Alternatively, levels of body surveillance significantly mediated the relation between body shame and subsequent ED symptoms, even when controlling for BMI and previous ED symptom severity. These findings, in conjunction with prior research on *tBP* and body shame (Becker et al., 2013; Kroon Van Deist & Perez, 2013), indicate that while body surveillance and ED symptoms improve following *tBP* participation, body shame appears to remain unaffected. Therefore, the evidence to date suggests that *tBP* does not intervene on body shame, and that despite the strong association between body shame and ED symptoms, reductions in body shame are not necessary for reducing ED symptoms. Instead, it appears that *tBP* may interrupt the cycle described in objectification theory by intervening on body surveillance, rather than on body shame.

Although these findings generally emphasize the role of body surveillance in reducing ED symptoms following *tBP*, there are some considerations relevant to this interpretation. First, findings regarding body shame may be unique to dissonance-based interventions. For instance, both a 3-week self-compassion meditation training (Albertson, Neff, & Dill-Shackleford, 2014) and a 6-week cognitive-behavioral body image intervention (Cassone, Lewis, & Crisp, 2016) demonstrated reductions in OBCS body shame scores at post-intervention. Thus, the OBCS body shame subscale may tap into a dimension of body shame better targeted by alternative intervention strategies. It is important to note, however, that neither study included long-term follow-up nor conducted mediational analyses.

Notably, conclusions from this study are limited by some methodological considerations. For example, the lack of an assessment-only control group prohibited examination of the temporal relations among variables under natural conditions as a comparison. Although preliminary evidence for complex relationships between ED risk factors exists (Fitzsimmons & Bardone-Cone, 2011), we did not examine reciprocity among the risk factors in this study.

Thus, reciprocity among these constructs in the context of *tBP* is unknown. Additionally, we only utilized self-report measures; replication efforts should employ a range of assessment methodologies. Although circumstances outside of the current study influenced attrition rates (Kilpela et al., 2014), we observed higher attrition at 14-month follow-up. Future research also should incorporate diverse populations to increase generalizability. Finally, body shame scores were low in the current study, indicating potential floor effects.

Overall, this longitudinal investigation enhances understanding of the roles of body shame and body surveillance in response to a dissonance-based intervention through 14-month follow-up. Over time, body surveillance mediated the association between body shame and subsequent ED symptoms. This study suggests that further investigation into the mechanistic roles of key constructs in objectification theory could inform intervention development and refinement in important ways.

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Highlights

- Body surveillance and body shame likely impact one another in a cyclical fashion
- Body Project mechanisms of action relevant to objectification theory are unknown
- Cross-lag panel analysis supported body surveillance as a mechanism of change
- The Body Project may interrupt this cycle by intervening on body surveillance

Figure 1.

Cross-lagged mediation model. (Coefficient b , standard error); BL = assessed at baseline; t = any assessment point following post-intervention (i.e., 8-week follow-up, 8-month follow-up, 14-month follow-up); $t-1$ = assessment point immediately prior to t (i.e., post-intervention, 8-week follow-up, 8-month follow-up); $t-2$ = two assessment points prior to t (i.e., baseline, post-intervention, 8-week follow-up); $*** p < .00001$; $* p < .05$; $ns = p > .05$.

Table 1
Means, Standard Deviations, and Correlations of Main Study Variables at Each Assessment

	Baseline Correlations				Mean (SD)			
	Body surveillance	Body shame	ED symptoms		BL (0)	PTx (1)	8-wk (8)	8-mo (32)
								14-mo (56)
Body mass index (BMI)	.07	.25**	.29**		22.24 (3.33)	--	--	--
Body surveillance (OBCS-Y)	--	.49**	.41**		5.01 (1.22)	4.62 (1.15)	4.51 (1.23)	4.71 (1.10)
Body shame (OBCS-Y)	--	--	.61**		2.92 (1.30)	2.70 (1.20)	3.03 (1.31)	3.02 (1.31)
ED symptoms (EDE-Q)	--	--	--		1.62 (1.46)	1.28 (1.53)	0.94 (1.30)	1.05 (1.73)

Note: SD = standard deviation; BL = baseline; PTx = post-intervention; (#) = weeks since baseline; BMI = body mass index; OBCS-Y = Objectified Body Consciousness Scale - Youth (Lindberg et al., 2006); EDE-Q = Eating Disorder Examination Questionnaire (Fairburn & Beglin, 1994);

** indicates $p < .01$.