

THE IMPORTANCE OF BODY IMAGE CONCERNS IN OVERWEIGHT AND
NORMAL WEIGHT INDIVIDUALS WITH BINGE EATING DISORDER

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ABSTRACT

Body image concerns in Binge Eating Disorder (BED) have been examined almost exclusively in overweight individuals with BED. The current study extends past research by including overweight and normal weight BED and non-BED groups to assess the multifactorial construct of body image using subscales of the Eating Disorder Examination 16.0 (EDE-16.0) and a Body Comparison Task. Independent of weight status and when controlling for age and race, women with BED are distinguished from those without BED by significantly greater overvaluation of shape and weight on the EDE -16.0 and significantly reduced weight satisfaction after a Body Comparison Task. Both BED diagnosis and weight status were independently associated with weight and shape concern subscales on the EDE-16.0. Taken together, these data provide further support for the consideration of body image concerns in the diagnostic criteria for BED.

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CHAPTER 1

INTRODUCTION

Binge Eating Disorder (BED) is found in 2-3.5% of individuals worldwide (Kessler et al., 2013). BED involves repeated objective overeating with a sense of loss of control. The current Diagnostic and Statistical Manual for Mental Disorders-5 (DSM-5) (American Psychiatric Association [APA], 2013) diagnosis of BED does not include a criterion regarding body image concerns (Ahrberg, Trojca, Nasrawi, & Vocks, 2011). This is in contrast to the diagnostic criteria for both Anorexia Nervosa (AN) and Bulimia Nervosa (BN) which include a requirement for individuals to place excess value on their perceived shape and weight when considering their overall self-concept, i.e., overvaluation of shape and weight (Mond & Hay, 2011). Likely due to the association between regular binge eating and weight gain over time (Fairburn, Cooper, Doll, Norman, & O'Connor, 2000), individuals with BED tend to be overweight, making it challenging to determine whether body image concerns are a feature of the psychology of BED or a function of overweight status.

Although not included in DSM-5 diagnostic criterion, body image concerns are clearly relevant for individuals with BED. Body image concerns are comprised of three components: behavioral, perceptual and cognitive-affective. The behavioral component refers to body-related checking or avoidance, and the perceptual component refers to distortions in how one views their body (Slade, 1994). The cognitive-affective component refers to overvaluation of shape and weight and body dissatisfaction. Overvaluation of shape and weight refers to a stable influence of shape and weight on one's self-concept (Fairburn, Cooper & O'Connor, 2008). Body dissatisfaction refers to

negative attitudes, judgments and evaluations of one's body that tend to vary based on mood or shape or weight changes (Cash, Counts, & Huffine, 1990; Mond & Hay, 2011). Thus, overvaluation of shape and weight and body dissatisfaction are related, but distinct concepts.

Overvaluation of shape and weight reliably distinguishes overweight individuals with and without BED (Goldschmidt et al., 2010; Grilo, Masheb, & White, 2010; Grilo et al., 2009; Grilo, White, Gueorguieva, Wilson, & Masheb, 2013; Harrison, Mond, Rieger, Hay, & Rodgers, 2015). In BED, overvaluation of shape and weight is strongly related to severity of ED, severity of depressive symptoms and poor treatment response (Grilo, Ivezaj, & White, 2015; Grilo et al., 2013; Hilbert et al., 2007). Individuals with BED may also experience greater body dissatisfaction than individuals without BED (Eldredge & Stewart, 1996; Svaldi, Caffier, Blechert, & Tuschen-Caffier, 2009). However, findings on body dissatisfaction within BED samples are not consistent (Fichter, Quadflieg, & Brandl, 1993), which may be due to the conflation of diagnostic status with weight status in BED. Research suggests that overvaluation of shape and weight is specific to EDs (Wilfley, Schwartz, Spurrell & Fairburn, 2000), regardless of one's weight status. Conversely, body dissatisfaction is common in women independent of ED diagnosis and across weight status, with studies showing that up to 63% of women with and without EDs across the spectrum of weight categories experience body dissatisfaction (Frederick, Peplau, & Lever, 2006). However, overweight women still tend to exhibit elevated levels of body dissatisfaction compared to normal weight women (Annis, Cash, & Hrabosky, 2004; Hill & Williams, 1998; Neighbors & Sobal, 2007; Weinberger, Kersting, Riedel-Heller, & Luck-Sikorski, 2016).

Body dissatisfaction has been extensively studied using self-report and interview measures, but has been less explored using body comparison paradigms in BED samples. Among women with elevated ED symptoms, body comparison to slender bodies results in greater self-defeating perceptions of one's body (Corning, Krumm, & Smitham, 2006), compared to images of average-size models, plus-size models and inanimate objects (Groesz, Levine, & Murnen, 2002). Furthermore, overweight women with BED do not differ from normal weight women with BN in the frequency of negative cognitions about their shape and weight, but reported significantly more negative cognitions than normal weight non-BED women during a body exposure task (Hilbert & Tuschen-Caffier, 2005). These findings suggest an effect of ED pathology on body dissatisfaction when induced by body comparison that is independent of weight.

To date, the examination of body image concerns in BED has occurred almost exclusively in overweight groups. To our knowledge, only one study has taken into account different weight categories among BED. It was found that a normal weight BED group had significantly lower weight concerns relative to a very obese BED group (Dingemans & van Furth, 2012). However, this study did not include non-BED control groups. Thus, the current study aims to disentangle the contributions of BED diagnostic status and weight status by comparing overweight and normal weight BED and non-BED groups on overvaluation of shape and weight, shape and weight concerns more generally, and assesses weight (body) satisfaction prior to and following a Body Comparison Task.

As overvaluation of shape and weight distinguishes BED from non-BED (Grilo et al., 2008), we hypothesized that (a) the BED group would report significantly greater overvaluation of shape and weight relative to the non-BED group. We also hypothesized

an interaction between BED diagnostic status and Weight status on the Weight Concern and Shape Concern subscales of the Eating Disorder Examination-16.0 (EDE – 16.0) (Fairburn et al., 2008), such that (b) overweight women with BED would report the greatest scores on the Weight Concern and Shape Concern subscales of the EDE – 16.0, followed by normal weight BED, overweight non-BED and normal weight non-BED. Finally, we hypothesized that (c) the BED group would show lower baseline weight satisfaction and greater decreases in weight satisfaction in response to the Body Comparison Task relative to the non-BED group.

CHAPTER 2

METHOD

Participants

Female participants were recruited into one of four groups: overweight BED, overweight non-BED, normal weight BED and normal weight non-BED. For the purposes of categorizing individuals within the current study, BMI guidelines from the World Health Organization (WHO, 1995) were used to classify participants as overweight ($BMI \geq 25.0$) or normal weight (BMI between 18.5 and 24.9). It should be noted that BMI is not indicative of levels of body fat (WHO, 1995) and is imperfect at categorizing diverse samples. However, information on BMI is easy to collect and calculate, and is an anthropometric measurement that is common among large, population based survey datasets (e.g., the Behavioral Risk Factor Surveillance System, WHO World Mental Health Surveys).

One hundred and eighty-nine BED and non-BED participants were invited to participate in the current study from ongoing studies within the laboratory. Recruitment involved online advertisements and flyer advertisements in the community. Advertisements for BED and non-BED were identical with the exception of the question “Do you binge eat?” on advertisements targeting BED participants. Recruitment yielded a total of 1,445 telephone screens to determine preliminary eligibility. Of the 189 potential participants invited to participate in the current study, 32 participants were excluded due to meeting criteria for an eating disorder other than BED or endorsement of binge eating that did not meet DSM-5 BED criteria (APA, 2013). Of the remaining participants, 59 were not interested or did not respond. The final sample consisted of 30 overweight

women with BED, 28 overweight non-BED women, 21 normal weight women with BED, and 19 normal weight non-BED women.

Sample Description

The mean age of participants was 31.10 years and the sample was predominately non-Hispanic/Latino (96.9%). Nearly half of the sample self-identified as Caucasian ($n = 48$; 49.0%), followed by African American ($n = 39$, 39.8%), Asian ($n = 8$; 8.2%) and Hispanic ($n = 3$, 3.1%). See Table 1 for a summary of demographic information across each of the BED status by weight groups.

Table 1. Demographic information of Overweight Binge Eating Disorder (BED), Normal weight BED, Overweight non-BED and Normal weight non-BED.

		Overweight BED	Normal Weight BED	Overweight non-BED	Normal Weight non-BED
Caucasian	%	33.30%	66.70%	32.10%	78.90%
African-American	%	63.30%	9.50%	64.30%	0%
Asian	%	0%	23.80%	0.00%	15.80%
Hispanic/Latino	%	3.30%	0%	3.60%	5.30%
Age	<i>M (SD)</i>	36.98 (11.36)	23.14 (3.37)	36.11 (12.54)	23.19 (7.39)
BMI	<i>M (SD)</i>	33.99 (5.37)	22.67 (1.82)	30.28 (4.01)	21.51 (1.93)

Power Analysis

Previous research suggests that the effect size for overvaluation of shape and weight, shape concern and weight concern are large for comparisons between BED and non-BED groups (Grilo et al., 2008). Power analyses conducted using GPower (Faul, Erdfelder, Lang & Buchner, 2007) revealed that a total sample size of 68, i.e., 17 per group (power = .90 for $f = .40$, given $\alpha = .05$), was sufficient to detect a large effect size for each outcome measure.

Procedure

The present study was reviewed and approved by the university institutional review board and took place over two separate testing sessions as part of a larger study. After screening for eligibility and obtaining consent, participants completed an online battery of self-report questionnaires. In the first session, eating pathology, mood and personality disorders were assessed by doctoral-level clinicians using the measures described below. Diagnoses were confirmed at a weekly best-estimate meeting with a licensed clinical psychologist (Klein, Ouimette, Kelly, Ferro & Riso, 1994; Kosten & Rounsaville, 1992). Height and weight were measured to calculate BMI. During the second session, participants completed a 10-minute Body Comparison Task administered by doctoral-level clinicians.

Measures

Demographic data survey. An abbreviated version of the Demographic Data Scale (DDS) (Linehan, 1982), a self-report questionnaire, was used to collect demographic information, such as age and sex.

Psychiatric disorders. The Structured Clinical Interview for the DSM IV-Text Revision (DSM-IV-TR) Axis-I disorders (SCID-I) (First, Spitzer, Gibbon, & Williams, 2002) was conducted with all participants by a team of doctoral-level clinicians.

Eating disorder examination-16.0. The EDE-16.0 (Fairburn, Cooper, & O'Connor, 2008) is an interviewer based, semi-structured interview that assesses behavioral features of EDs (e.g., frequency of binge eating episodes and compensatory behaviors) as well as cognitions associated with EDs (e.g., have you criticized yourself as a person for being the shape or weight that you are?). The EDE-16.0 was used to diagnose BED, as defined by the DSM-5 (APA, 2013), as well as to examine the individual subscales with reference to body image. In a study that examined the interrater and test-retest reliability of the EDE in a sample of adult patients with BED, the EDE-16.0 shows both good interrater and test-retest reliability for the EDE total score (Grilo, Masheb, Lozano-blanco, & Barry, 2004). In the current study, the EDE total score demonstrated an internal consistency of $\alpha = .93$.

Shape and weight overvaluation, or the importance of shape and weight on one's self-evaluation, was assessed using an average score of two questions that assess shape overvaluation and weight overvaluation from the EDE-16.0 (Fairburn et al., 2008), as in previous studies (Goldschmidt et al., 2010; Grilo et al., 2008). In the current study, the correlation between the importance of shape and importance of weight questions was $r = .93$.

The weight concern and shape concern subscales from the EDE-16.0 (Fairburn et al., 2008) were used to assess body dissatisfaction. The weight concern subscale consists of 5 items that assess preoccupation with weight or shape, desire to lose weight,

overvaluation of shape and weight, emotional reaction to prescribed weighing, and dissatisfaction with weight. The shape concern subscale consists of 8 items that assess a desire for a flat stomach, overvaluation of shape and weight, preoccupation with weight or shape, fear of weight gain, feelings of fatness, importance of shape in self-evaluation, dissatisfaction with shape, discomfort viewing or exposing one's body to scrutiny. Overvaluation of shape and weight questions were excluded from the subscale scores, as these were analyzed separately (Grilo et al., 2008). In the current study, the internal consistency of the weight concern subscale was $\alpha = .76$ and the internal consistency of the shape concern subscale was $\alpha = .91$.

Body Comparison Task

The Body Comparison Task was presented on a laptop using E-Prime 2.0 software (Psychology Software Tools, 2012). Immediately prior to the Body Comparison Task, participants were asked to rate "How satisfied do you feel about your weight right now?" on a visual analogue scale that ranged from "Not at all satisfied" (0) to "Completely satisfied" (460). Body comparison was induced using the presentation of 20 images of slim female bodies dressed in clothing that revealed their shape (Friederich et al., 2007). Previous research has found these images to be associated with decreased weight satisfaction as well as increased shape and weight concern in non-BED, normal weight women (Friederich et al., 2007). While viewing each image, participants listened to a recording that instructed: "When you look at this picture, please compare your body to the body of this model." After viewing each image, participants were asked to rate weight satisfaction using the same scale as at baseline. Ratings obtained after each of the 20 images were averaged to create a composite score.

Statistical treatment

Baseline 2 x 2 ANOVA of age and chi-square test for race were conducted to determine whether inclusion of these variables as covariates were necessary. For analyses where race or age was included as covariates, ANCOVAs were examined in lieu of ANOVAs. For these analyses, race was dummy coded as four variables (African-American 0/1, Asian 0/1, Hispanic 0/1, Caucasian 0/1). Caucasian was then used as the reference group and the other three race variables of African-American, Asian and Hispanic were entered simultaneously into the relevant ANCOVAs.

For all analyses, independent variables were BED status (BED or non-BED) and Weight Status (overweight or normal weight). A repeated measures Time x BED x Weight Status ANCOVA was conducted with weight satisfaction as the dependent variable. Three separate 2x2 ANCOVAs were conducted with (1) overvaluation of shape and weight, (2) weight concern and (3) shape concern as dependent variables¹. If interactions were significant, simple effects analyses were conducted to probe interactions. To correct for multiple comparisons, a Bonferroni-adjusted p -value of .0125 (.05/4) was used to determine significance. Partial η^2 was used to report effect sizes for the ANCOVAs, with the following cut-off conventions: small (.01), medium (.06) and large (.14) (Cohen, 1988). Confidence intervals were calculated based on Wuensch (2012). To explore whether the inclusion of age and race as covariates influenced the effect of BED and Weight Status on study variables, post-hoc analyses were conducted without the inclusion of covariates.

CHAPTER 3

RESULTS

Preliminary Analyses

Age and race were examined as potential covariates. A 2x2 ANOVA indicated that overweight individuals ($M = 36.56$, $SD = 11.85$) were older than normal weight individuals ($M = 23.17$, $SD = 5.57$) ($F_{(1,94)} = 43.18$, $p < .001$). The main effect of BED and the interaction of BED x Weight Status were not significant (both $p > .821$). A chi-square test indicated that there was a greater proportion of African Americans relative to all other races in the overweight (63.79%) than normal weight groups (5.0 %) ($\chi^2_{(3)} = 39.87$, $p < .001$). There were no significant race differences in the BED versus non-BED groups ($p = .825$). Therefore, age and race were controlled for in all subsequent analyses.

Exploratory, Pearson correlations were conducted to clarify associations between study variables among BED and non-BED (see Table 2). Among BED, all study measures were correlated, such that decreased weight satisfaction during the Body Comparison Task was significantly, positively associated with weight concern, shape concern and overvaluation of shape and weight ($ps < .001$ to $ps = .008$). When examining correlations between measures among the non-BED group, overvaluation of shape and weight, weight concern and shape concern were significantly and positively associated with each other ($ps < .001$ to $ps = .003$) but not with decreased weight satisfaction during the Body Comparison Task ($ps = 0.110$ to $ps = .691$).

A Fisher r-to-z transformation was conducted to examine significant differences in correlation coefficients between BED and non-BED (Meng, Rosenthal, & Rubin, 1992). Between BED and non-BED samples, the correlations between changes in weight

satisfaction from the Body Comparison Task with overvaluation of shape and weight ($p < .001$) and weight concerns ($p = .018$) were significantly stronger for BED than non-BED. The correlation coefficients were not significantly different between BED and non-BED for changes in weight satisfaction from the Body Comparison Task with shape concerns ($p = .114$), weight concerns with shape concerns ($p = .569$) or overvaluation of shape and weight with weight concerns ($p = .246$) or shape concerns ($p = .332$).

Table 2. Correlations between Overvaluation of Shape and Weight, Weight Concern, Shape Concern and Change in Weight Satisfaction in Binge Eating Disorder (BED) and non-BED.

	Binge Eating Disorder				non-Binge Eating Disorder			
	Shape and Weight Overvaluation	Weight Concern	Shape Concern	Change in Weight Satisfaction	Shape and Weight Overvaluation	Weight Concern	Shape Concern	Change in Weight Satisfaction
Shape and Weight Overvaluation	1	.41**	.58**	-.46**	1	.59**	.43**	.24
Weight Concern	--	1	.85**	-.41**	--	1	.88**	.06
Shape Concern	--	--	1	-.38**	--	--	1	-.07
Change in Weight Satisfaction	--	--	--	1	--	--	--	1

** $p < 0.01$

Clinical Characteristics

Participants with BED reported an average of 2.82 ($SD = 4.05$) episodes of binge eating per week for the preceding three months. There were no significant difference in binge frequencies between normal weight ($M = 2.04$, $SD = 1.72$) and overweight BED ($M = 2.69$, $SD = 1.97$) ($F_{(1, 49)} = 1.79$, $p = .197$). Of the participants with BED, 23 had co-occurring psychiatric disorders: 10 with a lifetime history of mood disorders, 5 with current (past month) mood disorders, 2 with a lifetime history of anxiety disorder, 9 with current anxiety disorder and 2 with a lifetime history of substance abuse. Participants within the non-BED comparison group reported no episodes of binge eating and no lifetime history of psychiatric disorders.

Eating Disorder Examination

See Table 3 for means and standard deviations of study variables for overweight BED, normal weight BED, overweight non-BED and normal weight non-BED.

Shape and weight overvaluation. On the composite measure of shape and weight overvaluation from the EDE-16.0 (Fairburn et al., 2008), a 2x2 ANCOVA revealed a significant main effect of BED for overvaluation of shape and weight ($p < .001$) (see Table 4), such that regardless of weight status, BED exhibited greater overvaluation of shape and weight relative to the non-BED group. There was no main effect of Weight Status or interaction between BED and Weight Status ($ps > .346$).

Weight concern and shape concern. A 2x2 ANCOVA on the EDE Weight Concern subscale revealed significant main effects of BED and Weight Status ($ps < .001$) (see Table 4). A 2x2 ANCOVA on the EDE Shape Concern subscale also revealed significant main effects of BED and Weight Status ($ps < .001$) (see Table 4). The

interaction of BED and Weight Status was not significant for either Weight Concern or Shape Concern ($ps > .679$). Both BED and being overweight were independently associated with greater Weight Concern and Shape Concern.

Table 3. Descriptive statistics on study measures for Overweight Binge Eating Disorder (BED), Normal weight BED, Overweight non-BED and Normal weight non-BED.

Measure	Overweight BED	Normal Weight BED	Overweight non-BED	Normal Weight non- BED
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Eating Disorder Examination				
Shape and weight overvaluation	2.90 (1.84)	3.25 (1.78)	1.25 (2.00)	0.76 (2.10)
Weight Concern	3.95 (1.55)	2.68 (1.63)	1.16 (1.30)	0.14 (0.32)
Shape Concern	3.25 (1.39)	2.38 (1.53)	1.34 (1.35)	0.38 (0.27)
Body Comparison Task				
Weight Satisfaction at Baseline	177.00 (86.35)	203.33 (74.05)	220.71 (87.72)	299.47 (81.75)
Weight Satisfaction at Body Comparison	94.07 (91.44)	159.24 (95.71)	223.76 (125.19)	308.80 (93.09)

Table 4. Main effects of Binge Eating Disorder diagnosis and Weight Status on Shape Concern, Weight Concern and Shape and Weight Overvaluation

<u>Main effect of BED</u>					
Measure	BED	non-BED	<i>F</i>	Partial η^2	90% CI for partial η^2
	<i>M (SD)</i>	<i>M (SD)</i>			
Shape Concern	3.42 (1.69)	.74 (1.13)	87.93**	.50	[.38, .59]
Weight Concern	2.88 (1.50)	.95 (1.14)	52.57**	.37	[.24, .48]
Shape and Weight Overvaluation	3.04 (1.81)	1.05 (2.03)	25.18**	.22	[.11, .34]

<u>Main effect of Weight Status</u>					
Measure	Overweight	Normal weight	<i>F</i>	Partial η^2	90% CI for partial η^2
	<i>M (SD)</i>	<i>M (SD)</i>			
Shape Concern	2.61 (2.00)	1.48 (1.75)	13.54**	.13	[.04, .24]
Weight Concern	2.33 (1.66)	1.43 (1.50)	12.46**	.12	[.04, .23]
Shape and Weight Overvaluation	2.10 (2.08)	2.07 (2.29)	0.74	.01	[.00, .07]

** $p < .01$

Body Comparison Task

In response to the Body Comparison Task, a Time x BED x Weight Status repeated measures ANCOVA revealed significant main effects of BED ($p < .001$) and Weight Status ($p < .001$) and a significant Time x BED interaction ($p = .003$) (see Table 5) (see Figure 1). Specifically, BED diagnostic status and Weight Status were independently associated with overall decreased weight satisfaction. However, women with BED, regardless of weight status, exhibited decreased weight satisfaction from baseline to after the Body Comparison Task relative to the non-BED group. The interactions for Time x Weight Status and Time x BED x Weight Status were not significant ($ps > .419$). Simple effects analyses revealed significant main effects of BED ($p < .001$) and Weight status ($p = .006$), but not the interaction of BED x Weight status ($p = .109$), at baseline.

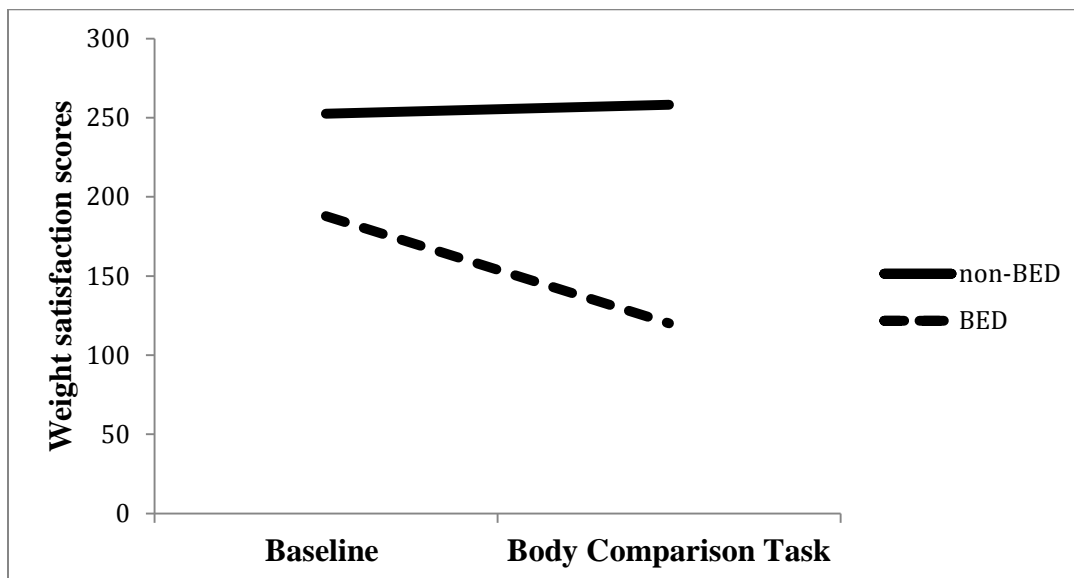
Post-hoc Analyses

Analyses were re-run without age and race as covariates to determine whether the inclusion of these covariates influenced the effect of BED and Weight Status on the study variables. The pattern of findings remained unchanged when age and race were as covariates.

Table 5. Weight satisfaction in response to the Body Comparison Task (repeated measures Time x BED status x Weight status ANCOVA)

Effect	<i>F</i>	<i>p</i>	Partial η^2	90% CI for partial η^2
BED status	42.59	< .001	.32	[.17, .45]
Weight status	12.74	< .001	.13	[.03, .26]
BED x Weight Status	1.48	.228	.02	[.00, .10]
Time x BED status	9.19	.003	.09	[.01, .22]
Time x Weight Status	.66	.419	.007	[.00, .08]
Time x BED x Weight Status	.56	.455	.006	[.00, .07]

Figure 1. Weight satisfaction at Baseline and after the Body Comparison Task for Binge Eating Disorder (BED) and non-BED.



CHAPTER 4

DISCUSSION

The finding that overvaluation of shape and weight was significantly greater among BED relative to non-BED replicates past research in overweight women with BED (Goldschmidt et al., 2010; Grilo et al., 2010; Grilo et al., 2009; Grilo et al., 2008; Harrison et al., 2015) and extends this finding to normal weight women with BED. The inclusion of normal weight women with BED provides further evidence of the specificity of overvaluation of shape and weight to BED, and EDs, rather than weight status (Goldschmidt et al., 2010; Grilo et al., 2010; Grilo et al., 2009; Grilo et al., 2013). Research suggests that overvaluation of shape and weight is a part of the core psychopathology of AN and BN (Cooper & Fairburn, 1993), and our results suggest that it may also be applicable to BED.

Consistent with our hypotheses, decreases in weight satisfaction in response to a Body Comparison Task and overvaluation of shape and weight were greatest among women with BED relative to non-BED, regardless of weight status, with large effect sizes. The finding that body comparison led to significantly decreased weight satisfaction in BED, but not non-BED, is consistent with past research in women with BN (Blechert, Nickert, Caffier, & Tuschen-Caffier, 2009) and AN (Friederich et al., 2010).

Collectively, the findings of greater overvaluation of shape and weight and decreased weight satisfaction as a result of body comparison among those with BED suggests a unique contribution of BED diagnostic status, rather than overweight status, to body image concerns (Blechert et al., 2009; Corning et al., 2006). Further support for this idea comes from the finding that decreased weight satisfaction after the body comparison

task was significantly correlated with weight concern, shape concern and shape and weight overvaluation in BED, but not non-BED. The specificity of BED diagnostic status on overvaluation of shape and weight is consistent with the transdiagnostic cognitive behavioral theory of EDs (Fairburn, Cooper & Shafran, 2003), which suggests that binge eating may be caused and maintained by overvaluation of shape and weight. Past research suggests that overvaluation of shape and weight is predictive of lower rates of remission from binge eating at post-treatment and higher frequency of binge eating at 12-month follow-up (Grilo et al., 2013). Currently, there is limited research that exclusively assesses the effectiveness of body image interventions in BED (Hilbert et al., 2002; Hilbert & Tuschen-Caffier, 2004), although body image interventions are typically included as part of cognitive behavioral treatment of EDs (Fairburn, 2008). Findings from the current study suggest that, regardless of weight status, women with BED may benefit from treatment that specifically addresses overvaluation of shape and weight. Future studies that assess the outcome of treatments that incorporate specific intervention for overvaluation of shape and weight may yield important advances in the treatment of BED.

The current findings also provide insight into the relationship between BED and weight status on more general measures of body dissatisfaction. Unlike overvaluation of shape and weight and changes in weight satisfaction due to body comparison, which appear specific to BED, BED and weight status independently accounted for more global aspects of body dissatisfaction (i.e., weight and shape concern) (Cash et al., 1990; Frederick et al., 2006; Mond & Hay, 2011). Women who were overweight with BED experienced the greatest weight and shape concerns, while normal weight non-BED

experienced the lowest weight and shape concern, with normal weight BED and overweight non-BED falling in between these two extremes. Thus, there appears to be an additive contribution with both BED and overweight status conferring the greatest risk for weight and shape concerns, whereas the presence of either BED or overweight status each confers equivalent risk.

The findings of the current study were limited by the use of a female-only sample, with age and race differences between the overweight and normal weight groups, a lack of a psychiatric comparison group and by the measures used. Older age is associated with weight gain and the age difference observed between the overweight and normal weight groups may reflect this trend (Flegal, Carroll, Kit, & Ogden, 2012). As the current pattern of findings remained the same with and without age and race as covariates, it is unlikely that these covariates attenuated the effect of weight status on the primary outcomes assessed. Furthermore, psychiatric comorbidity in the present study was higher among the BED group, relative to the non-BED group. As we did not include a psychiatric comparison group, we cannot conclude that the findings are above and beyond the effects of a psychiatric condition. However, research suggests that the rate of lifetime psychiatric co-morbidities in the current sample of BED is consistent with that found in a population with BED. For example, Kessler et al. (2013) found that of individuals with a lifetime history of BED, 46.1% met lifetime history of mood disorder and 56.1% met lifetime history of an anxiety disorder. As this is the first study to address body image concerns using four groups of overweight and normal weight individuals with and without BED, future studies could examine body image concerns using a BED sample and a non-BED psychiatric control group. Finally, the assessment of overvaluation of shape and weight

was conducted with only two questions, making it difficult to assess the reliability of this measure. However, the finding of a strong relationship between these questions and the Body Comparison Task adds to the validity of this construct. Although the Body Comparison Task used in this study did not include a control condition (e.g., average size models or inanimate objects), past research suggests that body comparison with slender bodies increases body dissatisfaction, as opposed to inanimate objects, average size models or plus-size models (Groesz et al., 2002; Halliwell & Dittmar, 2004).

Strengths of the current study include the use of both overweight and normal weight women with BED to extend the current literature on body dissatisfaction and overvaluation of shape and weight. The current study assessed body image concerns using multiple measures: an interview measure of ED psychopathology (Fairburn et al., 2008) and a body comparison task that has been found to induce body dissatisfaction (Friederich et al., 2010; Friederich et al., 2007). Further examination of the utility of the Body Comparison Task to distinguish EDs from weight disorders and to examine body image concerns across EDs is needed. Future studies may incorporate other aspects of body image concerns, such as perceptual distortions and shape dissatisfaction.

The present study found a specific relationship between BED diagnostic status with overvaluation of shape and weight and decreased weight satisfaction in response to a body comparison task, regardless of weight status. Furthermore, the current findings show that both BED diagnostic status and overweight status, independent of one another, conferred risk for more general body dissatisfaction. The current data add to our knowledge of the relationship between BED diagnosis and weight on various dimensions of body image concern and provide further support for the recommendation (Grilo et al.,

2008) that overvaluation of shape and weight be included as a diagnostic specifier of BED.

Footnotes

¹ The body comparison task was missing data for one participant in the normal weight Binge Eating Disorder (BED) group. On Eating Disorder Examination-16.0 (Fairburn et al., 2008) measures (weight concern, shape concern, overvaluation of shape and weight), data was missing for one participant in the overweight BED group and for one participant in the overweight non-BED group.

CHAPTER 5

SUPPLEMENTAL ANALYSES

Growth analysis of the Body Comparison Task

The examination of weight satisfaction from the Body Comparison Task was assessed using the average of 20 thin-ideal images, which precluded an examination of the effect of multiple presentations of thin-ideal images on weight satisfaction. Thus, an exploratory aim was to examine the effect of BED diagnostic status and Weight status on weight satisfaction throughout the Body Comparison Task. We expected a similar pattern of findings for baseline weight satisfaction as compared with an ANCOVA. Specifically, we expected that BED diagnostic status and Weight status were independently associated with lower baseline weight satisfaction, relative to non-BEDs and normal weight individuals. Furthermore, we expected a similar pattern of findings with respect to changes in weight satisfaction for the duration of the Body Comparison Task, as compared with an ANCOVA with an average composite for weight satisfaction. Specifically, we expected that BED diagnostic status would be associated with a steeper decline in weight satisfaction for the duration of the Body Comparison Task, relative to non-BED.

Method

For the Body Comparison Task, a linear growth analysis was conducted to examine weight satisfaction over the course of 20 thin-ideal images that were presented via E-Prime 2.0 software (Psychology Software Tools, 2012). Immediately following the presentation of each image, participants were asked to rate “How satisfied do you feel about your weight right now?” on a visual analogue scale that ranged from “Not at all satisfied” (0) to “Completely satisfied” (460). BED diagnostic status, Weight status and the interaction between BED and Weight status were included as predictors of weight satisfaction on the Body Comparison Task, with age and race included as covariates, in a linear growth model conducted in MPLUS 7.4 (Muthén & Muthén, 1998-2015). If the inclusion of the interaction between BED and Weight status does not improve the model fit, only the model assessing the effect of BED and Weight status on weight satisfaction on the Body Comparison Task will be reported.

Results

The linear growth model with BED diagnostic status and weight status was regressed onto baseline weight satisfaction (intercept) and change in weight satisfaction over time (slope). The inclusion of the interaction between BED and weight status improved the model fit ($\chi^2_{(19)} = 44.90, p < .001$), thus analyses are reported with the inclusion of the interaction term and with age and race as covariates.

Similar to findings conducted with an ANCOVA, findings indicate that BED diagnostic status ($p < .001$) and Weight status ($p = .006$), but not the interaction between BED and Weight status, influenced baseline weight satisfaction (intercept). The findings are such that individuals with BED report lower weight satisfaction at baseline compared to non-BED, independent of weight status, and individuals who are overweight report lower weight satisfaction at baseline compared to normal weight individuals, independent of BED diagnostic status. However, counter to what we expected given the significant contribution of BED diagnostic status on weight satisfaction as conducted with an ANCOVA, neither BED diagnostic status nor Weight status were significant contributors to changes in weight satisfaction over time (slope). Please see Tables 6 and 7 for parameter estimates of the models showing the effects of BED diagnostic status (BED vs. non-BED) and Weight status (overweight vs. normal weight) at baseline (intercept) and changes in weight satisfaction for the Body Comparison Task (slope). Please see Figures 2 and 3 for a graphical depiction of the effect of BED and Weight status at baseline (intercept) and changes in weight satisfaction for the Body Comparison Task.

Table 6. Parameter estimates of the model showing the effects of Binge Eating Disorder (BED) diagnostic status (BED vs. non-BED) and Weight status (overweight vs. normal weight) at baseline (intercept), with age and race as covariates.

Variable	Estimate	Standard error	Est./S.E.	<i>p</i>
Age	-.825	.91	-.91	.363
Hispanic	-64.83	47.43	-1.37	.172
Asian	-81.29	36.47	-2.23	.026
African-American	23.63	23.63	1.00	.317
BED	-143.27	28.44	-5.04	< .001
Weight	-103.19	37.19	-2.78	.006

Table 7. Parameter estimates of the model showing the effects of Binge Eating Disorder (BED) diagnostic status (BED vs. non-BED) and Weight status (overweight vs. normal weight) on changes in weight satisfaction for the Body Comparison Task (slope), with age and race as covariates.

Variable	Estimate	Standard error	Est./S.E.	<i>p</i>
Age	.06	.06	1.11	.265
Hispanic	.89	1.85	.48	.633
Asian	2.52	1.30	1.94	.052
African-American	1.06	.83	1.28	.202
BED	-.85	.88	-.97	.331
Weight	-.47	1.22	-.39	.697

Figure 2. Weight satisfaction as a function of Binge Eating Disorder (BED) diagnostic status (BED vs. non-BED).

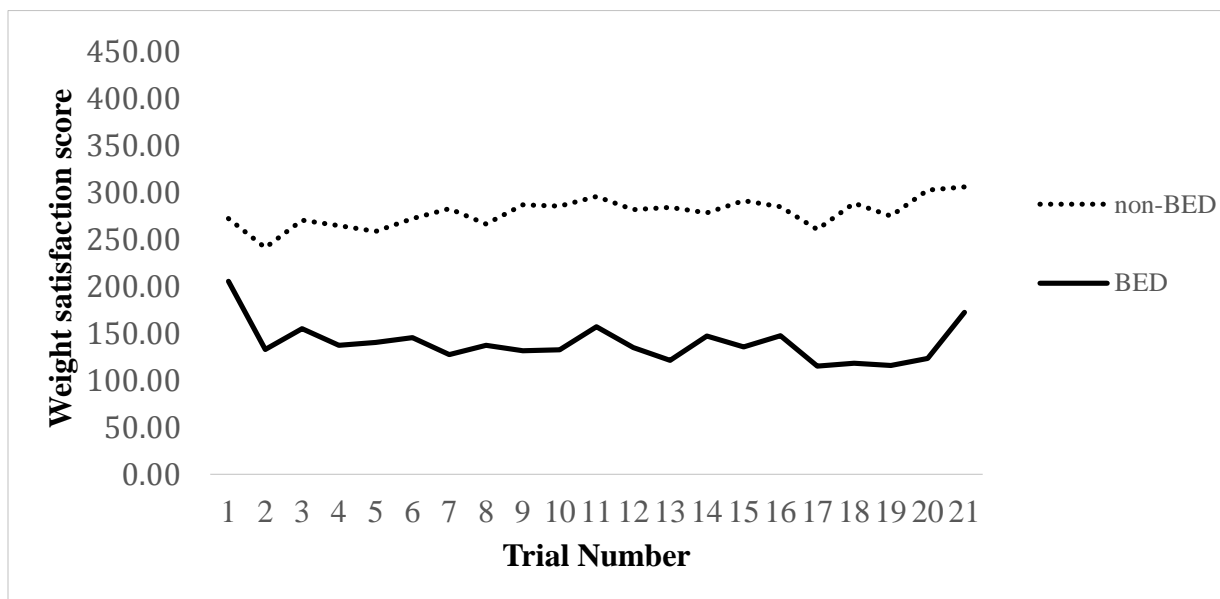
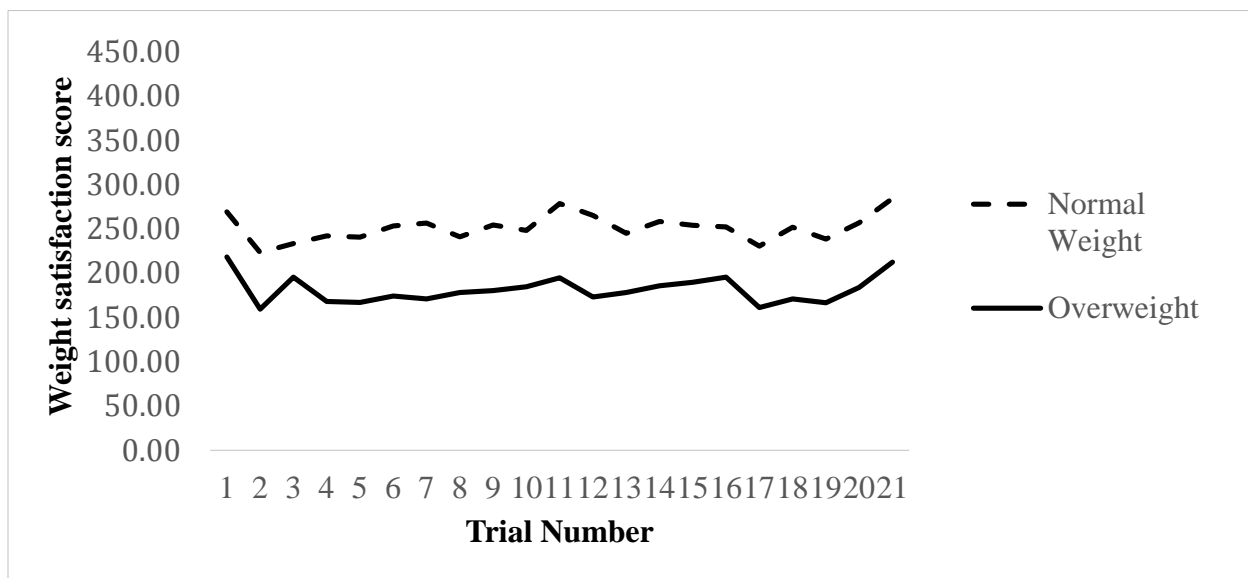


Figure 3. Weight satisfaction as a function of Weight status (overweight vs. normal weight).



Discussion

The finding that both BED diagnostic status and Weight status were significant contributors to baseline weight satisfaction (the intercept of the linear growth model) mirrored analyses conducted using ANCOVAs. However, the finding that neither BED diagnostic status nor Weight status were significant contributors to changes in weight satisfaction over time (slope) suggests that inter-trial, moment-to-moment changes in weight satisfaction as a result of the Body Comparison Task did not markedly differ between BED and non-BED and overweight and normal weight individuals. Indeed, findings suggest that participants did not experience significant decreases in weight satisfaction nor did they habituate to repeated trials of viewing thin-ideal images.

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CHAPTER 6

LITERATURE REVIEW– BODY DISSATISFACTION IN BINGE EATING
DISORDER

ABSTRACT

Body dissatisfaction is a common concern among women, and reflects an individual's subjective view of their body, which may vary as a function of mood or with changes in size and shape. Body dissatisfaction has been well studied in individuals who are overweight and in eating disorder samples. However, our understanding of body dissatisfaction in Binge Eating Disorder is limited due to the exclusive use of samples that are overweight or obese. This paper reviews existing research on body dissatisfaction among overweight women with and without BED, as well as the literature on body-related social comparison as an experimental method for inducing body dissatisfaction. Finally, this paper will discuss the concurrent examination of normal weight and overweight women with BED as a future direction for research on body dissatisfaction.

Body dissatisfaction, which is the negative evaluation of one's body on the basis of the size and shape of one's body parts or body as a whole (Cash, Counts, & Huffine, 1990; Cooper & Fairburn, 1993; Mond & Hay, 2011) is a common concern among women of industrialized countries (Frederick, Forbes, & Berezovskaya, 2008). Up to 63% of women in the United States report feeling dissatisfied with their weight (Frederick, Peplau, & Lever, 2006). Body dissatisfaction has primarily been researched within the context of eating disorders, as it is one of the strongest predictors of disordered eating and unhealthy weight control practices (Stice & Shaw, 2002), and is also prevalent among those who are overweight or obese (Cattarin & Thompson, 1994; Stice & Shaw, 2002).

As will be reviewed in this paper, the literature suggests that overweight individuals experience greater body dissatisfaction relative to those of normal weight. Furthermore, individuals with BED experience greater body dissatisfaction relative to those without BED. However, the study of body dissatisfaction in BED is limited due to the primary use of overweight/obese samples or a lack of consideration for weight status, with little understanding of how BED diagnostic status affects body dissatisfaction among those who are normal weight. As such, our current understanding of body dissatisfaction in BED is confounded by the concurrent contribution of overweight status. Thus far, there is a lack of empirical research that examines body dissatisfaction in overweight/obese and normal weight samples with and without BED, such that we can only infer that BED diagnostic status confers greater body dissatisfaction than being overweight alone. This review will culminate in a hypothesis of how body dissatisfaction may be experienced in individuals who are normal weight with BED. Finally, this paper

will also summarize research on body-related social comparison as one method to induce body dissatisfaction.

Weight status and Binge Eating Disorder

For the purposes of this review, it is important to clarify the definitions of weight status, as well as provide an overview of the eating disorders (EDs) captured in the Diagnostic and Statistical Manual 5 (DSM-5) (American Psychiatric Association [APA], 2013). The World Health Organization (1995) defines individuals as normal weight if the derivation of one's height and weight, otherwise known as Body Mass Index (BMI) falls within a range of 18.5 to 24.9 points. Individuals with a BMI that falls below 18.5 are considered underweight, between 25.0 to 29.9 are considered overweight, between 30.0 to 39.9 are considered obese and beyond 40.0 are considered very obese. The consideration of specific BMI ranges are important with respect to health risks such as cardiovascular disease and chronic health conditions such as diabetes (Dagenais et al., 2005; Kopelman, 2007; Weiss et al., 2004). However, the distinction between "overweight" and "obese" is less meaningful when describing the psychological consequences of excess weight (e.g., body dissatisfaction) (Schwartz & Brownell, 2004). Thus, the term "overweight" will be used in this paper to be inclusive of all those with a BMI above or equal to 25.0.

Eating disorders are the only psychiatric diagnoses that includes criterion on abnormalities in caloric intake and expenditure, which have serious consequences on one's body weight. There is considerable heterogeneity within eating disorders, which include Anorexia Nervosa (AN), Bulimia Nervosa (BN) and Binge Eating Disorder (BED). Epidemiological studies suggest that, among women, the lifetime prevalence of

AN is .9%, 1.5% in BN and 3.5% in BED (Cossrow et al., 2016; Hudson, Hiripi, Pope, & Kessler, 2007; Kessler et al., 2013). Population based studies suggest that up to 44% of adolescents engage in disordered eating behaviors without meeting ED diagnostic criteria (Neumark-Sztainer et al., 2007).

In the DSM 5, AN is characterized by dietary and caloric restriction that leads to significantly low body weight within the context of one's development, an intense fear of gaining weight even though underweight, and a disturbance in the way that one experiences their body weight or shape (APA, 2013). BN is characterized by recurrent episodes of binge eating (eating an objectively large amount of food with a sense of loss of control), recurrent compensatory weight-control behaviors (e.g., vomiting, laxative/diuretic use, fasting, excessive exercise) and overvaluation of shape and weight. Overvaluation of shape and weight reflects the excess value that one places on their self-worth based on their perceived shape and weight and reflects a relatively stable self-image (Mond & Hay, 2011). BED is characterized by recurrent episodes of binge eating without compensatory weight-control behaviors that is associated with at least three associated features: eating more rapidly than normal, eating until uncomfortably full, eating large amounts of food when not physically hungry, eating due to embarrassment of food intake and feelings of disgust, depression or guilt after binge eating episodes (APA, 2013).

BED is unique from AN and BN in that it does not include a criterion that assesses cognitions regarding one's body; rather, it focuses on the distress associated with binge-eating. Although not specifically included in the diagnostic criterion for each eating disorder, individuals with AN tend to be underweight or of low body weight,

individuals with BN tend to be of normal weight, and individuals with BED tend to be overweight. It is important to note that although individuals with BED tend to be overweight, BED is not synonymous with being overweight. Indeed, up to 68% of adults in the United States have a BMI in the overweight range or beyond (Flegal, Carroll, Kit, & Ogden, 2012), whereas the prevalence of BED in the general population is between 2-3.5% (Cossrow et al., 2016; Hudson et al., 2007; Kessler et al., 2013).

Body Dissatisfaction

Body dissatisfaction refers to attitudes and evaluation of one's body based on the size and shape of their body parts or body as a whole (Ahrberg, Trojca, Nasrawi, & Vocks, 2011; Cash et al., 1990; Cooper & Fairburn, 1993; Mond & Hay, 2011). Satisfaction with one's body tends to fluctuate based on one's mood, or with changes in one's shape or weight (Masheb, Grilo, Burke-Martindale, & Rothschild, 2006; Mond & Hay, 2011). This is in contrast to overvaluation of shape and weight, a separate but related construct within body dissatisfaction. Overvaluation of shape and weight is considered part of the core psychopathology of AN and BN (Cooper & Fairburn, 1993). Specifically, overvaluation of shape and weight refers to the excess value that one places on their self-worth based on their perceived shape and weight and reflects a relatively stable self-image (Mond & Hay, 2011) that does not vary based on fluctuations of mood (Masheb et al., 2006). Although many individuals experience some level of dissatisfaction with their shape and weight (Frederick et al., 2006), relatively few individuals define their self-worth based upon their shape and weight (Cooper & Fairburn, 1993; Mond & Hay, 2011). Evidence that overvaluation of shape and weight is distinct from general body dissatisfaction or from being overweight comes from AN and

BN samples, who are typically low or normal weight and yet exhibit greater overvaluation of shape and weight relative to normal weight healthy controls (Attia, 2010; Grilo et al., 2009).

Overvaluation of shape and weight is not currently part of the diagnostic criteria for BED, as approximately 40% of BED patients with clinically significant eating pathology and binge-eating frequency (Grilo et al., 2009) do not endorse clinically significant overvaluation of shape and weight (defined as a score of ≥ 4.0 on the overvaluation of shape and weight questions on the Eating Disorder Examination) (Fairburn, Cooper, & O'Connor, 2008). However, data is supportive of the inclusion of overvaluation of shape and weight as a diagnostic specifier (Grilo et al., 2008; Grilo, Ivezaj, & White, 2015). The inclusion of overvaluation of shape and weight as a diagnostic specifier provides clinicians with a clinically useful cognitive feature of BED that has significant prognostic utility (Grilo, White, Gueorguieva, Wilson, & Masheb, 2013). Overvaluation of shape and weight reliably differentiates overweight individuals with BED from overweight individuals without BED on measures of eating disorder psychopathology and depression levels (Goldschmidt et al., 2010; Grilo et al., 2009; Grilo et al., 2013). Overvaluation of shape and weight is associated with higher levels of eating disorder psychopathology in those with BED (Harrison, Mond, Rieger, Hay, & Rodgers, 2015) and predicts non-remission of binge eating and higher frequency of binge eating at 12-month follow up after guided self-help (gsh) treatment with Cognitive Behavioral Therapy (CBT) or behavioral weight loss (Grilo et al., 2013). To date, there is a lack of evidence that has examined whether overvaluation of shape and weight changes over the course of treatment of BED. Research suggests that scores on the shape concern

and weight concern subscales of the Eating Disorder Examination (EDE) (Fairburn et al., 2008), which includes overvaluation of shape and weight within its respective subscales, decreases over the course of 12-weeks of treatment (Grilo & Masheb, 2005). However, this decrease did not significantly differ as a function of treatment modality (gsh-CBT, gsh-behavioral weight loss and control group), although binge-eating remission rates were significantly greater among those who received gsh-CBT (Grilo & Masheb, 2005). Furthermore, although overvaluation of shape and weight predicts non-remission of binge eating and higher frequency of binge-eating at 12-month follow up, it remains unknown whether changes in overvaluation of shape and weight over the course of treatment mediates treatment outcome.

Overvaluation of shape and weight is one way to assess the multifactorial construct of body image concerns, and is related to, but distinct from, body dissatisfaction. Body dissatisfaction is considered a normative experience in Western culture (Cooper & Fairburn, 1993; Frederick et al., 2006; Mond & Hay, 2011; Tantleff-Dunn, Barnes, & Larose, 2011). Body dissatisfaction is commonly assessed on a continuum using self-report questionnaire measures. Among women, the greatest change in body satisfaction occurs during puberty (Kostanski, Fisher, & Gullone, 2004). Body dissatisfaction has been extensively studied in adolescent girls and has been found to prospectively predict disordered eating and eating disorders (McKnight, 2003; Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006), depressive mood and low self-esteem (Paxton, Neumark-Sztainer, Hannan, & Eisenberg, 2006) and health-compromising behaviors, such as unhealthy weight-control behaviors and lowered physical activity (Neumark-Sztainer et al., 2006). Furthermore, body dissatisfaction at adolescence has

been found to persist over a 10-year period, such that females become increasingly dissatisfied with their bodies as BMI increases from adolescence through young adulthood (Bucchianeri, Arikian, Hannan, Eisenberg, & Neumark-Sztainer, 2013).

Among adult women, body dissatisfaction has implications beyond disordered eating, and is associated with emotional distress (Johnson & Wardle, 2005), depressive symptoms (Stice & Bearman, 2001), eating disorders (Goldschmidt, Wall, Loth, & Neumark-Sztainer, 2015; Neumark-Sztainer et al., 2006; Stice & Shaw, 2002) and future weight gain (Manzato, Bolognesi, Simoni, & Cuzzolaro, 2015). In addition to its relevance to emotional and mental well-being, body dissatisfaction is also associated with behavioral risk factors for medical complications beyond EDs. For example, research suggests that body dissatisfaction is associated with decreased likelihood of cancer screening self-exams (Ridolfi & Crowther, 2013), greater physical limitations, increased impairment due to bodily pain (Wilson, Latner, & Hayashi, 2013) and increase difficulties in smoking cessation (King, Matacin, White, & Marcus, 2005).

Individuals who are overweight experience greater body dissatisfaction than those who are normal weight. Body image is a multifactorial construct, and incorporates subjective satisfaction, affective, cognitive, behavioral and perceptual components (Thompson, 2004; Thompson, Altabe, Johnson, & Stormer, 1994). Measures that assess body image typically assess a trait dimension. For example, a number of studies have utilized self-report measures of trait body dissatisfaction such as the Body Cathexis Scale, and the Figure Rating Scale, have found a positive relationship between weight increases and self-reported body dissatisfaction (Hill & Williams, 1998; Neighbors & Sobal, 2007). In a sample of college age women, it was found that

overweight women had greater body dissatisfaction, more weight-related anxieties and more frequent dieting than normal weight women without an overweight history (Cash et al., 1990). This finding is replicated in a sample of overweight women from the community, who reported greater body dissatisfaction than normal weight women (Sarwer, Wadden, & Foster, 1998).

In addition to the relationship between current overweight status and body dissatisfaction, data shows that levels of body dissatisfaction (as measured by a composite of body dissatisfaction created from the Multidimensional Body-Self Relations Questionnaire, Body Areas Satisfaction scale and Situational Inventory of Body Image Dysphoria) remain elevated even among those who lose weight (Annis, Cash, & Hrabosky, 2004). Among women who were currently overweight, formerly overweight and never overweight, body dissatisfaction was greatest in women who were currently overweight, followed by women who were formerly overweight (Annis et al., 2004). The use of a composite body dissatisfaction measure, which assesses multiple aspects of body image dissatisfaction (e.g., satisfaction with specific body parts, affective, cognitive and perceptual components), indicates that the experience of being overweight confers greater risk for experiencing body dissatisfaction in multiple domains, even if excess weight is subsequently lost.

Samples that are weight-loss seeking and samples with a diagnosis with BED are important exceptions to the positive relationship between increasing BMI and body dissatisfaction. Several studies have found that in non-BED, weight-loss seeking samples, there was a non-significant relationship between BMI and body dissatisfaction (Matz, Foster, Faith, & Wadden, 2002; Sarwer et al., 1998), which may be attributable to the

non-representative nature of weight-loss seeking samples. Weight-loss seeking samples may be motivated to engage in weight loss due to greater weight and shape distress, or may experience greater weight and shape distress as a consequence of engaging in weight loss behaviors, relative to overweight individuals in the general population.

Individuals with Binge Eating Disorder experience greater body dissatisfaction than those without Binge Eating Disorder. Another factor that increases one's propensity to experience body dissatisfaction is the presence of an eating disorder diagnosis. Body dissatisfaction and overvaluation of shape and weight has been well documented in AN and BN (Cash & Brown, 1987; Cash & Deagle, 1997), with a growing knowledge base among BED samples. Evidence suggests that those with BED experience greater body dissatisfaction than individuals without BED (Eldredge & Stewart, 1996; Svaldi, Caffier, Blechert, & Tuschen-Caffier, 2009), and that BED experience similar levels of body dissatisfaction relative to other ED samples. Among weight loss seeking women, overweight women with BED exhibited greater body dissatisfaction, as measured by weight and shape concern on the EDE, compared to overweight women without BED, and exhibited similar levels of body dissatisfaction as overweight women with an Eating Disorder Not Otherwise Specified (EDNOS) (Eldredge & Stewart, 1996). Moreover, this finding was consistent even when degree of overweight was controlled for, (e.g., high BMI versus low BMI within overweight status), suggesting that BED and EDNOS diagnostic status conferred risk for body dissatisfaction in addition to relative weight within overweight status or having a desire to lose weight. Additional research utilizing non-overweight/obese samples is needed to

clarify the relative contributions of BED diagnostic status above and beyond the contribution of overweight status.

In another study that assessed body shape satisfaction using the Body Shape Questionnaire, it was found that overweight women with BED experienced body shape dissatisfaction that was almost twice that of overweight women without BED (Svaldi et al., 2009). Finally, it was found in a sample of mixed-weight status BED, AN, BN, normal weight non-ED and overweight non-ED, that BED patients exhibited similar levels of weight and shape concerns as those with BN (Wilfley, Schwartz, Spurrell, & Fairburn, 2000). Furthermore, individuals with BED reported significantly greater levels of weight and shape concerns than AN and normal weight and overweight non-ED groups (Wilfley et al., 2000).

The examination of body dissatisfaction among women has been advanced due to the relative ease of use of self-report questionnaires. However, the fluctuation of body dissatisfaction in response to changes in one's mood, perceived shape and weight and perceived control over eating (Cooper & Fairburn, 1993) is a central component. As such, self-report questionnaires that typically assess trait body image dissatisfaction fail to capture the labile, state component of body dissatisfaction. Experimental paradigms that incorporate time-limited measures of state body image dissatisfaction, as well as ecological momentary assessments, are best able to capture this component of body image dissatisfaction. For example, overweight women with BED, normal weight women with BN and normal weight women without an ED completed an experimental paradigm, which involved a body exposure task. The body exposure task consisted of viewing their bodies in a white leotard for 5 minutes, during which they were asked to verbalize all

cognitions that entered their minds. Overweight women with BED expressed similar numbers of negative cognitions about their shape and weight as normal weight women with BN, but significantly more negative cognitions than normal weight women without an ED (Hilbert & Tuschen-Caffier, 2005). The similar number of negative cognitions generated by overweight women with BED and normal weight women with BN suggests an influence of ED pathology on body dissatisfaction independent of weight status.

Social Comparison

With respect to the study of body image dissatisfaction, one of the most commonly used methods of inducing body dissatisfaction is the use of body-related social comparison, which has been proposed as a mediator in the relationship between exposure to the thin-ideal and body dissatisfaction (Groesz, Levine, & Murnen, 2002; Myers & Crowther, 2009; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Although body dissatisfaction has been well-studied within children, adolescent and adult samples with and without eating disorders (Frederick et al., 2006; Murnen & Smolak, 2000; Neumark-Sztainer et al., 2006; Stice & Shaw, 2002), the mechanisms in which body dissatisfaction is induced are poorly understood. Body image dissatisfaction may be induced in a number of ways, such as feeling discomfort with one's body, attention paid by others to one's body (positive or negative) (Murnen & Smolak, 2000; Vincent & McCabe, 2000) and feelings of inadequacy towards one's body (Keery, Van den Berg, & Thompson, 2004), and social comparison is only one of many means by which women may feel dissatisfied with their bodies. Social comparison theory postulates that humans seek to compare themselves to others in order to assess their own standing amongst their peers (Festinger, 1954). Social comparison in the context of body dissatisfaction can refer to

both upward and downward comparisons. Research suggests that when one compares their body to another body that is deemed superior (Corning, Krumm, & Smitham, 2006), one is engaging in upward social comparison and results in greater body dissatisfaction. Conversely, when one compares their body to another body that is deemed inferior, one is engaging in downward social comparison, which may bolster self-esteem (Bessenoff, 2006).

Social comparison in women without eating disorders. Given the prevalence of the thin ideal in Western culture, body-related social comparison to the thin ideal has been postulated as one mechanism by which one develops body dissatisfaction (Thompson et al., 1999). Findings from a meta-analytic review revealed that women with and without ED engage in upward body-related social comparison specifically with slender bodies, rather than average size models, plus-size models or inanimate objects (Groesz et al., 2002). These findings further point to body dissatisfaction as a result of body-related social comparison to the thin ideal.

In a sample of college age women, participants were randomly assigned to receive a picture of a female whose body size was manipulated to appear slender or overweight, or no picture, under the pretense that the participant was being judged against this person. Participants who were being compared to a thin-ideal female reported increased body dissatisfaction, versus no change in body dissatisfaction among those compared to an oversize body shape (Lin & Kulik, 2002). Consistent with the idea that overvaluation of shape and weight is specific to EDs, the women in this study did not report a change in their self-esteem even when body dissatisfaction increased (Lin & Kulik, 2002).

In an extension of exposure to thin-ideal images in the media, one study examined body-related social comparison using in-vivo interactions with a confederate whose body size conformed to the thin ideal or whose body size represented the average woman (control). Participants were college aged, normal weight women, and those who interacted with the thin-ideal confederate experienced significant increases in body dissatisfaction relative to women who interacted with the control confederate (Krones, Orjada, Batres, & Stice, 2005).

The examination of body-related social comparison necessitates that the likelihood that one engages in body-related social comparison be measured. In one study, the self-reported discrepancy between actual and ideal body size among normal weight college women was measured. Participants then viewed advertisements with or without the thin ideal and were asked to imagine themselves wearing the clothing that the models wore (Bessenoff, 2006). Women with high self-reported size discrepancy reported lowered appearance based self-esteem and increased thoughts of weight-reduction after viewing the thin ideal, relative to advertisements without the thin ideal and relative to women low on size discrepancy (Bessenoff, 2006). Conversely, women with low self-reported size discrepancy reported increased self-esteem after viewing images that depicted the thin ideal. Taken together, findings suggest that women who report greater discrepancy between their actual and ideal body size experience greater susceptibility to body dissatisfaction within the context of body-related social comparison. Furthermore, greater discrepancy between actual and ideal body size is associated with higher BMI, pointing to the influence of weight status on the likelihood of engaging in body-related social comparison.

Social comparison in women with eating disorders. Social comparison of bodies in EDs is particularly relevant to the construct of shape and weight overvaluation. Those who place a high value on shape and weight to define their self-worth are more likely to engage in social comparison. Individuals who engage in high levels of social comparison are more likely to be unsure of themselves and exhibit lower levels of self-esteem and higher self-consciousness (Gibbons & Buunk, 1999; Mintz & Betz, 1988).

Women who exhibit ED symptoms, but without meeting criteria for full-threshold AN, BN or BED, exhibited a significantly greater tendency to engage in social comparison, relative to women without ED symptoms (Corning et al., 2006). When participants were asked to make ratings on slim, female bodies presented in images, relative to their own bodies, women with ED symptoms perceived their own bodies with more self-defeating ratings than women without ED symptoms (Corning et al., 2006).

Extant literature suggests that upward body-related social comparison has particularly deleterious effects on body dissatisfaction. One study examined both upward and downward body-related social comparison in a sample of normal weight women with BN and HCs. In this study, women with BN showed a clear preference (as measured by eye tracking fixation time) for bodies with lower BMI, whereas HC women did not show differential preferences between high BMI and low BMI bodies (Blechert, Nickert, Caffier, & Tuschen-Caffier, 2009). Furthermore, after viewing bodies with a lower BMI, women with BN reported greater body dissatisfaction, whereas HC women reported decreased body dissatisfaction (Blechert et al., 2009). This paradoxical increase in body dissatisfaction in BN and decrease in body dissatisfaction in HC is consistent with past research (Corning et al., 2006). This finding also suggests that the experience of body

dissatisfaction is contingent on one's engagement in upward body-related social comparison.

In sum, evidence suggests that experiences of body dissatisfaction when engaged in body-related social comparison with thin-ideal images is not exclusive to women with EDs, but exists along a continuum (Groesz et al., 2002; Krones et al., 2005; Lin & Kulik, 2002; Thompson et al., 1999). However, body-related social comparison is particularly relevant for body dissatisfaction among women with EDs (Corning et al., 2006).

Body Dissatisfaction in Normal Weight BED

Currently, the examination of body dissatisfaction in BED has occurred primarily among those who are overweight or obese, or weight status has not been accounted for in analyses. Research suggests that individuals who are normal weight may be a minority among those with BED, with prevalence rates ranging from 9.8% (Dingemans & van Furth, 2012) to 47.2% (Fairburn, Cooper, Doll, Norman, & O'Connor, 2000). It is unclear whether increased body dissatisfaction observed in BED is due to BED diagnostic status, or whether overweight status moderates the effect of BED diagnostic status on body dissatisfaction. To clarify the role of BED diagnostic status and weight status on body dissatisfaction in BED, we must examine body dissatisfaction in BED groups who are normal weight.

To our knowledge, only one study has taken into account different weight categories (normal weight, overweight, obese and very obese, according to WHO (1995) guidelines) when examining eating disorder psychopathology. This study examined the four subscales of the Eating Disorder Examination (EDE), the gold standard interview measure of eating psychopathology: dietary restraint, eating concern, weight concern and

shape concern (Dingemans & van Furth, 2012). The only differences found were in weight concern, such that the normal weight BED group had significantly lower weight concern than the very obese BED group. Given the large disparity in weight between these groups, replication of this finding in a sample of individuals who are normal weight and overweight with and without BED is needed in order to delineate the contributions of BED diagnostic status and weight status on eating pathology and body image dissatisfaction.

Future Directions

As reviewed, the present state of the literature suggests that overweight status is associated with greater body dissatisfaction among non-ED women. Among overweight women, BED diagnostic status is associated with greater body dissatisfaction compared to non-ED. Finally, overweight women with BED experience similar levels of body dissatisfaction as normal weight women with BN. Experimental studies that utilize body-related social comparison tasks enhance our understanding of the labile nature of body dissatisfaction. Specifically, body-related social comparison reliably induces body dissatisfaction among women with and without EDs, and influences on self-esteem appear to be specific to women with EDs (Friederich et al., 2007; Groesz et al., 2002; Thompson et al., 1999).

To understand whether body dissatisfaction in BED is due to BED diagnostic status or weight status, we must concurrently examine body dissatisfaction in BED groups who are both normal weight and overweight. Given that body dissatisfaction is a multifactorial construct, our research base can be extended with the use of multiple methods of measurement (Thompson, 2004): for example, the combination of

questionnaire and interview measures with experimental measures that assess change in body dissatisfaction over time or with mood change. As body dissatisfaction tends to fluctuate based on one's mood or changes in shape or weight (Mond & Hay, 2011), experimental studies can provide information on the degree to which one's satisfaction with their body changes. Past research on body dissatisfaction in normal weight, non-ED women have found that comparison of one's body to that of slim, female bodies reliably induces dissatisfaction with one's own body (Friederich et al., 2007; Groesz et al., 2002; Thompson et al., 1999). Indeed, normal weight women with BN show decreased body satisfaction after comparing their bodies to pictures of slim women, while normal weight women without an ED paradoxically show increased body satisfaction after the same body comparison task (Blechert et al., 2009). The authors suggest that this may be due to a preference in women with BN for bodies with lower BMIs, which is not present in normal weight women without an ED (Blechert et al., 2009).

Given the absence of literature regarding the level of body dissatisfaction experienced by normal weight women with BED, hypotheses regarding the experience of body dissatisfaction among normal weight women with BED may be extrapolated from studies that compare overweight women with BED, normal weight women with BN and overweight women without an ED. Such an examination control for the contribution of weight status given an ED diagnosis, and allows for comparisons of body dissatisfaction among women with an ED as compared to overweight women without an ED. Thus, hypotheses regarding the relative contribution of ED diagnostic status and weight status can be inferred. Fichter and colleagues (1993) did not find significant differences between overweight women with BED and overweight women without BED on a self-

report measure of body dissatisfaction, suggesting that body dissatisfaction was due to overweight status, rather than BED diagnostic status (Fichter, Quadflieg, & Brandl, 1993). Furthermore, once BMI was controlled for, overweight women with BED no longer scored higher than normal weight BN on a self-report measure of body dissatisfaction (Fichter et al., 1993), suggesting that body dissatisfaction in BED may be partially attributable to overweight status. This suggests that among overweight and normal weight women with BED, overweight women with BED may experience greater body dissatisfaction than normal weight BED. It is hypothesized that in a sample of overweight and normal weight women with and without BED, body dissatisfaction may be greatest among those who are overweight with BED, followed by normal weight with BED, overweight non-BED and normal weight non-BED.

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