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Examining Weight Bias and Loss-of-Control Eating among Individuals Seeking Bariatric Surgery

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Abstract

Objective: Externalized weight bias (EWB), directed towards others, and internalized weight bias (IWB), directed towards the self, are thought to exacerbate obesity and disordered eating and may be important factors to assess and understand among individuals seeking bariatric surgery. This study examined clinical correlates (pre-surgical BMI, depressive symptoms, weight self-efficacy, and shape/weight overvaluation) of both EWB and IWB among individuals presenting for bariatric surgery with and without regular loss-of-control eating (LOC-eating).

Methods: 316 adults presenting for bariatric surgery completed established self-report measures to assess EWB, IWB, depressive symptoms, weight self-efficacy and core symptoms of disordered eating including LOC-eating and overvaluation of shape/weight.

Results: IWB and EWB were not associated with pre-surgical BMI, age, or sex, but were both significantly higher among White than non-White participants. Adjusting for race, IWB and EWB were significantly associated with greater eating-disorder psychopathology and depressive symptoms and with less weight related self-efficacy. Participants who endorsed regular LOC-eating (53.5% of sample) endorsed significantly lower weight self-efficacy and higher IWB, EWB, depressive symptoms, and overvaluation of shape/weight.

Conclusions: Findings suggest that regular LOC-eating is common among individuals seeking bariatric surgery and associated with a range of heightened eating-disorder and psychosocial concerns including both IWB and EWB. Future research exploring the longitudinal significance of the relationship between these two forms of weight bias and LOC-eating is indicated.

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Keywords

weight bias; bariatric surgery; loss-of-control eating; eating disorders; obesity

Introduction

Weight-related bias is pervasive and linked to detrimental psychosocial sequalae that can undermine health, psychological well-being, and weight loss efforts for individuals with obesity, including those who seek and undergo bariatric surgery (1, 2). Such biases can be experienced and perpetuated in two ways: 1) externalized weight bias (EWB) defined as externally directing negative attitudes and biases towards others with overweight and obesity, and 2) internalized weight bias (IWB) defined as internalizing publicly held stigmatizing weight biases as salient to oneself (3). Individuals with obesity report frequent and widespread experiences of weight stigma and discrimination (4–6); such experiences are associated with negative medical (7) and psychological sequalae (8). Importantly, research has suggested that experiences of weight bias may lead some persons to both externally project and internally accept negative weight-biased attitudes, thereby experiencing elevated EWB and IWB (9). Individuals seeking bariatric surgery are thus vulnerable to the negative sequelae of both EWB and IWB because of their obesity diagnosis and the subsequent greater frequency and magnitude of weight-related stigma and discrimination (8, 10, 11).

Growing evidence suggests that weight stigma may increase risk of behaviors that promote and exacerbate obesity (12, 13). Although there is mixed evidence with regard to associations between IWB and body mass index (BMI), a systematic review of mediation studies conducted with individuals with obesity suggests that weight stigma may, when mediated by elevated psychological symptoms, be a driver of weight gain and hinder weight loss efforts (14). This proposed relationship is directly relevant and critical for the bariatric surgery population who are at increased risk for psychopathology including lower self-esteem, elevated depressive and anxiety symptoms, and loss-of-control eating (LOC-eating) (15, 16). Specifically, among individuals seeking bariatric surgery, histories of weight-based teasing (8) and greater IWB is associated significantly with greater depressive (2), anxiety, and eating-disorder symptoms (17). Much less is known about these relationships with EWB, especially with respect to the bariatric surgery patient population; however, among treatment seeking patients with obesity, EWB was related significantly to depression and eating psychopathology, regardless of binge eating diagnostic status (18).

IWB is also strongly linked to self-efficacy, or the confidence in one’s ability to perform and succeed in challenging situations; self-efficacy is a factor central to long-term behavior change and is associated with weight loss and quality of life following bariatric surgery (19). The process model of self-stigma theorizes the link between self-efficacy and IWB and EWB with the following core components: i) maladaptive cognitive processes related to self-stigma, ii) mediating processes influencing low self-esteem and self-efficacy, and iii) subsequent negative effects on goal related behavior with prior research documenting that self-directed weight stigma can interfere with adaptive physical activity and eating behaviors (13, 20, 21). Among individuals with overweight and obesity, greater IWB predicted lower

core self-evaluation (22) and relatedly, is correlated with psychological distress and weight and eating-related behaviors including frequency of LOC- eating (23, 24).

Post-surgical LOC-eating, a core feature of binge eating, has emerged as an important clinical variable within the bariatric literature; LOC-eating is common among individuals presenting for bariatric surgery and, post-operatively, is associated long-term negative prognostic significance including poorer outcomes and weight gain over time (25, 26). LOC-eating is purported to be a key factor associated with the degree of clinical distress with overeating and obesity which, in turn, likely contributes to both IWB and EWB (27, 28). Previous research has highlighted important distinctions regarding severity of pathology among individuals seeking bariatric surgery with and without regular LOC-eating, suggesting associations between LOC-eating and heightened psychopathology (29, 30). Thus, this study sought to understand further these group differences and elucidate the clinical relationships pertaining to LOC-eating, EWB and IWB and the following clinical correlates: pre-surgical BMI, depressive symptoms, weight-related self-efficacy and eating-disorder psychopathology. This is the first study to our knowledge to examine both EWB and IWB among patients presenting for bariatric surgery. Both constructs have been consistently and strongly associated with binge-eating symptoms in non-surgical samples (18, 31–34), and therefore, we hypothesized that patients with regular LOC-eating would endorse higher levels of both EWB and IWB compared to those who did not endorse regular LOC-eating. We also hypothesized that both weight bias variables (EWB and IWB) would be associated positively with pre-surgical BMI, depressive symptoms, and eating-disorder psychopathology, and inversely associated with weight-related self-efficacy.

Methods

Participants

The participant group was comprised of 316 adults seeking bariatric surgery at Ascension St. Vincent Bariatric Center. Participants were recruited during a scheduled appointment near the end of their participation in a 3–6 month medically supervised weight management program consisting of monthly visits required by insurance carriers to prepare for bariatric surgery. Eligible participants were adults (18 and older) seeking bariatric surgery at Ascension St. Vincent's bariatric surgery program. This study received approval from the Ascension St. Vincent Hospital Institutional Review Boards and all participants provided written informed consent prior to beginning study procedures.

The majority of participants were female (n = 261, 82.6%) and White, non-Hispanic (n = 265, 83.9%) with a mean age of 42.8 years (SD = 11.0). The majority completed at least some college (57.8%). The mean pre-surgical body mass index (BMI) was 49.5 kg/m^2 (SD = 9.4).

Measures

Weight Bias Internalization Scale—The Weight Bias Internalization Scale (WBIS) is an 11-item self-report measure that determines the degree to which respondents believe negative stereotypes and self-statements about overweight or obesity apply to themselves

(32). Previous research suggests removing the first item, “I feel I am just as competent as anyone,” to improve internal consistency (17, 35), and a more recent confirmatory factor analysis of the 10-item version, conducted with data from 253 individuals presenting for bariatric surgery, indicated acceptable fit (36). Thus, we used the 10-item version of the WBIS in this study. Respondents rate their agreement with each item on a 7-point scale (1 = “strongly disagree” to 7 = “strongly agree”). A higher score indicates greater internalized weight bias. In the present study, Cronbach’s alpha was good (α = .86).

The Attitudes Towards Obese Person’s Questionnaire—The Attitudes Towards Obese Person’s Questionnaire (ATOP) is a 20-item self-report measure that assesses an individual’s overall attitude towards having obesity (37). Respondents rate each item using a 6-choice Likert scale (range 0–120) and a higher total score reflects more positive attitudes towards obesity. The measure has been validated for use with adult populations and among a sample of adults with overweight or obesity, reliability was acceptable (α = .76) (38). Cronbach’s alpha in the present study was good (α = .80).

The Patient Health Questionnaire—The Patient Health Questionnaire (PHQ-9) is a widely used 9-item self-report measure that assesses depressive symptoms (39). Responses range from a score of 0 (not at all) to 3 (nearly every day) per question, with a total range of 0–27. Higher scores are associated with greater depressive symptoms. Cronbach’s alpha in the present study was good (α = .85).

The Weight Efficacy Lifestyle Questionnaire—The Weight Efficacy Lifestyle Questionnaire (WEL) is a 20-item self-report measure that asks respondents to rate their confidence to resist eating in challenging circumstances (range 0–9) (40). WEL offers a total score and five subscale scores, each of which is related to situations regarding food: negative emotions, availability, social pressure, physical discomfort, and positive activities. A higher total score suggests greater confidence to resist eating in these situations. Cronbach’s alpha in the present study was excellent (α = .96).

The Eating Disorder Examination Questionnaire-Brief— The Eating Disorder Examination Questionnaire-Brief (EDE-Q-7) (41) is a self-report measure that assesses the core behavioral symptoms (e.g., LOC- eating) and associated eating-disorder psychopathology. The briefed-Q-7 (41) version assessed specific behavioral and cognitive aspects of eating-disorder psychopathology that have demonstrated clinical and prognostic significance in patients following bariatric surgery: LOC-eating frequency (25, 29) and overvaluation of shape and weight (when shape and weight is viewed as a core aspect of one’s identity; (42)). For the purposes of analysis, LOC-eating frequency (a variable with a total of 4 forced choice response options) was dichotomized by regular LOC-eating (combining the following two response options: ‘sometimes’ (once per week) and ‘almost always’ (almost daily) to reflect at least one episode per week) and non-regular LOC-eating (combining the remaining two response options: ‘never’ and ‘rarely’ (once per month to reflect one or fewer episodes per month) and the two groups were thus differentiated by at least one episode. In several psychometric comparison analyses, this specific EDE-Q-7

version has received consistent support and found to be superior to the original longer version (41, 43, 44). Higher scores reflect greater eating-disorder psychopathology.

Weight Variables—Participants provided self-reported height and weight which were used to calculate BMI. However, participants had been weighed as a part of their program participation just before they were approached about study participation. Previous research suggests that the bariatric patient population is generally quite accurate in terms of these self-reported measurements both pre and post-surgery (45, 46) and because they had just received feedback about their weight at their medical appointment, we expect these self-reports to be highly accurate.

Statistical Analyses

Data were analyzed using SPSS version 26 and the *p* value of <.05 was considered statistically significant. Descriptive statistics were used to summarize the sample demographics. Partial correlations, adjusting for race, were used to examine the linear relationships between variables. Independent samples *t*-test and analysis of covariance (ANCOVA) were used to test for mean group differences between participants with and without regular LOC-eating with respect to the EWB, IWB, weight efficacy, depressive symptoms, and overvaluation of weight/shape while adjusting for potential confounds (age and pre-surgical BMI). The cut-point of at least once weekly LOC-eating has been linked to significantly poorer outcomes (25) and is the cut-point used for eating disorders in the Diagnostic and Statistical Manual of Mental Disorders- 5th edition (47).

Results

Across the overall participant group (N= 316), the mean WBIS score was 4.61 (SD = 1.25). 39.4% (n = 122) endorsed an average WBIS item score of ≥5 out of a possible 7, suggesting that approximately 2/5 of the participant group experienced relatively high levels of IWB. The mean ATOP score was 60.04 (SD = 17.20). There were no significant sex differences observed for either the ATOP (p = .75), or the WBIS, (p = .10). Mean WBIS score was not associated significantly with age (p = .21) or pre-surgical BMI (p = .73) but was significantly higher among White participants (M = 4.71, SD = 1.22) compared with non-White participants (M = 4.02, SD = 1.23), $t(307) = -3.58$, p <.001. Likewise, mean ATOP score was also not associated significantly with age (p = .07) or pre-surgical BMI (p = .27) but was significantly associated with race with White participants endorsing significantly more negative attitudes about obesity compared with non-White participants, $t(305)$= 3.74, p <.001.

Partial correlations, adjusting for race, were used to summarize the linear relationship between the two weight bias variables, WBIS and ATOP, and clinical variables (see Table 1). Overall, the WBIS and ATOP total scores were significantly associated with greater eating-disorder psychopathology and depressive symptoms, and less self-efficacy regarding weight control. Across these variables, the pattern of findings indicated larger effects for the WBIS compared with the ATOP.

With regard to LOC-eating endorsement in the past month, 14.2% (n = 45) denied experiencing any LOC-eating, 31.3% (n = 99) reported an episode occurred only once, 45.6% (n = 144) reported an episode occurred once per week, and 7.9% (n = 25) reported almost daily episodes. Thus, 53.5% (n = 169) of the participant group endorsed regular LOC eating defined as episodes occurring at least once weekly. Table 2 summarizes the group differences between participants with regular LOC-eating (at least once weekly) and non-regular LOC eating (once per month or less). There were no significant group differences observed across sex (p = .95) or race (p = .76). Pre-surgical BMI was associated at a trend level; participants with regular LOC-eating had a marginally higher BMI (M = 48.46, SD = 9.58) compared with participants who endorsed non-regular LOC-eating (M = 46.27, SD = 11.68; p = .054). Participants with regular LOC-eating were also significantly younger in age (M = 42.77, SD = 11.05) than those with non-regular LOC-eating (M = 45.29, SD = 11.17; p < .05). Adjusting for age and pre-surgical BMI did not attenuate the group differences.

Discussion

Recent research efforts have highlighted negative associations between weight bias and negative obesity-related health outcomes (1, 7, 12). Findings of the present study add to this emerging literature in several important ways and highlight the potential importance of addressing and treating weight bias. To our knowledge, this is the first study to assess *both* externalized weight bias attitudes (EWB) and internalized weight bias (IWB) and psychosocial correlates among individuals seeking bariatric surgery. Overall, findings suggest that both weight bias constructs are associated with greater depressive symptoms, less weight self-efficacy, and greater eating-disorder psychopathology across major constructs, including LOC-eating frequency, and overvaluation of shape/weight. Consistent with previous research, particularly among the BED literature, greater frequency and severity of LOC-eating is suggestive of greater overall psychopathology including significantly more negative weight bias attitudes (23, 48). Further, among treatment seeking patients with obesity, IWB and EWB are associated with greater severity of psychopathology including depressive and disordered eating symptoms (34).

The mean WBIS score of 4.61 in the present sample was consistent with a mean score of 4.54 reported in prior research with pre-operative bariatric patients (2). Similarly, the overall mean ATOP score of 60.04 in this study is comparable to previous research among females with obesity (M = 60.00; SD = 15.48), females with BED (M = 59.62, SD = 19.93) (28), and men and women seeking treatment for obesity (M = 65.68, SD = 19.43) (18). These findings suggest that overall, patients presenting for bariatric surgery are at risk for relatively high levels of both IWB and EWB; and importantly, individuals experiencing regular LOC-eating endorsed significantly higher IWB and EWB compared to those with non-regular LOC-eating. With regard to sociodemographic variables, no significant differences were observed in sociodemographic variables (age, sex, pre-surgical BMI) for either weight bias construct (externalized or internalized weight bias); these findings suggest weight bias exists across persons of varied sociodemographic characteristics and that our clinical findings are unlikely confounded by differences in these domains.

The observed significant differences with regard to race, with white individuals endorsing significantly higher levels of IWB and EWB compared with non-white individuals, adds to the growing body of research documenting racial differences in endorsement and experience of weight bias (18, 24, 49). However, these findings should be interpreted with caution as the majority of this participant group was comprised of white women. Moreover, research suggests that weight stigma does present across racial groups (7) although may be experienced, interpreted, or internalized differently in non-white populations. Thus, future research calls for greater diversity within the non-white/minority category to help clarify the intersectionality between multiple categories, e.g., weight, racial, and gendered stigma (50, 51).

Our empirical findings add to the literature base linking LOC-eating with EWB and IWB (18, 24, 34). Findings supported the hypothesis that individuals with regular LOC-eating (at least one episode per week in the last month), would endorse significantly greater EWB and IWB compared to those who did not endorse regular LOC-eating. More research is needed to conclude the long-term prognostic significance of weight bias constructs with respect to bariatric surgery outcomes. While some research suggests that only *post*operative, rather than preoperative, LOC-eating is predictive of poorer bariatric surgical outcomes (25, 26), the contribution of IWB and EWB to these relationships remains largely understudied. To our knowledge, only one study has examined IWB longitudinally: pre-operative IWB was associated with significantly less weight loss at 1-year post-operative follow-up, suggesting the potential prognostic value of IWB (2). As EWB and IWB can be experienced across weight status (52), it cannot be assumed that undergoing bariatric surgery and associated weight loss will resolve the negative sequalae.

Findings also supported our hypothesis that both weight-bias constructs - IWB and EWB - would be associated positively with depressive symptoms, weight-related self-efficacy, and domains of eating-disorder psychopathology. Results were significant for both constructs, but it is notable that the pattern of correlations and group differences demonstrated a larger effect with regard to IWB compared with EWB. Lent et al. (2014) also observed a significant positive correlation between pre-operative depressive symptoms and IWB. Among individuals seeking bariatric surgery, emotion dysregulation has been identified as a full mediator in the association between IWB and non-normative eating behaviors, including eating in the absence of hunger which is a behavioral indicator of LOC-eating (53). To further clarify the relationships between these variables, models testing depression and weight related self-efficacy as mediators between IWB and LOC-eating and EWB and LOC-eating would expand upon the findings of the present study. Possible pathways between weight bias and weight loss challenges may also include maladaptive coping strategies (e.g., problematic eating behaviors as a response for dealing with experienced negative stigma), less physical activity due to social avoidance, and increased stress response. The significant group differences in psychopathology between those with and without regular LOC-eating suggests that the presence of LOC-eating is clinically meaningful and should prompt additional assessment and treatment consideration.

The majority of our participant group identified as female and White and though this demographic overrepresentation is common across the bariatric literature (54), findings may

not generalize more broadly or to post-surgical patients. Further, the significant racial group differences should be interpreted with caution and in context of these demographic limitations. The study was also limited by self-reported height and weight, which might have resulted in an underestimation (55), although other research has demonstrated that individuals seeking bariatric surgery are generally accurate reporters of these metrics (45, 46, 56) and patients had just been weighed at a presurgical weight management visit directly before study participation. Further, it should not be overlooked that participants were recruited for this study after attending approximately four insurance required monthly psychoeducational groups to prepare for surgery. The material presented in the groups did not address weight bias directly, however participation in these preparatory groups may have influenced study responses, e.g., participants may have had more awareness of their eating and thought patterns and/or been more biased by social desirability. We were also unable to account for the presence or potential effects of pharmacological treatments as our study recruitment, which aimed for broad generalizability to bariatric centers, did not exclude participants who were taking psychiatric medication. Moreover, it is well established that consideration and statistical adjustment for treatment and medication effects in naturalistic studies is extremely complex and it often precludes any clear inferences (57). In naturalistic studies, severity drives treatment and treatments are often unrelated to outcomes (57, 58). Finally, causal interpretations of the data were not possible due to the study's cross-sectional analytic design. With growing evidence acknowledging the clinical relevance of weight bias and stigma among the bariatric surgery patient population (17, 24, 53), further longitudinal examination of these constructs is warranted to assess changes in EWB and IWB and related clinical correlates.

Weight stigma has been proposed as a possible mechanism contributing to the obesity epidemic because of the mounting evidence linking it to poorer health behaviors, increased psychosocial stress, and the trickle-down socioeconomic effects correlated with weight discrimination (52). Much of the extant literature focuses on IWB and the current study fills a gap by presenting findings for both IWB and EWB. Previous researchers have suggested the importance of offering pre-operative interventions addressing weight bias for individuals seeking bariatric surgery (59). The present findings align with this clinical recommendation; patients with regular LOC-eating may have relatively higher IWB and EWB and thus be appropriate candidates for clinical intervention (23). The core qualities that EWB and IWB negatively influence, including self-view and self-efficacy, may be important for making and maintaining behavior changes associated with surgical preparation, post-surgical success, and health outcomes (1, 60, 61). Importantly, however, pre-surgical treatments targeting weight biases should not be mandatory given the present lack of evidence examining the prognostic significance of these constructs, and this is an important direction for future research.

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All procedures performed in the study were in accordance with the ethical standards of the national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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Table 1.

Partial correlations of weight bias variables, pre-surgical BMI, depression, weight efficacy, and eating psychopathology, adjusting for race

	WBIS	ATOP
Pre-surgical BMI	.03	.08
PHQ-9 total	.50***	−.19**
WEL total	−.29***	.19**
LOC-eating Frequency	.29***	−.17*
LOC-eating Distress	.37***	−.08
Overvaluation Weight/Shape	.56***	−.31***

Note. WBIS = Weight Bias Internalization Scale; ATOP = Attitudes Towards Obese People; PHQ-9 = Patient Health Questionnaire – 9 item version; WEL = Weight Efficacy Lifestyle Questionnaire; EDE-Q = Eating Disorder Examination Questionnaire - Brief; LOC-eating = loss-of-control eating

* $p < .05$

** $p < .01$

*** $p < .001$

Table 2.

Means and standard deviations of weight bias and clinical variables and examination of group differences (≥ weekly LOC-eating versus ≤ monthly LOC-eating)

	Regular LOC- eating ≥ weekly *n* = 169	**Non-regular LOC-eating ≤ monthly *n* = 144**	**Independent samples *t*-test**	**Effect size**	**ANCOVA (Age; Pre-surgical BMI)**	**Effect size**
	M (SD)	***M (SD)***	***t***	**Cohen's *d***	***F***	**η^2**
ATOP	58.04 (16.71)	62.43 (17.30)	2.24 *	.26	4.48 *	.02
WBIS	4.88 (1.21)	4.28 (1.23)	−4.25 ***	.50	15.29 ***	.05
WEL	111.89 (31.18)	142.52 (30.35)	8.62 ***	1.00	71.29 ***	.20
PHQ-9	9.11 (5.65)	6.53 (5.20)	−4.16 ***	.48	15.31 ***	.05
EDE-Q Overvaluation	3.98 (1.77)	3.01 (2.03)	−4.40 ***	.50	17.23 ***	.05

Note. ATOP = Attitudes Towards Obese People; WBIS = Weight Bias Internalization Scale; WEL = Weight Efficacy Lifestyle Questionnaire; PHQ-9 = Patient Health Questionnaire – 9 item version; EDEQ-B = Eating Disorder Examination Questionnaire-Brief; LOC-eating = Loss-of-control eating

* $p<.05$;

** $p<.01$;

*** $p\leq.001$