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Gender differences in weight bias internalisation and eating pathology in overweight individuals

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Introduction

Overweight men and women face weight stigmatization at rates on par with racial discrimination (Puhl, Andreyeva, & Brownell, 2008). Driving weight-based discrimination and bias are stereotypes about overweight individuals as unmotivated, lacking willpower, and to blame for their weight status (Puhl & Heuer, 2009). Despite the perception that weight stigmatization motivates overweight persons to lose weight (Puhl, Peterson, & Luedicke, 2012), research shows that weight stigmatization is associated with increased food consumption (Schvey, Puhl, & Brownell, 2011), binge eating (Almeida, Savoy, & Boxer, 2011), and poorer weight loss outcomes (Carels et al., 2009). Further, the internalization of weight biased attitudes is prevalent among overweight individuals, especially those who have experienced weight-based discrimination (Puhl, Moss-Racusin, & Schwartz, 2007) or weight-based teasing (Menzel et al., 2010; Puhl & Latner, 2007). Weight bias internalization is associated with significant negative health consequences, including psychological morbidity (Carels et al., 2010; Pearl, White, & Grilo, 2013), increased eating pathology (Durso, Latner, White, et al., 2012; Schvey, Roberto, & White, 2013), and increased risk of obesity (Sutin & Terracciano, 2013). Importantly, weight bias internalization is associated with more severe psychopathology overall (Durso, Latner, White, et al., 2012; Pearl et al., 2013; Schvey et al., 2013) and mediates the relationship between experiencing stigmatization and eating pathology (Durso, Latner, & Hayashi, 2012).

Socio-cultural models of eating pathology consider the internalization of negative body attitudes to be at the core of the etiology and maintenance of eating disorders (Stice, 2002). Though body ideals differ for women and for men, internalization of idealized bodies is associated with dissatisfaction with body shape/weight and increased risk of psychopathology. For instance, thin-ideal internalization among women is considered a risk factor for eating pathology (Stice, 1998; Thompson & Stice, 2001), which is associated with more negative attitudes towards overweight bodies (Carels & Musher-Eizenman, 2010). Men

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also report internalizing body image ideals (Blond, 2008) and shape/weight dissatisfaction (McCabe & Ricciardelli, 2004), which increases risk of disordered eating (Keel, Fulkerson, & Leon, 1997) and extreme weight control behaviors (Finlayson, Kelly, & Saklofske, 2002; Furnham & Calnan, 1998). Thus, concern about body image, including shape and weight, is associated with increased eating pathology in both men and women.

Although both men and women experience weight stigmatization and body dissatisfaction, women experience more eating-related psychopathology (Hilbert, de Zwaan, & Braehler, 2012; Kessler et al., 2013; Mitchison, Hay, Slewa-Younan, & Mond, 2012). Women report experiencing more weight stigmatization (Hebl & Heatherton, 1998; Latner, Stunkard, & Wilson, 2005; Pearl, Puhl, & Brownell, 2012; Schvey, Puhl, Levandoski, & Brownell, 2013) and more weight bias internalization as compared to men (Andrejeva, Puhl, & Brownell, 2008; Pearl, White, & Grilo, 2014; Schvey et al., 2011; Schvey et al., 2013), whereas men report having more anti-fat attitudes, especially against women (Barnes, Ivezaj, & Grilo, 2013; Pearl et al., 2012; Schvey et al., 2013). However, women also have a higher rate of depressive symptoms (Nolen-Hoeksema, 2012) and tend to internalize more than men (Huselid & Cooper, 1993). Because depression can exacerbate eating pathology symptoms (Presnell, Stice, Seidel, & Madeley, 2009), higher rates of depression could also contribute to eating pathology in women. Thus, there may be gender differences in the relationship between weight bias internalization, depressive symptoms, and eating-related psychopathology.

In this paper, we investigated gender differences in weight bias internalization and eating pathology in overweight adults. We tested (1) whether the relationship between weight bias internalization and eating pathology differs for overweight men and women (2) whether depressive symptoms differentially relate to eating pathology in overweight men and women. To our knowledge, this is the first study investigating gender differences in weight bias internalization and its relationship to eating and mood-related psychopathology.

Methods

Participants

Overweight and obese adults ($N = 664$) were selected from a sample of 1720 volunteers. The sample included 566 women and 98 men whose BMI classified them as overweight or obese ($BMI \geq 25.5 \text{ kg/m}^2$) and who completed all measures in full. Of the 664 participants, 34.6% were overweight ($BMI > 25$; $N_{\text{female}} = 197$, $N_{\text{male}} = 33$) and 65.4% were obese ($BMI > 30$; $N_{\text{female}} = 369$, $N_{\text{male}} = 65$). These data were collected as part of a large study and have been previously published (Schvey et al., 2013), although we report novel analyses of gender differences here. The study recruited volunteers through Craigslist advertisements for a questionnaire about varying descriptor terms, including “health behaviors” and “eating habits”. The online advertisement was posted to Craigslist sites in cities across the United States and included a link to an external online survey. Participants were offered a 1 in 20 chance to win a \$50 gift certificate in exchange for their participation. The study was approved by the Institutional Review Board.

Procedures

Participants confirmed their willingness to participate and provided informed consent. All self-report questionnaires were completed through an anonymous survey hosted on SurveyMonkey (<http://www.surveymonkey.com>), an online data gathering website that uses a 128-bit data encryption. Participants were assured that their responses were anonymous.

Measures

Demographics—The study included self-reported questions about participants' age, gender, race, height, and weight. Current BMI was computed from self-reported height and weight (kg/m^2).

Weight Bias Internalization Scale (WBIS; Durso & Latner, 2008) measures the degree to which participants endorse the applicability of negative stereotypes about overweight or obese persons to themselves. The present study included the 11-item self-report scale, which measures responses on a 7-point Likert scale ("strongly disagree" to "strongly agree"). The present sample demonstrates strong internal consistency ($\alpha = .89$).

Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994) assesses eating disorder symptoms during the previous 28 days, and includes four subscales assessing Dietary Restraint, Eating Concern, Shape Concern, and Weight Concern, which are averaged yielding a Global composite score. The EDE-Q measures frequency of objective binge episodes (OBEs; eating unusually large amounts of food while experiencing a subjective sense of loss of control), subjective binge episodes (SBEs; loss of control over eating but not eating an objectively large amount of food) and purging behaviors (self-induced vomiting, laxative misuse, diuretic misuse) over the previous 28 days. The EDE-Q has extensive psychometric support in diverse disordered eating groups, including in a community sample (Mond, Hay, Rodgers, Owen, & Beumont, 2004). In the present study, the EDE-Q demonstrated strong internal consistency ($\alpha = .89$).

Questionnaire for Weight and Eating Patterns- Revisited (QWEP-R; Yanovski, Nelson, Dubbert, & Spitzer, 1993) assesses current and past eating/weight patterns, including dieting history (e.g. age first overweight, history of weight cycling). Weight cycling is measured on an ordinal scale ranging from "none" to "5 or more" representing the number of times that the participant has lost and regained more than 20 pounds.

Beck Depression Inventory (BDI; Beck & Steer, 1987) is a 21-item scale that assesses current symptoms of depression (Beck, Steer, & Carbin, 1988). Scores range from 0 – 63; higher scores indicate greater levels of depression. The BDI showed excellent internal consistency in the present sample ($\alpha = .91$).

Statistical Analyses

All analyses were conducted in SPSS version 20. Overall means and means for men and women separately were computed for demographic variables, eating pathology correlates, eating pathology measures, and weight bias internalization and compared using ANOVA and chi-square. Further, we examined the correlation between weight bias internalization and

measures of eating pathology and depression in men and women. We corrected for multiple comparisons using a Bonferroni-Holm step-down for correlations with WBIS or BDI and all other measures for men and women (Aickin & Gensler, 1996). Finally, we conducted Fisher's r -to- z analyses to compare correlations between (1) weight bias internalization and eating pathology for men and women and (2) depressive symptoms and eating pathology in men and women.

Results

Participant Characteristics

Table 1 displays the overall means and means by participant gender for demographic variables (age, BMI), eating pathology correlates (age first overweight, weight cycling, BDI), eating pathology (OBE, SBE, Purging, and EDE-subcales) and weight bias internalization (WBIS).

There were no significant differences between men and women in demographic variables, such as age, BMI, BDI, or age first overweight. There were no significant differences in SBEs, OBEs, rates of purging, Eating Concern, or Dietary Restraint. However, women reported a significantly higher rate of weight cycling, and more weight bias internalization (WBIS), Shape Concern, Weight Concern, and Global eating pathology than men.

Correlation between WBIS and Eating Pathology

Table 2 displays the correlation between WBIS, eating pathology correlates (BMI, BDI, age first overweight, weight cycling), and eating pathology (OBE, SBE, Purging, EDE-Q and subscales) separated by gender. In both men and women, WBIS was associated with higher BMI and more depressive symptoms. However, only women showed a significant relationship between WBIS and a history of weight cycling.

WBIS was associated with more severe eating pathology. WBIS was associated with more OBEs and SBEs, as well as higher scores on the Eating Concern, Shape Concern, Weight Concern subscales and Global EDE-Q in both men and women. However, only women showed a significant relationship between WBIS and purging behaviors and WBIS and the EDE Dietary Restraint subscale. The relationships between WBIS and all measures remained significant, controlling for BMI and BDI.

Depressive symptoms were associated with increased eating pathology in men and women (e.g. OBE, eating/weight/shape concern). However, only women reported a significant relationship between depressive symptoms and rates of SBE, rates of purging, and Dietary Restraint (Table 2). Among female participants, when controlling for WBIS, there was a significant relationship between depressive symptoms and SBE ($r = .18, p < .001$), Eating Concern ($r = .20, p < .001$), Shape Concern ($r = .12, p = .008$), Weight Concern ($r = .13, p = .001$) and Global EDE-Q ($r = .15, p = .001$). However, among male participants, controlling for WBIS, a significant relationship between depressive symptoms and Eating Concern ($r = .22, p = .04$) and Weight Concern ($r = .22, p = .04$) was observed, but depression was not associated with any behavioral measures of eating pathology (OBE, SBE, Purging) or Global EDE-Q. When controlling for both WBIS and BMI, the

relationship between depressive symptoms and all measures of eating pathology for men were non-significant, whereas for women, all but Dietary Restraint remained significant.

Fisher's R-to-Z

Using Fisher's r-to-z to compare correlation coefficients, we examined whether the relationship between weight bias internalization and eating pathology differed for men and women. We found that the relationship between WBIS and Dietary Restraint was stronger for women ($z = 1.67$, $p = .049$, one-tailed) and the relationships between WBIS and OBEs ($z = -2.24$, $p = .013$, one-tailed) and WBIS and SBEs ($z = -2.92$, $p = .002$, one-tailed) were stronger for men. We did not find significant gender differences in the magnitude of relationships between WBIS and age first overweight, weight cycling, purging, Eating Concern, Shape Concern, Weight Concern, or Global EDE-Q. However, we did find significant differences for WBIS and BDI ($z = 2.02$, $p = .022$, one-tailed) and WBIS and BMI ($z = -2.34$, $p = .009$, one-tailed), such that the relationship between WBIS and depression symptoms was stronger in women, whereas the relationship between WBIS and BMI was stronger for men.

Next, we used Fisher's r-to-z to compare the relationship between depressive symptoms and other variables in men and women. We found that the relationship between depressive symptoms and BMI ($z = -1.57$, $p = .046$, one-tailed) was stronger in men. There were no significant differences in the relationship between depression and other measures, including eating pathology variables, in men and women.

Discussion

This study explored gender differences in weight bias internalization and eating pathology. As expected, we found that weight bias internalization is associated with greater psychological distress and eating pathology in overweight adults. This replicates prior studies showing higher rates of depression, body image disturbance, and pathological eating in overweight individuals who internalize weight biased attitudes (Pearl et al., 2013; Pearl et al., 2014; Schvey et al., 2013). Further, we found that despite similar rates of binge and purge episodes, overweight women reported stronger weight bias internalization and were more concerned with shape and weight than overweight men, which is consistent with prior work (Hilbert, de Zwaan, & Braehler, 2012).

Our findings extend prior literature by demonstrating that weight bias internalization is associated with eating pathology differently among women and men. We found that among women, weight bias internalization was most strongly associated with the cognitive and attitudinal features of an eating disorder, whereas among men, weight bias internalization was associated with behavioral features of an eating disorder (e.g. binge eating episodes). Specifically, in women, weight bias internalization was associated with restrictive eating and depressive symptoms more so than in men. However, in men, weight bias internalization was associated with higher BMI and more reported objective and subjective binge episodes than in women. This suggests that weight bias internalization in women both occurs at lower BMIs and with more influence on eating-related cognition, attitudes, and mood than in men.

Thus, we found substantial gender differences in the relationship between weight bias internalization and eating pathology in overweight men and women.

Higher rates of weight bias internalization in women could be due to either to (1) more exposure to weight-based stigmatization, or (2) more internalization of stigmatizing experiences. Interestingly, we found that correlates of eating pathology, such a history of weight cycling, were associated with greater weight bias internalization in women. Prior work has shown that weight cycling increases risk of adiposity and restrictive eating (Enriquez, Duncan, & Schur, 2013; Fairburn & Beglin, 1994; Fairburn et al., 1998; Foster, Sarwer, & Wadden, 1997), which in turn may contribute to increased risk of internalization of weight bias, potentially through greater exposure to stigmatizing experiences. An important area for future research is examining the developmental trajectories associated with stigmatizing experiences, the internalization of weight bias, and the onset of restrained eating and eating pathology, and whether these trajectories are different for men and women.

Future research should examine whether some individuals are more vulnerable to the internalization of weight bias. If the relationship between weight bias internalization and eating pathology in women is due to more exposure to weight-based discrimination, then these results have important social justice implications and may bolster support for policies that prohibit weight discrimination, especially if it disproportionately affects women. In contrast, if the relationship between weight bias internalization and eating pathology in women is due to a higher rate of internalization of the same number of stigmatizing experiences, then these results may be clinically useful and allow for assessment and intervention with those who are more likely to internalize weight bias. Indeed, our finding that women who internalize weight bias report more concurrent depressive symptoms than men warrants further investigation into symptom trajectories and opportunities for intervention.

This study has limitations. First, this study uses a cross-sectional design, limiting conclusions about causation. However, our analyses highlight meaningful relationships between variables that warrant future research. In addition, this study is limited by online survey tools, which may have biased the sample to include individuals who have access to a computer, who are likely to be recruited through Craigslist postings, and who had interest in completing a survey about health behaviors or eating. Nevertheless, prior work has found that internet-based recruitment is reliable (Gosling, Vazire, Srivastava, & John, 2004) and anonymous surveys increase reporting of eating disorder symptoms (Lavender & Anderson, 2009). Though we relied upon self-reported height and weight, previous research has reported very high correlations ($>.9$) between self-reported and measured BMI (Kuczmarski, Kuczmarski, & Najjar, 2001; Stunkard & Albaum, 1981), supporting the suitability of these data. Further, though our sample is large, it has a greater number of women than men, potentially limiting the power of analyses in men. Despite this, our analyses that compare statistical relationships in men vs. women (Fisher r -to- z) account for these differences by weighting each correlation coefficient based on sample size. Finally, the present study measures self-reported gender differences and not differences in gender roles or gender identity. Future research could examine whether differences in sexual orientation and personality traits (e.g., femininity and masculinity) contribute to gender differences in thin

ideals, muscular ideals, and weight bias internalization, and whether these differences are associated with eating pathology.

Despite its limitations, this study has several strengths. The study included a large sample of overweight men and women, which allowed for novel analysis of gender differences in weight bias internalization and eating pathology. These differences were not previously observed during the development of the WBIS due to a smaller, predominantly female sample, which limited power to assess gender differences (Durso & Latner, 2008). Our sample has improved power to detect gender differences due to its large size, despite that our sample also includes more women than men. The gender differences observed in our sample suggest that gender differences in weight bias internalization are important to consideration in future research. In addition, the use of anonymous surveys may have reduced the amount of self-report bias that is typically present in interview-based assessments of eating pathology (Lavender & Anderson, 2009). This may have produced a more robust measure of eating pathology in the present sample.

Our results have important clinical implications. Our findings highlight the lack of adequate clinical guidelines for identifying and treating weight bias internalization in overweight individuals, which stands in stark contrast to well developed interventions to challenge body image disturbances in normal weight or underweight women and developing body image interventions in men. Knowledge about gender differences in the clinical presentation of body image disturbances and eating pathology in overweight individuals may allow for the development of targeted treatment that includes specific weight bias and body image-related psycho-education. Future treatment development may benefit from targeting weight bias internalization as part of therapeutic interventions, both for individuals with and without eating disorder symptoms.

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Table 1

Gender Differences in Demographic and Eating-Related Characteristics

	Overall	Women	Men	F-value or χ^2	Effect size (η^2)
N	644	566	98		
Age	37.73 (12.40)	37.76 (12.19)	37.55 (13.62)	0.00	.000
Body Mass Index	34.51 (7.58)	34.60 (7.85)	33.94 (5.84)	0.74	.001
Age first overweight	17.20 (10.24)	17.16 (10.27)	17.36 (10.15)	0.00	.000
Weight cycling	2.42 (.96)	2.45 (.97)	2.25 (.90)	5.27*	.016
OBE ¹	3.04 (5.48)	2.96 (5.39)	3.56 (5.96)	1.15	.000
SBE ²	3.75 (5.85)	3.61 (5.62)	4.50 (7.02)	1.93	.004
Purging	2.48 (8.40)	2.62 (8.86)	1.75 (4.95)	0.71	.001
EDE-Restraint	2.38 (1.55)	2.39 (1.55)	2.32 (1.50)	0.01	.000
EDE-Eating	2.19 (1.57)	2.23 (1.57)	2.00 (1.54)	1.63	.003
EDE-Shape	4.28 (1.45)	4.36 (1.41)	3.84 (1.60)	9.19**	.017
EDE-Weight	3.70 (1.33)	3.79 (1.28)	3.23 (1.52)	11.79**	.034
Global EDE	3.14 (1.22)	3.19 (1.20)	2.85 (1.30)	14.55**	.022
BDI ⁴	15.92 (10.34)	15.87 (10.08)	16.23 (11.79)	0.00	.000
WBIS ⁵	4.74 (1.39)	4.81 (1.37)	4.33 (1.43)	8.48*	.016

¹ OBE- Objective Binge Episode, past 30 days;² SBE- Subjective Binge Episode, past 30 days;³ EDE-Q- Eating Disorder Examination Questionnaire Total score;⁴ BDI – Beck Depression Inventory;⁵ WBIS- Weight Bias Internalization Scale;**
p < .001;*
p < .05

Table 2

Correlation Between Weight Bias Internalization and Eating Pathology

Women (n=566)													
	WBIS	BMI	BDI	Age First Overweight	Weight Cycling	OBE	SBE	Purging	EDE- Restraint	EDE- Eating	EDE- Shape	EDE- Weight	EDE- Total
WBIS	--	.14**	.61**	-.12* [†]	.20**	.28**	.26**	.14**	.35**	.56**	.71**	.66**	.66**
BMI	.38**	--	.20**	-.26**	.36**	.09*	.07	-.04	.01	.12**	.10*	.08	.09*
BDI	.45**	.34**	--	-.06	.21**	.34**	.31**	.22**	.19**	.48**	.50**	.49**	.49**
Age First Overweight	-.06	-.12	-.17	--	-.22**	-.04	-.03	-.02	-.04	-.07	-.06	-.09*	-.08
Weight Cycling	.19	.29**	.22* [†]	-.19	--	.19**	.22**	.07	.09*	.23**	.19**	.19**	.22**
OBE	.49**	.14	.23**	-.03	.21*	--	.94**	.28**	.14**	.50**	.30**	.31**	.38**
SBE	.53**	.15	.18	-.03	.26**	.82**	--	.32**	.13**	.51**	.31**	.32**	.39**
Purging	.09	.05	.11	-.09	.15	.12	.12	--	.23**	.28**	.21**	.22**	.29**
EDE-Restraint	.18	-.02	.06	-.10	.22*	.15	.12	.29**	--	.42**	.38**	.36**	.69**
EDE-Eating	.57**	.28**	.42**	-.19	.43**	.59**	.54**	.24**	.45**	--	.63**	.65**	.84**
EDE-Shape	.74**	.26*	.39**	-.08	.24*	.46**	.43**	.02	.46**	.70**	--	.85**	.86**
EDE-Weight	.68**	.36**	.45**	-.11	.25*	.45**	.40**	.12	.44**	.73**	.91**	--	.85**
Global EDE	.64**	.26*	.39**	-.14	.34**	.49**	.45**	.20*	.69**	.86**	.91**	.91**	--

Values to the top-right of the diagonal are correlation coefficients for female participants; values to the lower-left represent correlation coefficients among male participants.

WBIS = Weight Bias Internalization Scale; BMI = Body Mass Index; BDI = Beck Depression Inventory; OBE = Objective Binge Episode, SBE = Subjective Binge Episode, Purging = combined frequency of vomiting, laxative use, and diuretic use; EDE = Eating Disorder Examination Questionnaire (with subscales for Restraint, Eating, Shape, and Weight).

**
p < .001;

*
p < .05;

[†] did not survive Bonferroni-Holm correction.

All values are Pearson's correlations, except weight cycling is a Spearman's correlation because it is an ordinal variable.